Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Review of Regulatory Issues for New Wastewater Discharge

Technical Memorandum
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Author: Tetra Tech MPS

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Note: The information presented for the NPDES permits for each of the plants has not been updated since the original distribution of this report in April 2002. Some of these permits may have been updated in the interim.

Review of Regulatory Issues for New Wastewater Discharge

1. Objective

The objective of this memorandum is to identify issues and regulations associated with potential expansion of an existing, or construction of a new, wastewater treatment facility to serve the Detroit Water and Sewerage Department (DWSD) demands over the next 50 years. The specific goals of this task are to research and report water quality concerns in the Clinton River, Rouge River, and Detroit River watersheds at the present time as well as into the future, and to determine the regulations governing additional wastewater treatment plant discharges into these water bodies. Table A provides a list of the 25 suburban wastewater treatment plants surrounding greater Detroit and gives reasons as to why or why not specific facilities are included within this technical memorandum. Of these 25 suburban wastewater treatment plants, 22 are in the Detroit Wastewater Master Plan planning area. The other three plants are included as examples of plants that discharge to the Detroit River.

Table A. Other Wastewater Treatment Plants Surrounding Detroit.

FACILITY	INCLUDED	NOT INCLUDED	REASON
Algonac WWTP		✓	Discharges into the St. Clair River, which is outside of the report scope.
Americana Estates pf Casco WWTP		✓	A mobile home park – a non-municipal WWTP.
Ann Arbor WWTP		✓	Discharges into the Huron River, which is outside of the report scope.
Armada WWTP	✓		Discharges into the Clinton River as discussed in the report.
Commerce Twp WWTP		✓	Although discharges into Rouge River and fits report criteria, no NPDES permit was available to obtain discharge limits.
Holly Village WWTP		✓	Discharges into the Shiawassee River, which is outside of the report scope.
Marine City WWTP		✓	Discharges into the St. Clair River, which is outside of the report scope.
Memphis WW Stabilization Lagoons		✓	Discharges into the Belle River, which is outside of the report scope.
Milford WWTP		✓	Discharges into the Huron River, which is outside of the report scope.
Mt Clemens WWTP	✓		Discharges to the Clinton River as discussed in the report.
New Baltimore WWTP		✓	Discharges into Lake St. Clair, which is outside of the report scope.
Pontiac WWTP	✓		Discharges to the Clinton River as discussed in the report.
Richmond WWTP		✓	Discharges into the Milwaukee River (into Lake St. Clair), which is outside the report scope.
Romeo WWTP		✓	Although discharges into Clinton River and fits report criteria, no NPDES permit was available to obtain discharge limits.
Salem WWTP	✓		Discharges to the Rouge River as discussed in the report.
St. Clair County Sanitary Authority – East China WWTP		✓	Discharges into the St. Clair River, which is outside the report scope.
South Lyon WWTP		✓	Discharges into Inchwagh Lake (part of Huron River Watershed), which is outside the report scope.
Walled Lake / Novi WWTP	✓		Discharges to the Rouge River as discussed in the report.
Warren WWTP	✓		Discharges to the Clinton River as discussed in the report.
Wixom WWTP		✓	Discharges into the Huron River, which is outside of the report scope.
Wyandotte / Wayne County WWTP	✓		Discharges to the Detroit River as discussed in the report.
YCUA WWTP	✓		Discharges to the Rouge River as discussed in the report.
Grosse Ile Twp WWTP	✓		Added to list and discussed in the report as examples of plants discharging to the Detroit River.
South Huron Valley WWTP	✓		Added to list and discussed in the report as examples of plants discharging to the Detroit River.
Trenton WWTP	✓		Added to list and discussed in the report as examples of plants discharging to the Detroit River.

2. Approach

In order to meet the stated objective, the following tasks were completed:

- Establish current DWSD wastewater treatment flows and facility capacity.
- Determine expected future flows using existing population growth estimates.
- Identify other municipal wastewater treatment facilities discharging into the Rouge River, Clinton River, and Detroit River Watersheds. Obtain and highlight current NPDES discharge limits on these plants. Describe current plants' design capacities, average daily influents, and any available future expansion plans.
- Assess the viability of regional watersheds to accept additional wastewater treatment plant discharges.
- Evaluate all regulations that will impact or potentially impact the construction and operation of a new wastewater treatment facility in the region.
- Evaluate the specific effects of these regulations on the proposed facility, and the actions that will be required to ensure compliance.
- Identify additional issues of concern.

This study also includes an evaluation of existing DWSD software for calculation of indirect Industrial Pretreatment Program (IPP) discharge limitations. The evaluation focused on the ability of the software to be used to quickly determine the potential IPP local discharge limits within potential wastewater treatment facility service areas in the region, accounting for various design flows, receiving streams, and including updated water quality standards (assuming designated uses remain the same).

3. Wastewater Treatment Facilities And Flow Evaluation

3.1 Current DWSD Wastewater Treatment Plant

The Detroit Water and Sewerage Department (DWSD) serves approximately 77 communities, including Detroit. The 904-square mile service area serves approximately 3.2 million people. The population is concentrated in the City of Detroit, Wayne County, Southern Macomb County, and Southeastern Oakland County.

The Detroit Wastewater Treatment Plant (DWWTP) is located at 9300 West Jefferson Avenue in Detroit. According to DWSD, the current primary treatment capacity of the plant is 1,520 million gallons per day (mgd) with a secondary capacity of 930 mgd.

3.2 Expected Population Growth

The Southeast Michigan Council of Governments (SEMCOG) offers population estimates for the DWSD service area through the year 2030. The population estimates show net increases in Macomb and Oakland Counties and a net decrease in Wayne County. A majority of the population growth is expected to take place in central and northern Macomb County and northern and western Oakland County, which lie at the northern edge of the DWSD service area.

3.3 Other Wastewater Plants Within The DWSD Region

There are approximately 22 suburban wastewater treatment plants in communities surrounding greater Detroit. Nine of these plants have been chosen to illustrate NPDES permit discharge parameters into the water bodies of interest, with respect to this report – the Clinton River, the Rouge River, and the Detroit River. Table 1 illustrates these chosen municipal wastewater treatment facilities, as well as associated wastewater flows and design capacities. Details about each plant are also provided, including the receiving water body, the average receiving water flow, and the NPDES permit discharge limits.

Table 1. DWSD Service Area Major Wastewater Treatment Facilities.

WWTP Name	County	Current Avg. Wastewater Flow (mgd)	Design Capacity (mgd)	Receiving Stream	Watershed
Grosse Ile	Wayne	2	2	Trenton Channel	Detroit River
Mt. Clemens	Macomb	3.83	6	Clinton River	Clinton River
Oakland Co.-Walled Lake/Novi	Oakland	2.42	3.5	Walled Lake Branch	Rouge River
Pontiac	Oakland	12.4	25.5	Clinton River	Clinton River
South Huron Valley	Wayne	11	24	Detroit River	Detroit River
Trenton	Wayne	5	6.5	Elizabeth Park Canal	Detroit River
Warren	Macomb	23.18	36	Red Run Drain	Clinton River
Wayne Co.-Wyandotte	Wayne	50	125	Trenton Channel	Detroit River
Armada	Macomb	0.16	0.35	East Branch of Coon Creek	Clinton River
Salem Township	Washtenaw	0.013	0.05	Johnson Drain	Rouge River
Ypsilanti Community Utilities Authority	Washtenaw (Wayne Discharge)	21.5	28.9	Rouge River (Lower Branch)	Rouge River
TOTALS	**---**	**137.51**	**258.46**	**---**	**---**

3.3.1 Grosse Ile Township Wastewater Treatment Plant

The current average flow for the Grosse Ile Township Wastewater Treatment Plant is 2 mgd. The design flow is 2 mgd. There are no current plans for future plant expansions.

The Grosse Ile Treatment Plant discharges into the Trenton Channel of the Detroit River. The harmonic mean flow of the receiving water at the discharge point is 320 cubic feet per second (cfs). The current NPDES permit became effective in May 2000 and is scheduled to expire in October 2002. Table 2 summarized the modified discharge limits.

It should be noted that this plant is not within the DWSD planning area, but was added as an example of a plant that discharges to the Detroit River.

Table 2. Grosse Ile Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	---	469	751	---	lbs./day	25	40	---	mg/L	5x Weekly	Composite
Total Suspended Solids	---	563	844	---	lbs./day	30	45	---	mg/L	5x Weekly	Composite
Phosphorus (Total)	---	19	---	---	lbs. / day	1.0	---	---	mg/L	5x Weekly	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.5	mg/L	5x Weekly	Grab
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	5x Weekly	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	5x Weekly	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 4.0	mg/L	5x Weekly	Grab

3.3.2 Mount Clemens Wastewater Treatment Plant

Mount Clemens is continuing the separation of sewers to minimize the combined sewer overflow discharges from the system. Based on data available on the SEMCOG Internet site, the population in Mount Clemens decreased from 1990 to 2000, with further decreases projected. The existing wastewater treatment plant site is capable of supporting some expansion, and recent dialogue among the neighboring communities toward such has been initiated.

The Mount Clemens Treatment Plant discharges into the Clinton River. The harmonic mean flow of the receiving water at the discharge point is 330 cfs. The current average flow for the treatment plant is 3.83 mgd with a design flow of 6.0 mgd.

The current NPDES permit became effective in April 1997. Efforts were underway to renew the permit, as it expired in October 2000. The discharge limitations are summarized in Table 3.

.Table 3. Mount Clemens Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	*Monthly Ave*	*7-Day Ave*	*Daily Max*	*Units*	*Monthly Ave*	*7-Day Ave*	*Daily Max (/ Min)*	*Units*	*Frequency*	*Type*
$CBOD_5$	---	200	500	---	lbs./day	4.0	---	10	mg/L	Daily	Composite
Total Suspended Solids	---	1,000	1,500	---	lbs./day	20	30	---	mg/L	Daily	Composite
Nitrogen (NH_x)	5/1 – 9/30	25	100	---	lbs. / day	0.5	---	2.0	mg/L	Daily	Composite
	10/1 – 11/30	350	500	---	lbs. / day	7.0	---	10.0	mg/L	Weekly	Composite
	12/1 – 4/30	---	---	---	lbs. / day	11.0	---	---	mg/L	Weekly	Composite
Phosphorus (Total)	---	50	---	---	lbs. / day	1.0	---	---	mg/L	Daily	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	Daily	Grab
Dissolved Oxygen	5/1 – 9/30	---	---	---	---	---	---	* / 5.0	mg/L	Daily	Grab
	10/1 – 4/30	---	---	---	---	---	---	* / 6.0	mg/L	Daily	Grab
Mercury	---	---	---	---	---	0.0013	---	---	µg/L	Weekly	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.036	mg/L	Daily	Grab

3.3.3 Oakland County - Walled Lake/Novi Wastewater Treatment Plant

The discharge point for the Walled Lake/ Novi Wastewater Treatment Plant is located in the Walled Lake Branch, a tributary to the Middle Branch of the Rouge River. The harmonic mean flow of the receiving water at this discharge point is 1.1 cfs.

The current average flow for the Walled Lake/ Novi Wastewater Treatment Plant is 2.42 mgd. The design flow is 3.5 mgd. A plant expansion to a design flow of 7.5 mgd is planned for the future. The current NPDES permit became effective in the beginning of October 1996. Efforts were underway to renew the permit, as it expired in October 2000. The discharge limitations are summarized in Table 4.

Table 4. Walled Lake / Novi Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	5/1 – 11/30	117	292	---	lbs./day	4	---	10	mg/L	Daily	Composite
	12/1 – 3/31	379	584	---	lbs./day	13	---	20	mg/l	Daily	Composite
	4/1 - 4/30	321	496	---	lbs./day	11	---	17	mg/L	Daily	Composite
Total Suspended Solids	5/1 – 11/30	584	876	---	lbs./day	20	---	30	mg/L	Daily	Composite
	12/1 – 4/30	876	1314	---	lbs. / day	30	---	45	mg/L	Daily	Composite
Nitrogen (NH_x)	5/1 – 11/30	15	58	---	lbs. / day	0.5	---	2	mg/L	Daily	Composite
	12/1 – 3/31	---	257	---	lbs. / day	---	---	8.8	mg/L	Daily	Composite
	4/1 – 4/30	---	88	---	lbs. / day	---	---	3	mg/L	Daily	Composite
Phosphorus (Total)	---	---	---	2,684	lbs. / year	---	---	---	---	Daily	Composite
Mercury	---	---	---	---	---	0.0013	---	---	µg/L	2x Monthly	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
Chlorine (TRC)	---	---	---	---	---	---	---	0.036	mg/L	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	Daily	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 7.0	mg/L	Daily	Grab

3.3.4 Armada Wastewater Treatment Plant

The Armada Wastewater Treatment Plant discharges into the East Branch of Coon Creek in the Clinton River Watershed. The harmonic mean flow of the receiving water at the discharge point is 0.8 cfs.

The current average flow for the Armada treatment plant is 0.16 mgd. The design flow is 0.35 mgd. The current NPDES permit became effective in October 1995 and expired in October 2000. Table 5 summarizes the discharge limits.

Table 5. Armada Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	5/1 – 11/30	---	29	---	lbs./day	---	---	10	mg/L	5x Weekly	Composite
	12/1 – 3/31	73	100	---	lbs./day	25	40	---	mg/l	5x Weekly	Composite
	4/1 - 4/30	29	43	---	lbs./day	10	---	15	mg/L	5x Weekly	Composite
Total Suspended Solids	5/1 – 11/30	58	88	---	lbs./day	20	30	---	mg/L	5x Weekly	Composite
	12/1 – 4/30	88	131	---	lbs. / day	30	45	---	mg/L	5x Weekly	Composite
Nitrogen (NH_x)	5/1 – 9/30	6.7	10.2	---	lbs. / day	2.3	---	3.5	mg/L	5x Weekly	Composite
	10/1 – 11/30	14	29	---	lbs. / day	4.8	---	9.9	mg/L	5x Weekly	Composite
	12/1 – 3/31	30	---	---	lbs. / day	10.4	---	---	mg/L	5x Weekly	Composite
	4/1 – 4/30	19	---	---	lbs. / day	6.5	---	---	mg/L	5x Weekly	Composite
Phosphorus (Total)	---	3	---	---	lbs. / day	1.0	---	---	mg/L	Weekly	Composite
Amenable Cyanide	2.6	---	---	---	lbs. / day	5.2	---	---	µg/L	Weekly	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.036	mg/L	Daily	Grab
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	5x Weekly	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	5x Weekly	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 6.0	mg/L	5x Weekly	Grab

3.3.5 Salem Township Wastewater Treatment Plant

The wastewater treatment plant for Salem Township services 600 residents. It discharges into Johnson Drain, a tributary to the Upper Branch of the Rouge River. The current mean flow of the receiving water at the discharge point is unknown.

The current average flow for the Salem Township treatment plant is 0.013 mgd; its design flow is 0.05 mgd. The NPDES permit for the Salem Township Treatment Plant became effective in October 2001 and expires in October 2006. Table 6 summarizes the discharge limits.

Table 6. Salem Township Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	5/1 – 11/30	2.3	5.8	---	lbs./day	4.0	---	10	mg/L	5x Weekly	Composite
	12/1 – 4/30	15	23	---	lbs./day	25	40	---	mg/l	5x Weekly	Composite
Total Suspended Solids	5/1 – 11/30	12	18	---	lbs./day	20	30	---	mg/L	5x Weekly	Composite
	12/1 – 4/30	18	26	---	lbs. / day	30	45	---	mg/L	5x Weekly	Composite
Nitrogen (NH_x)	5/1 – 11/30	0.3	1.2	---	lbs. / day	0.5	---	2.0	mg/L	5x Weekly	Composite
	12/1 – 3/31	3.0	---	---	lbs. / day	5.1	---	---	mg/L	5x Weekly	Composite
	4/1 – 4/30	3.7	---	---	lbs. / day	6.4	---	---	mg/L	5x Weekly	Composite
Phosphorus (Total)	---	0.6	---	---	lbs. / day	1.0	---	---	mg/L	5x Weekly	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	5x Weekly	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	5x Weekly	Grab
Dissolved Oxygen	5/1 – 11/30	---	---	---	---	---	---	* / 8.0	mg/L	5x Weekly	Grab
	12/1 – 3/31	---	---	---	---	---	---	* / 7.0	mg/L	5x Weekly	Grab
	4/1 – 4/30	---	---	---	---	---	---	* / 4.0	mg/L	5x Weekly	Grab

3.3.6 Pontiac Wastewater Treatment Plant

As with Mount Clemens, the population in the City of Pontiac decreased between 1990 and 2000. Therefore, it is difficult to predict when the design capacity of the plant will be reached. The plant can be upgraded to handle the wet weather flow from the sanitary system. Land is available for the expansion of the current plant; however, there are currently no plans to expand the plant.

The treatment plant discharges into the Clinton River. The harmonic mean flow of the receiving water at the discharge point is 41 cfs. The current discharge flow from treatment plant is 12.4 mgd with a design flow of 25.5 mgd. The current NPDES permit became effective in January 1997. Efforts were underway to renew the permit, as it expired in October 2000. Table 7 summarizes the discharge limitations.

Table 7. Pontiac Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	5/1 – 11/30	850	2,100	---	lbs./day	4.0	---	10	mg/L	Daily	Composite
	12/1 – 3/31	4,000	6,000	---	lbs./day	19	---	28	mg/l	Daily	Composite
	4/1 – 4/30	2,100	3,200	---	lbs./day	10	---	15	mg/l	Daily	Composite
Total Suspended Solids	5/1 – 11/30	4,300	6,400	---	lbs./day	20	---	30	mg/L	Daily	Composite
	12/1 – 4/30	6,400	9,600	---	lbs. / day	30	---	45	mg/L	Daily	Composite
Nitrogen (NH_x)	5/1 – 11/30	110	430	---	lbs. / day	0.5	---	2.0	mg/L	Daily	Composite
	12/1 – 3/31	1,300	3,200	---	lbs. / day	6.2	---	15	mg/L	Daily	Composite
	4/1 – 4/30	1,100	1,800	---	lbs. / day	5.0	---	8.4	mg/L	Daily	Composite
Phosphorus (Total)	---	210	---	---	lbs. / day	1.0	---	---	mg/L	Daily	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
Chlorine (TRC)	---	---	---	---	---	---	---	0.038	mg/L	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	Daily	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 6.0	mg/L	Daily	Grab

3.3.7 South Huron Valley Utility Authority (SHVUA) Wastewater Treatment Plant

The SHVUA Wastewater Treatment Plant, located in Brownstown Township, has a current average flow of approximately 11 mgd. A recent expansion increased the plant's 12 mgd design flow to 24 mgd as of November 2000. Based on flow projections prepared by the member communities, all of the 24 mgd capacity has been contracted.

The treatment plant discharges into the Detroit River. The harmonic mean flow of the receiving water at the discharge point is 209,000 cfs. The current NPDES permit became effective in September 1998 and was scheduled to expire in October 2002. The discharge limitations as of April 2002 are summarized in Table 8.

It should be noted that this plant is not within the DWSD planning area, but was added as an example of a plant that discharges to the Detroit River.

Table 8. SHVUA Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	---	5,000	8,000	---	lbs./day	25	40	---	mg/L	Daily	Composite
Total Suspended Solids	---	6,000	9,000	---	lbs./day	30	45	---	mg/L	Daily	Composite
Phosphorus (Total)	---	200	---	---	lbs. / day	1.0	---	---	mg/L	Daily	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.038	mg/L	Daily	Grab
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	Daily	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 4.0	mg/L	Daily	Grab

3.3.8 Trenton Wastewater Treatment Plant

The Trenton Wastewater Treatment Plant has a current average flow of approximately 5 mgd and a design flow of 6.5 mgd. The population within the City limits has decreased from 1990 to 2000. The site can support additional expansion of the treatment plant, but no plans have been initiated.

The treatment plant discharges into the Elizabeth Park Canal, which is a tributary to the Detroit River. The harmonic mean flow of the receiving water at the discharge point is 320 cfs. The current NPDES permit became effective in November of 1998 and was scheduled to expire in October 2002. Table 9 illustrates the discharge limitations as of April 2002.

It should be noted that this plant is not within the DWSD planning area, but was added as an example of a plant that discharges to the Detroit River.

Table 9. Trenton Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	---	1,360	2,170	---	lbs./day	25	40	---	mg/L	Daily	Composite
Total Suspended Solids	---	1,630	2,440	---	lbs./day	30	45	---	mg/L	Daily	Composite
Phosphorus (Total)	---	54	---	---	lbs. / day	1.0	---	---	mg/L	Daily	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
Mercury	---	---	---	---	---	0.0013	---	---	µg/L	2x Monthly	Composite
PCBs	---	---	---	---	---	0.000026	---	---	µg/L	2x Monthly	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.038	mg/L	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	Daily	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 4.0	mg/L	Daily	Grab

3.3.9 Warren Wastewater Treatment Plant

The current average flow for the Warren Wastewater Treatment Plant is 23.18 mgd. The design flow is 36 mgd. Current land constraints would make any further expansion of this facility extremely difficult; thus, no future plant expansions are currently planned.

The treatment plant discharges into Red Run Drain, a tributary to the Clinton River. The harmonic mean flow of the receiving water at the discharge point is 77 cfs. The current NPDES permit became effective in January 1997. Efforts were underway to renew the permit, as it expired in October 2000. The discharge limitations are summarized in Table 10.

Table 10. Warren Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	5/1 – 11/30	2,000	5,000	---	lbs./day	4	---	10	mg/L	Daily	Composite
	12/1 – 3/31	4,500	6,500	---	lbs./day	9	---	13	mg/l	Daily	Composite
	4/1 - 4/30	2,000	3,500	---	lbs./day	4	---	7	mg/L	Daily	Composite
Total Suspended Solids	4/1 – 11/30	10,000	15,000	---	lbs./day	20	30	---	mg/L	Daily	Composite
	12/1 – 3/31	13,000	19,500	---	lbs. / day	26	39	---	mg/L	Daily	Composite
Nitrogen (NH_x)	5/1 – 11/30	250	1,000	---	lbs. / day	0.5	---	2.0	mg/L	Daily	Composite
	12/1 – 3/31	1,500	2,500	---	lbs. / day	3.0	---	5.0	mg/L	Daily	Composite
	4/1 – 4/30	1,350	1,750	---	lbs. / day	2.7	---	3.5	mg/L	Daily	Composite
Phosphorus (Total)	---	500	---	---	lbs. / day	1.0	---	---	mg/L	Daily	Composite
Copper	---	110	---	---	lbs. / day	36	---	---	µg/L	Daily	Composite
Silver	---	3	----	---	lbs. / day	1	---	20	µg/L	Daily	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9	SU	Daily	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 6.0	mg/L	Daily	Grab

3.3.10 Wayne County - Wyandotte Wastewater Treatment Plant

The Wyandotte Wastewater Treatment Plant has a separate sanitary sewer system. However, due to large volumes of inflow/ infiltration during wet weather periods, the plant was recently expanded in order to accommodate these wet weather flows, and thus reduce discharges from sanitary sewer overflows. Although the dry weather flow is significantly below the design flow, the plant cannot treat additional wastewater because the wet weather design flow would be exceeded. Land constraints prevent this site from any further plant expansion.

The treatment plant discharges into the Trenton Channel, a segment the Detroit River. The harmonic mean flow of the receiving water at the discharge point is 47,000 cfs.

The current discharge flow from treatment plant is 50 mgd with a design flow of 125 mgd. The current NPDES permit became effective April 1997 and was scheduled to expire in October 2001. The discharge limitations are summarized in Table 11.

Table 11. Wyandotte Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	---	26,000	42,000	---	lbs./day	25	40	---	mg/L	Daily	Composite
Total Suspended Solids	---	31,000	47,000	---	lbs./day	30	45	---	mg/L	Daily	Composite
Phosphorus (Total)	---	1,000	---	---	lbs. / day	1.0	---	---	mg/L	Daily	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.038	mg/L	Daily	Grab
Oil and Grease	---	---	---	---	---	10	---	---	µg/L	Daily	Grab
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
pH	---	---	---	---	---	---	---	6.0 / 9.0	SU	Daily	Grab
Dissolved Oxygen	---	---	---	---	---	---	---	* / 4.0	mg/L	Daily	Grab

3.3.11 Ypsilanti Community Utilities Authority (YCUA) Wastewater Treatment Plant

The current average flow from the YCUA Treatment Plant is 21.5 mgd. The design flow is 28.9 mgd. Expansion is currently underway, which will bring the design capacity to 58 mgd.

Although the plant itself is located outside of the DWSD service area, it handles wastewater from some communities within DWSD, including Plymouth, Northville, and Canton Townships, and discharges into the Lower Branch of the Rouge River. The harmonic mean flow of the receiving water at the discharge point is 2.8 cfs.

The current NPDES permit became effective in July 1997, and was scheduled to expire in October 2001. The discharge limitations are summarized in Table 12.

Table 12. YCUA Wastewater Treatment Plant NPDES Discharge Limits.

Parameter		Quantity				Quality				Analyses	
	Period	Monthly Ave	7-Day Ave	Daily Max	Units	Monthly Ave	7-Day Ave	Daily Max (/ Min)	Units	Frequency	Type
$CBOD_5$	4/1 – 10/31	1,940	4,840	---	lbs./day	4.0	---	10	mg/L	Daily	Composite
	11/1 – 11/30	3,390	5,330	---	lbs./day	7.0	---	11	mg/l	Daily	Composite
	12/1 – 3/31	4,840	7,260	---	lbs./day	10	---	15	mg/l	Daily	Composite
Total Suspended Solids	---	9,674	14,512	---	lbs./day	20	30	---	mg/L	Daily	Composite
Nitrogen (NH_x)	4/1 – 4/30	2,100	3,140	---	lbs. / day	6.2	---	6.5	mg/L	Daily	Composite
	5/1 – 10/31	242	967	---	lbs. / day	0.5	---	2.0	mg/L	Daily	Composite
	11/1 – 11/30	4,110	5,320	---	lbs. / day	8.5	---	11	mg/L	Daily	Composite
	12/1 – 3/31	5,220	8,220	---	lbs. / day	11	---	17	mg/L	Daily	Composite
Phosphorus (Total)	5/1 – 8/31	---	---	---	---	0.7	---	---	mg/L	Daily	Composite
	9/1 – 4/30	---	---	---	---	0.8	---	---	mg/L	Daily	Composite
Chlorine (TRC)	---	---	---	---	---	---	---	0.036	mg/L	Daily	Grab
Cadmium	---	---	---	---	---	0.9	---	16	µg/L	Weekly	Composite
Fecal Coliform	---	---	---	---	---	200	400	---	#/100 ml	Daily	Grab
pH	---	---	---	---	---	---	---	6.5 / 9.0	SU	Daily	Grab
Dissolved Oxygen	5/1 – 3/31	---	---	---	---	---	---	* / 6.0	mg/L	Daily	Grab
	4/1 – 4/30	---	---	---	---	---	---	* / 7.0	mg/L	Daily	Grab

3.4 Key Limit Summary

NPDES permit values as of April 2002 for three discharge parameters are illustrated in Table 13 for comparison purposes: $CBOD_5$, Total Suspended Solids (TSS) and Total Phosphorus. These key limits provide an indication as to the concentrations a wastewater treatment discharging into these watersheds may be expected to meet. Included with the wastewater treatment plant name is the design capacity.

Table 13. Summary of Key Limits and the associated watersheds.

	$CBOD_5$ (mg/L)	***TSS (mg/L)***	***Total Phosphorus (mg/L)***
Detroit River			
Grosse Ile (2 MGD)	25	30	1
South Huron Valley (24 MGD)	25	30	1
Trenton (6.5 MGD)	25	30	1
Wayne County – Wyandotte (125 MGD)	25	30	1
Clinton River			
Mt. Clemens (6 MGD)	4	20	1
Pontiac (26 MGD)	4	20	1
Warren (36 MGD)	4	20	1
Armada (0.35 MGD)	10	20	1
Rouge River			
Oakland County – Walled Lake / Novi (3.5 MGD)	4	20	.252*
Salem Township (0.11 MGD)	4	20	1
YCUA (29 MGD)	4	20	0.7

Average discharge flows (following each plant location) included for comparison purposes.
* - Value converted to mg/L for comparison purposes based on the permitted 2,684 lbs./yr., and the average flow of 3.5 MGD.

4. Regulatory Review And Evaluation

The research associated with this task included a review of the Federal Clean Water Act (CWA) and the Michigan Natural Resources and Environmental Protection Act for related material. Water quality regulations and policies are critical with regard to the siting of a new wastewater treatment facility in any watershed. Water Quality criteria are initially established by the United States Environmental Protection Agency (US EPA), and adopted by the Michigan Department of Environmental Quality (MDEQ) as water quality standards to help protect the receiving water designated uses, either as stated by the US EPA, or on a more stringent basis. Subsequently, discharge limitations for wastewater treatment plants are set under the NPDES Permit Program of the CWA. Pertinent policies that were reviewed include:

- Pollutant Total Maximum Daily Loads (TMDLs) as per part of the Water Quality Planning and Management regulation at 40 CFR Part 130(b) and Section 303(d) of the Federal Clean Water Act (CWA) and Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994.
- NPDES Permits and Water Management as per Part 31 of the Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994.
- Water Quality-Based Effluent Limit Development for Toxic Substances as per Part 8 of the Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994.
- Water Quality Guidance for the Great Lakes System as published by the Environmental Protection Agency on March 23, 1995.
- Wastewater Discharge Permits as per Part 21 of the Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994.
- Land Application of Biosolids as per Part 24 of the Michigan Natural Resources and Environmental Protection Act, Act 451 of 1994.
- The Federal Antidegredation Policy (40 CFR Parts 122, 123, 124 and 131) and Water Quality Planning and Management Regulation (40 CFR Part 130).
- Surface Water Quality Standards (WQS) and associated Designated Uses described in Part 4 of Part 31 Rules of the Natural Resources and Environmental Protection Act, Act 451 of 1994.
- Areas of Concern and Remedial Action Plans (RAP) through the Great Lakes Water Quality Agreement of 1978.
- Protection of species and preservation of critical habitats, designated as threatened or endangered as per the Federal Endangered Species Act (ESA); the Endangered Species Act of the State of Michigan, Part 365 of the Natural Resources and

Environmental Protection Act, Act 451 of 1994; and the Memorandum of Agreement between the US EPA, the Fish and Wildlife Service (FWS), and the National Marine Fisheries Service (NMFS), which consolidates Sections 7, and 9 of the ESA and water quality issues related to NPDES permitting in parts 303, 304, and 402 of the Federal CWA.

Outside sources were contacted for input in accordance with the requirements of this task. These sources were contacted regarding either regulatory concerns, water quality issues within individual watersheds, water quality data they may have compiled as a future resource, or for procedures regarding one of the above categories (such as water quality monitoring practices or permitting procedures). Such contacted parties included:

- Jessica Opfer, Watershed Planner, and Brett Levin, Community Education Coordinator, Clinton River Watershed Council.
- Theresa Dakin, Ecologist, Huron River Watershed Council.
- Michael Adrounie, Lab and NPDES/ IPP Permit Manager, Ann Arbor Wastewater Treatment Facility.
- Ted Starbuck, Senior Environmental Planner, Southeast Michigan Council of Governments (SEMCOG).
- Gary White, Associate Director, Stephen Lichota, Supervisor, and Elwin Coll, Division Director, Macomb County Health Department, Environmental Health Services.

5. Findings

5.1 Current Watershed Concerns

The US EPA, in partnership with the MDEQ, keeps an intricate "Index of Watershed Indicators," or IWI, on overall watershed health in the majority of water bodies in Michigan. A series of 'environmental indicators' are used to characterize individual watershed conditions and vulnerabilities, and combined them to give overall watershed health ratings. The scores range from one to six (one being the most healthy), based on present water quality conditions (meeting state designated uses, containing contaminated sediments, condition of ambient water quality, and wetland loss) and increasing vulnerability pressures (from pollution loads discharged in excess of permitted levels, pollution potential from agricultural and urban runoff, and changes in human population levels).

In addition, MDEQ Surface Water Quality Division, based on US EPA rules, has established a series of standards for all Michigan surface waters. These standards establish whether-or-not the water body is attaining a series of designated uses, based on issues of water quality. MDEQ has established that at least the following uses be designated for all Michigan water bodies:

- Agriculture.
- Navigation.
- Industrial Water Supply.
- Public Water Supply at point of water intake.
- Warmwater Fishery.
- Other Indigenous aquatic life and wildlife.
- Partial Body Contact / Recreation (Total Body Contact between the months of May through October).

These standards, called the Michigan Water Quality Standards, are based on protection and preservation of these uses, and described further in Part 4 of the Natural Resources and Environmental Protection Act, Act 451 of 1994.

According to the Great Lakes Water Quality Agreement of 1978, Michigan water bodies that are not attaining the Michigan Water Quality Standards are designated as "Areas of Concern." Each Area of Concern, according to this agreement, is to have a 'Remedial Action Plan' (RAP) developed, illustrating the problems associated with the water body, and proposing a clean-up plan. The RAP is used to achieve two objectives: to inform the public of concerns in their watershed and how the problems are being addressed, and to raise money and promote involvement in clean-up issues.

5.2 Clinton River Watershed

The Clinton River watershed spans approximately 738 square miles. The river itself consists of 808.6 total river miles, with 389 river miles considered perennial (having a flow year round). There are 304 lakes in the watershed, covering 12,544 acres. The major portions of the river habitats are designated as urban and agricultural, but a small percentage of watershed areas remain designated as riparian forest. As of 1990, the watershed had a population of close to 870,000 residents, and contained 33 total wastewater facilities, of which seven are public. These seven public wastewater treatment facilities discharged just over 25 mgd into the Clinton River, according to the United States Geological Services (USGS) 1990 Water Use record.

The U.S. EPA's IWI gave the Clinton River Watershed an overall score of five, with serious present conditions, but a low vulnerability rating. The Clinton River presently does not meet all of Michigan's Designated Uses, as per the Michigan Natural Resources and Environmental Protection Act. Figure 2 shows portions of the watershed that do not presently meet the designated uses; thus, the watershed had been designated as an Area of Concern by the MDEQ. The Clinton River Watershed Council had their last RAP revision in 1998.

The primary concerns in this watershed, according to the Clinton River Watershed Council, are increasing turbidity and non-point-source contamination due to the ongoing effects of increasing urbanization and sprawl in Oakland and Macomb Counties. Urbanization is decreasing the amount of pervious soil with atmospheric contact, thus decreasing the resulting runoff water quality and increasing the suspended solids into the river. This increased sediment input raises Clinton River turbidity, and thus reduces beneficial light penetration.

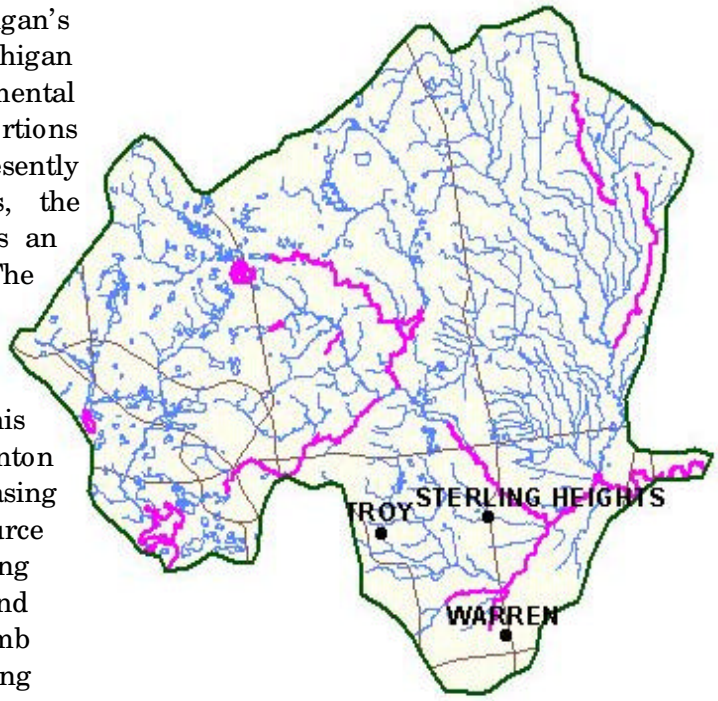

Figure 2. Clinton River Watershed
Red areas designate 303(d) Listed Waters: "Under Section 303(d) of the Clean Water Act, each State must prepare a list of waters that are not meeting their water quality standards. These lists are required to be submitted to EPA for review and approval every April of even years (e.g. 1996, 1998). Total Maximum Daily Loads (TMDLs) are then established from th most recently approved list."

~http://www.epa.gov/iwi/303d/refer/meta.html#303

The Clinton River has also had a history of problems of high detrimental bacteria counts, primarily fecal coliform (i.e., *E. coli*), although identifying the exact source of the problem has generated a great deal of controversy in previous years. Presently, as directed by the Clinton River RAP, the Macomb County Health Department Division of Environmental Health closely monitors the Clinton River water quality. They perform monitoring events weekly for *E. coli*, and monthly events to monitor nutrients and metals. They have extensive data available as a future reference, much of it available to the public on their World Wide Web page.

5.3 Rouge River / Detroit River Watershed

The US EPA and the MDEQ group the Rouge River and the Detroit River into one watershed. These combined watersheds consist of 686 square miles, and 739 total river miles, flowing through the densest population areas in the state. In 1990 the watershed was inhabited by 2,259,000 residents, over 1.5 million on the Rouge River watershed itself. About 321 Rouge River miles are considered perennial. The Rouge

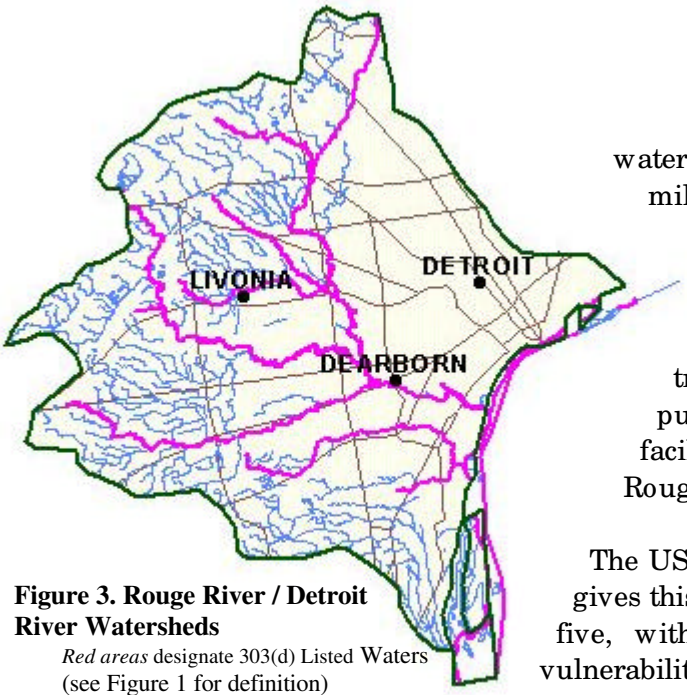

Figure 3. Rouge River / Detroit River Watersheds
Red areas designate 303(d) Listed Waters (see Figure 1 for definition)

watershed separately consists of 438 square miles, consisting of the Main Rouge River and three separate branches: the Upper, Middle, and Lower. In 1990, the Detroit/ Rouge watersheds contained 87 total wastewater treatment facilities, with 24 of them public. These public wastewater facilities discharged 1,834 mgd into the Rouge and Detroit Rivers.

The US EPA, as with the Clinton watershed, gives this watershed an overall heath rating of five, with high present condition and low vulnerability. The Rouge Watershed already has a significant number of dischargers, as well as contamination issues associated with both point and non-point sources. The Rouge and Detroit watersheds have had decades of continuous and widespread problems related to heavy metal and persistent bioaccumulative toxins (PBT) contamination. Similar to the Clinton, the Rouge has serious problems associated with urbanization and runoff, with often-high turbidity and bacteria levels.

As both the Detroit River and the Rouge River are designated as Areas of Concern, RAP's have been created for each; the Detroit River's latest update was completed in 1996, and the Rouge River's in 1998. The Rouge River has made significant progress toward restoration over the past decade. The Friends of the Rouge, a grassroots community awareness organization in the Detroit area, updates the Rouge River RAP with report cards illustrating the restoration progress for the public; the last update was 1999. The Ypsilanti Community Utilities Authority (YCUA), in 1994-95, redirected their tertiary treated wastewater effluent discharge from the Huron River into the Lower Branch of the Rouge River. This change, reportedly, significantly improved water quality in this branch of the river by increasing the base river flow for the Lower Branch, which previously had a highly variable base flow, and producing significantly higher dissolved oxygen levels, where prior levels were often poor at best.

Significant data is available on the Rouge River for future reference. The Wayne County Department of Environment Rouge Program Office has an extensive database, and has a significant ongoing monitoring program in all the primary branches of the Rouge River and many of the tributaries, for a variety of parameters including dissolved oxygen, *E. coli*, metals, and nutrients.

5.4 Species of Concern

The placement of any new point-source discharge in an aquatic environment must be selected with consideration to the effects on local flora and fauna. Habitats of sensitive species, or species listed by the MDEQ or the US EPA as threatened or endangered, must be taken into account.

The Michigan Natural Features Inventory (MNFI), in association with the MDEQ and the Nature Conservancy, has instituted a database to identify, evaluate, and track locations of Michigan's threatened species. Table 14 summarizes the aquatic species of concern that may be affected by the construction and/ or additional discharge associated with a new wastewater facility in the DWSD service area. Although the listed species are primarily aquatic, it must be noted that many terrestrial species rely on water quality as well.

Table 14. Species of Concern in two Michigan counties.

County	*Common Name*	*Genus species*	*Description*	*Status*
Macomb	Lake Sturgeon	Acipenser fulvescens	Fish	Threatened
Macomb	Eastern Sand Darter	Ammocrypta pellucida	Fish	Threatened
Macomb	Spotted turtle	Clemmys guttata	Reptile	Threatened
Macomb	Snuffbox	Epioblasma triquetra	Mussel	Endangered
Macomb	Mooneye	Hiodon tergisus	Fish	Threatened
Macomb	Silver Chub	Hybopsis storeriana	Fish	Species of concern
Macomb	Wavy-rayed Lamp Mussel	Lampsilis fasciola	Mussel	Threatened
Macomb	Pugnose Shiner	Notropis anogenus	Fish	Species of concern
Macomb	Black-crowned Night-heron	Nycticorax nucticorax	Bird	Species of concern
Macomb	Hickorynut	Obovaria olivaria	Mussel	Species of concern
Macomb	Purple Lilliput	Toxoplasma lividus	Mussel	Endangered
Macomb	Salamander Mussel	Simpsonaias ambigua	Mussel	Endangered
Macomb	Round Hickorynut	Obovaria subrotunda	Mussel	Endangered
Oakland	Blanchard's Cricket Frog	Acris crepitans blanchardi	Amphibian	Species of concern
Oakland	Eastern Sand Darter	Ammocrypta pellucida	Fish	Threatened
Oakland	Spotted Turtle	Clemmys guttata	Spotted Turtle	Threatened
Oakland	Redside Dace	Clinostomus elongatus	Fish	Endangered
Oakland	Snuffbox	Epioblasma triquetra	Mussel	Endangered
Oakland	Huron River Leafhopper	Flexamia huroni	Insect	Species of concern
Oakland	Common Loon	Gavia immer	Bird	Threatened
Oakland	Wavy-rayed Lamp Mussel	Lampsilis fasciola	Mussel	Threatened
Oakland	Copperbelly Watersnake	Nerodia erythrogaster neglecta	Reptile	Endangered
Oakland	Pugnose Shiner	Notropis anogenus	Fish	Species of concern
Oakland	Eastern Massasauga	Sistrurus catenatus catenatus	Reptile	Species of concern
Oakland	Rayed Bean	Villosa fabalis	Mussel	Threatened
Oakland	Salamander Mussel	Simpsonaias ambigua	Mussel	Endangered
Oakland	Purple Lilliput	Toxoplasma lividus	Mussel	Endangered

5.5 Existing Regulations

5.5.1 NPDES Permit

The Federal Water Pollution Control Act Amendments of 1972 created the system for permitting wastewater discharges to surface waters, known as the National Pollutant Discharge Elimination System (NPDES) Program. The NPDES Program was modified again by passage of the Clean Water Act in 1977 and the Water Quality Act of 1987.

In most cases, the NPDES Permit Program is administered by the individual states. In Michigan, the MDEQ Surface Water Quality Division administers the NPDES program. A NPDES permit places technology-based and water quality-based effluent limits on a discharge to ensure compliance with water quality standards in the receiving water and therefore protect the designated uses.

A new wastewater treatment plant discharging to a surface water within Michigan would be required to obtain a NPDES permit.

5.5.2 Great Lake Initiative (GLI)

On March 23, 1995, the US EPA published the 'Water Quality Guidance for the Great Lakes System', commonly known as the Great Lakes Initiative (GLI). The GLI was passed to help protect and restore the Great Lakes ecosystem.

The GLI consists of the following:

- Water quality criteria for certain pollutants to protect aquatic life, wildlife, and human health, as well as detailed methodologies to develop criteria for additional pollutants.
- Implementation procedures to develop consistent water quality-based effluent limits in discharge permits.
- Total maximum daily loads of pollutants that can be allowed to reach the Great Lakes.
- Antidegradation policies and procedures.
- Provisions to establish consistent goals or minimum requirements for RAPs and Lakewide Management Plans (LaMPs).

5.5.3 Total Maximum Daily Load (TMDL)

The US EPA required that the Great Lake States incorporate the GLI provisions into their water quality standards and NPDES Permit Program. Therefore, any new wastewater treatment plant's NPDES permit would have the GLI provisions incorporated into the permit requirements.

According to section 303(d) of the 1977 Federal Clean Water Act, the US EPA has designated that each state develop a list of their most impaired waters. These determinations are based on the water body's attainment of its designated uses and/ or other impairments designated within their Water Quality Standards even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that priority rankings be established for waters on the lists and TMDL values are developed for each.

A TMDL simply specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point (wasteload allocation or WLA) and nonpoint pollutant sources (load allocation or LA). By law, US EPA must approve or disapprove the lists and TMDLs established

by the MDEQ. If the MDEQ's submission is inadequate, US EPA must establish the list or the TMDL.

The TMDL policies have two important features that must be noted. First, TMDL's are pollutant specific. States must not only list waters that are both impaired and threatened, but also must specify the impairing pollutants. At the state's discretion, the water body may remain on the list after US EPA approves the TMDL, or until water quality standards are attained. Second, only portions of the water body may be effected by the imposed TMDL. The portion of the water body that does not meet its designated use may be simply limited to a 100-meter section, or it may entail the water body as a whole. Therefore, a new discharge location may not be restricted by an allocated TMDL, but it may be restricted for a TMDL ratified further downstream.

5.5.4 NPDES Permit Discharge Limit Development

Chemical specific water quality based effluent limits are incorporated into NPDES permits where MDEQ determines that a toxic substance is or may be discharged into a waterbody at levels that have the potential to cause an excursion above the established water quality standard. This determination is made by developing preliminary effluent limitations (PEL's) and comparing these to the potential effluent quality (PEQ) of the discharge.

PELs are developed using Wasteload Allocations (WLA's) for each toxic substance that the permittee reports as known or believed to be present in its discharge. The WLA for the permittee is based upon the TMDLs for the specific pollutant and surface water receiving the discharge. For surface waters lacking a TMDL, MDEQ uses a mathematical formula to determine the WLA. This formula takes into account water quality measurements (i.e. dissolved oxygen, pH, ammonia, phosphorus, etc.), mixing zones and ambient receiving water concentration. Chronic WLA's will be expressed as a monthly average limit and acute WLA's will be expressed as a daily maximum limit.

The PEQ is determined based on samples taken from the discharge, with probability and confidence levels taken into consideration when less than ten sampling events are performed. If the PEQ is greater than the PEL, MDEQ will include a water quality based effluent limit for that specific chemical in the facility's NPDES permit, as well as language stating the frequency of monitoring and constituents to be monitored.

The water quality values used in determining effluent limitations are based on the Rule 57-Water Quality Values set forth by MDEQ, which incorporate the values and limit methodologies as stated in the Great Lakes Initiative (GLI). MDEQ, as of July 16, 2001, has 209 substances that are on the water quality values list. Of the 209, 77 have no numerical standards at this time. As more data are gathered, MDEQ will publish limitations for these substances and potentially add additional substances. The remaining 132 compounds have set limitations in place, which may change as more data are collected. These limited compounds are listed below.

Formaldehyde
DDT
2,4-Dinitrophenol
Carbon tetrachloride
Parathion
Cyanide, free
Chlordane
Lindane
4-Chloro-3-methylphenol
Dieldrin
Aniline
Acetic acid
Methanol
Acetone
Chloroform
Dimethylsulfoxide
Hexachloroethane
Benzene
1,1,1-Trichloroethane
Endrin
Bromomethane
Vinyl chloride
Acetaldehyde
Methylene chloride
1,1-Dichloroethane
1,1-Dichloroethylene
Dichlorofluoromethane
Propylene oxide
1,1,2-Trichloro-1,2,2-trifluoroethane
Heptachlor
Isophorone
1,2-Dichloropropane
Methyl ethyl ketone
1,1,2-Trichloroethane
Trichloroethylene
1,1,2,2-Tetrachloroethane
Acenapthene
Diethyl phthalate
Di-n-butyl phthalate
Phenanthrene
Butyl benzyl phthalate
Fluorene
Carbazole
Hexachlorobutadiene
Pentachlorophenol
2,4,6-Trichlorophenol
Dinoseb
Naphthalene
3,3'-Dichlorobenzidine
2,4-D
2-Methylphenol
1,2-Dichlorobenzene
2-Chlorophenol
1,2,4-Trimethylbenzene
1,2,4,5-Tetrachlorobenzene
Nitrobenzene
4-Nitrophenol
Ethylbenzene
Styrene
N-ethylaniline
2,4-Dimethylphenol
1,4-Dichlorobenzene
4-Chlorophenol
1,2-Dibromoethane
1,2-Dichloroethane
Acrylonitrile
Ethylene glycol
3-Methylphenol
1,3,5-Trimethylbenzene
Toluene
Chlorobenzene
Phenol
Butylamine
Diethylamine
Tetrahydrofuran
1,2-Bis(2-chloroethoxy)ethane
Endosulfan
Bis(2-ethylhexyl)phthalate
1,2,4-Trichlorobenzene
2,4-Dichlorophenol
Triethylamine
RDX
1,4-Dioxane
Tetrachloroethylene
N,N-dimethylacetamide
Dibenzofuran
Octylphenol
Oxalic acid
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
Fluoranthene
Aldrin
1,2-Dichloroethylene
1,3-Dichlorobenzene
Methoxyacetic acid
Xylene
Methyl tert butyl ether (MTBE)
Atrazine
HMX
6-Chloropicolinic acid
Lead
Lithium
Manganese
Mercury
Molybdenum
Nickel
Silver
Strontium
Thallium
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Chromium
Cobalt
Copper
Vanadium
Zinc
Ammonia, unionized coldwater
Ammonia, unionized warmwater
Hydrogen peroxide
Bromine
Selenium & inorganic salts
Chlorine
Hydrogen sulfide
Toxaphene
DBNPA
Alachlor
Chromium, hexavalent
Cyanazine
n-Nonylphenol (mixed isomers)

The GLI bans the use of mixing zones in PEL calculations for the following bioaccumulative chemicals of concern (BCCs):

Lindane
Mirex
Hexachlorocyclohexane (BHC)
Hexachlorobenezene
Alpha-Hexachlorocyclohexane
Chlordane
beta-Hexachlorocyclohexane
delta-Hexachlorocyclohexane
Hexachlorobutadiene
DDT / DDD / DDE

Photomirex
Octachlorostyrene
1,2,4,5-Tetrachlorobenzene
PCBs
Toxaphene
2,3,7,8-TCDD
Pentachlorobenzene
Mercury
1,2,3,4-Tetrachlorobenzene
Dieldrin

5.5.5 Pollutant Minimization Program

In the case where an effluent limit for a toxic substance is calculated to be less than the quantification level, the NPDES permit will contain the effluent limit as calculated. As a requirement to meet the effluent limit, MDEQ will include a special condition in the NPDES permit for development and implementation of a Pollutant Minimization Program (PMP). The PMP will be for each toxic substance with an effluent limit below the quantification level. The goal of the PMP is to maintain the effluent concentration of the toxic substance at or below the effluent limit. The PMP describes the control strategy designed by the POTW to proceed towards the goal of meeting the effluent limit.

5.5.6 Industrial Pretreatment Program

In order to prevent pass-through of pollutants, prevent disruption of the treatment plant or collection system and protect the safety of plant workers, a publicly owned treatment works (POTW) will likely need to institute an Industrial Pretreatment Program (IPP) for Indirect Discharges (as opposed to Direct Discharge into receiving waters, which are handled through the NPDES Permit Program by the MDEQ). The POTW Authority administering the IPP Program issues Industrial Waste Discharge Permits. All Industrial Categorical Standards must also be enforced.

The IPP bans discharges, under the general prohibition category, that may:

- Create a fire or explosion hazard.
- Have an extremely low/ high pH.
- Obstruct the POTW.
- Result in excessive heat loading.
- Contain petroleum or non-biodegradable oil.
- Contain pollutants that create toxic fumes.

The IPP also needs to contain local limits for all pollutants of concern to the treatment plant. At a minimum, the POTW will need to evaluate the following parameters for local limits:

- Arsenic
- Cadmium
- Chromium
- Copper
- Cyanide
- Lead
- Mercury
- Nickel
- Silver
- Zinc

In order to collect representative data MDEQ requires one of the following:

- One sample per month for a year of wastewater treatment plant influent, effluent, sludge, discharges at other locations, as appropriate, and sanitary sewage, with not less than two separate sampling events each weekday, Monday to Friday.
- Six samples each taken over a four-week period of wastewater treatment plant influent, effluent, sludge, discharges at other locations, as appropriate, and sanitary sewage, with not less than two separate sampling events each weekday, Monday to Friday.

Based on the sampling, a calculation to determine the maximum allowable headworks loading (MAHL) and collection system limitations (CSL's) is performed for each pollutant of concern. These calculations are based on:

- NPDES permit pass-through.
- Aquatic toxicity pass-through.
- Secondary treatment inhibition.
- Impact on sludge disposal method.
- Fire/ explosion and fume toxicity.

The pollutant load contributed by sanitary use (residential or 'background level') is subtracted from the total allowable load coming into the headworks of the POTW and the remaining load is attributed to industrial users. The industrial user loading is then distributed among the individual industrial users by calculating a local limit.

The IPP will also need to include the mechanism and appropriate legal authority, by incorporation into the sewer use ordinance, to issue permits to industrial users and enforce local, state and national regulations.

5.5.7 Antidegradation Statement

Before any new or increased loading of pollutants to any surface water can be allowed, an antidegradation statement must be filed with the MDEQ. The antidegradation statement must identify the social or economic development and the benefits to the community/ industry that would be foregone if the new or increased loading of pollutants were not allowed.

The factors addressed in the antidegradation statement may include:

- Employment increases.
- Production level increases.
- Employment reductions avoidance.
- Efficiency increases.
- Industrial, commercial, or residential growth.
- Environmental or public health problem corrections.
- Economic or social benefits to the community.

If the proposed discharge contains BCCs, the discharger must minimize the new or increased loading of the BCC by implementing pollution prevention alternatives and techniques. If the pollution prevention alternatives and techniques do not sufficiently minimize the BCC loading, then the discharger will have to evaluate alternative or enhanced treatment techniques.

5.5.8 Antibacksliding

In 1987, Congress passed an amendment to the CWA that included a prohibition against backsliding. The antibacksliding regulations prohibit a controlling authority (MDEQ, in this case) from reissuing NPDES permits containing effluent limitations, standards or conditions less stringent than the final limits contained in the previous permit, except in limited cases.

Cases where backsliding may be allowed are:

- A revised TMDL on the receiving water has been performed and an increased loading may be allowed.
- The designated use of the receiving water is removed or changed.
- The water quality standard of the receiving water has been attained.
- Technical mistakes were made in issuing the NPDES permit.

Any relaxed permit limits must not result in a violation of the applicable water quality standard.

5.5.9 Wastewater Treatment Plant Construction Regulations

The Surface Water Quality Division within the MDEQ is responsible for issuing municipal wastewater collection and treatment facility construction permits (under Act 451) for discharges to surface waters of the State.

Prior to construction or alteration of a sewerage system or treatment facility, plans and specifications must be submitted to MDEQ. A licensed Professional Engineer registered in the State of Michigan must prepare these submittals. The engineer must design the facility such that all air emissions, sludge and water discharges will be in compliance with criteria established by Air Quality, Waste Management and Surface Water Quality Divisions of MDEQ.

A basis of design must also be submitted for MDEQ review and approval. The basis of design must include the following:

- General map of the service area showing the location of the existing and proposed sewer system.
- The service area in acres.
- The present and future population densities per acre and total population.
- The present and future per capita sewerage contribution, average and maximum.
- A description of commercial and industrial waste contributions.
- The current and design flow rates, average and maximum.

- The size of pipe, grade, and, where appropriate, the size of the pump station, number and capacity of pumps, size and length of force main, and point of discharge.
- An analysis of the effect of the proposed additional flows on the existing sewerage system.
- A detailed explanation of steps to be taken in case of power failure or equipment breakdown, including a description of special reserve units available for emergency treatment, storage, or transportation of the wastewater.

A MDEQ district engineer from the area where the facility is to be constructed reviews the plans and specifications. There is no statutory time established for this review. Upon the determination by MDEQ that the plans and specifications are complete and satisfactory, a permit for construction will be issued. If construction does not commence within two years of permit issuance, the permit will expire. Funds for construction cannot be expended until a permit is issued.

Any construction activities must have proper soil erosion and sedimentation control. The MDEQ has delegated issuance of soil erosion and sedimentation control permits to the local municipality (county, township, city or village). The local municipality must have in their ordinance requirements for soil erosion and sedimentation control. The local municipality is also in charge of enforcement of the permit conditions. If the local municipality does not enact a soil and erosion control program to the MDEQ's satisfaction, the MDEQ will hire a consultant to administer the municipalities soil and erosion control program.

Additional Regulatory Constraints that may Apply

The following MDEQ regulations may or may not impact construction depending on the proposed facility's location:

Part 31 – Water Sources Protection – Except where allowed by permit, MDEQ prohibits the occupation, filling or grading of floodplains, streambeds or stream channels. This regulation also requires that the channels and the portions of the floodplains that are the floodways are not inhabited and are kept free and clear of interference or obstruction that will cause any undue restriction of the capacity of the floodway.

Part 301 – Inland Lakes and Streams – Prior to any construction that may impinge upon any lake or stream, a permit must be obtained from MDEQ. The permit application must show what steps are to be taken during construction to protect any nearby lake or stream.

Part 303 – Wetland Preservation – Depending on the local ordinance, MDEQ or the local municipality will require a permit before any construction activity is performed in designated wetlands.

Part 361 – Farmland and Open Space Preservation – This MDEQ regulation allows property owners of agricultural lands to receive property tax incentives if the land usage remains agricultural. This makes it less likely that a farmland property owner would sell the land for any use other than agricultural.

Sludge Disposal

On November 25, 1992, pursuant to Section 405 of the Clean Water Act (CWA), EPA published 40 CFR Part 503-Standards for the Use or Disposal of Sewage Sludge. This regulation established requirements for the final use or disposal of sewage sludge (Class A and B) when:

- The sludge is applied to land to either condition the soil or to fertilize crops grown in the soil.
- The sludge is placed on the land for final disposal (landfill).
- The sludge is incinerated.

Michigan regulations for incineration of sewage sludge are covered under Part 55 Air Pollution Control of Public Act 451, Natural Resources and Environmental Protection Act. The rules establish standards consisting of permitting requirements, pollutant limits and operational requirements for incineration.

The state of Michigan regulations for land application of sewage sludge are covered under Part 24 Biosolids Rules of Part 31, Water Resources Protection. The rules establish standards consisting of general requirements, pollutant limits, management practices and operational requirements for the beneficial land application of biosolids.

FUTURE REGULATIONS

US Environmental Protection Agency

Effluent Guidelines and Standards for the Construction and Development Industry

US EPA is proposing effluent guidelines that will apply to construction activities associated with new development and re-development activities. The regulations will address storm water runoff from construction sites during active construction, as well as post-construction runoff. Public sector construction sites will potentially be affected by this rulemaking. EPA will develop design criteria for erosion and sediment control and stormwater best management practices. These requirements will be implemented in NPDES storm water permits issued to construction site owners and operators.
Proposed Final Action Date: March 2004

NPDES requirements for municipal sanitary sewer collection systems

US EPA is developing a notice of proposed rulemaking that would propose a broad-based reevaluation framework for sanitary sewer collection systems under the NPDES program. EPA is proposing standard requirements to address reporting, public notification, and record keeping requirements for sanitary sewer overflows (SSOs), capacity assurance, management, operation

and maintenance requirements for municipal sanitary sewer collection systems, and a prohibition on SSOs.
Proposed Final Action Date: February 2003

Round 2 Standards for the use or disposal of sewage sludge

US EPA's Round 2 Standards propose to add dioxins, dibenzofurans and coplanar polychlorinated biphenyls as additional toxic pollutants to be regulated in land applied sewage sludge.
Proposed Final Action Date: December 2001

Water Quality Standards Regulation – Revision

The Federal water quality standards published in 40 CFR 131 govern the development, review and revision of water quality standards under section 303(c) of the Clean Water Act. Based upon experience gained over the last 20 years of the program, EPA's proposed revisions to 40 CFR 131 are intended to strengthen the water quality standards regulation, thus enhancing water quality management on a watershed basis and focusing Federal and State resources on the areas of greatest concern.
Proposed Final Action Date: July 2003

40 CFR 503 – Biosolids Rule

US EPA is currently evaluating the chromium limit for biosolids land application. The current pollutant concentration of 1,200 mg/kg has been withdrawn pending further review.
Proposed Final Action Date: Unknown

6. Impact of Known and Future Regulations

6.1 TMDL Applications and Locations

TMDL's may be the most restrictive regulation of the near future. The schedule for establishment of the TMDL's in the Clinton, Rouge, and Detroit watersheds is illustrated in Table 16. Since the TMDL allocation must be maintained, any new entity wishing to discharge to the affected water body must negotiate a decrease from another source to maintain the daily loading value.

Table 16. Michigan TMDL Schedule.

Water body ID	Water Body Name	TMDL Schedule Year	County	Problem Summary	Location Description	Size (Miles/ Acres)	Water-shed
061406g	Orchard Lake	2011	Oakland	Mercury Lake.		788A	Clinton
061407c	Stony Creek	2007	Macomb	Pathogens (Rule 100).	Inwood Road Downstream To Include W.Br. Stony Creek To The Confluence Of Clinton River.	8M	Clinton
061402a	Red Run Drain	2001	Macomb	CSO, Untreated Sewage Discharge, Pathogens (Rule 100); Macroinvertebrate Community Rated Poor.	From Drain Confluence With The Clinton R. U/S (T2n, R12e, S19) Including All The Tributaries To Warren, Center Line, Madison Hts., Troy, and Clawson.	6M	Clinton
061406a	Lake Orion	2011	Oakland	Mercury Lake.	Orion Twp. R10e, T4n, Sec. 2-11; At Lake Orion	470A	Clinton
061405a	Cass Lake	2011	Oakland	Mercury Lake.		1280A	Clinton
061402b	Bear Creek	2001	Macomb	CSO, Pathogens (Rule 100).	Mound Road/Vandyke Road Downstream To Confluence With Clinton River.	2.5M	Clinton
061404a	Clinton River	2001	Oakland	Fish Community Rated Poor.	Pontiac WWTP D/S To Paint Creek Confluence.	10.7M	Clinton
061404c	Clinton River	2001/2006	Macomb	FCA-PCBs; CSO's, Pathogens (Rule 100); D.O. Violations.	From Yates Park Dam (Just U/S From Utica) To Lake St. Clair.	25M	Clinton
061408c	Coon Creek	2001	Macomb	CSOs, Pathogens (Rule 100).	Armada D/S To Confluence With Highbank Creek. Beginning in T5n,R13e, Sec.23 And Extending D/S To T4n,R14e, Sec.6.	8M	Clinton
061406e	Lower Trout Lake	2011	Oakland	Mercury Lake.		62A	Clinton

Water body ID	Water Body Name	TMDL Schedule Year	County	Problem Summary	Location Description	Size (Miles/ Acres)	Water-shed
061405g	Gallagher Creek	1999	Oakland	Macroinvertebrate Community Rated Poor.	Near Village Of Goodison, T4n, R10e.	2M	Clinton
061408d	Deer Creek	2006	Macomb	Pathogens (Rule 100).	Chester Twp. At North Road SW Of New Haven, Tributary To Clinton River, N. Br.	2M	Clinton
061406f	Maceday Lake	2011	Oakland	Mercury Lake.		200A	Clinton
061304q	Rouge River, Middle Branch	2005	Wayne	FCA-PCBs.	Phoenix Lake Dam D/S (To Include Newburgh Lake And Nankin Lake) To The River Rouge, Main Br. Confluence.	30M	Rouge / Detroit
061305g	Rouge River, Main Branch	2005	Wayne	CSO, Untreated Sewage Discharge, Pathogens (Rule 100); WQS Exceedances For D.O.; Fish And Macroinvertebrate Communities Rated Poor.	River Rouge, Main Br., U/S Of River Rouge, Lower Br. Confluence, To Include Tributaries (River Rouge, Upper Br.; Bell Branch, Evans Ditch And Franklin Branch), Thence, U/S To Big Beaver Road.	54M	Rouge / Detroit
061301i	Ecorse River, N. Br. & S. Br.	2003	Wayne	Macroinvertebrate Community Rated Poor; Untreated Sewage Discharges, Pathogens (Rule 100).	Beech-Daly Rd. D/S To Dix-Toledo Rd. And Inkster Rd. D/S To Electric Ave.	15M	Rouge / Detroit
061304p	Rouge River, Middle Branch	2004	Wayne	FCA-PCBs.	Phoenix Lake Dam D/S (To Include Newburgh Lake And Nankin Lake) To The River Rouge, Main Br. Confluence.	30M	Rouge / Detroit
061401a	Detroit River	2005/2010	Wayne	FCA-PCBs And Mercury; CSO, Untreated Sewage Discharge, Pathogens (Rule 100).	Entire River From Lake St. Clair To Lake Erie.	26m	Rouge / Detroit
061304h	Tonquish Creek (Middle Rouge)	2007	Wayne	Macroinvertebrate Community Rated Poor.	Tonquish Creek From Joy Road D/S To Confluence.	7m	Rouge / Detroit

6.2 NPDES Permit Applications And Procedures

The MDEQ Surface Water Quality Division is in charge of administrating and enforcing the NPDES Permit Program requirements in Michigan. According to MDEQ regulations, a NPDES permit application must be filed at least 180 days prior to commencement of a surface water discharge.

The permit application and issuance process can take up to one year, depending on:

- Type of proposed discharge.
- Characteristics of receiving water.
- Overall complexity of the application.

Once the application is received, MDEQ staff will make preliminary determinations on the application, including a proposal to issue or deny the discharge described in the application. If conditions are satisfactory to continue with permit application processing, MDEQ will:

- Propose water quality based effluent limitations.
- Propose a schedule of compliance for meeting the proposed effluent limitations (if applicable).
- Any other restrictions deemed necessary by the MDEQ.

MDEQ will then place the proposed permit and associated limitations on public notice. The public notice will include:

- A description of the activities generating the proposed discharge.
- The name of the waterway the discharge is proposed to enter.
- A statement of MDEQ's tentative determination to issue or deny the proposed permit application.

For discharges greater than 500,000 gallons per day, MDEQ is required to prepare a fact sheet. The fact sheet contains:

- A sketch of the proposed discharge location.
- A quantitative description of the proposed discharge including average daily flow and average discharge (pounds/ day) of any pollutants subject to limitation by MDEQ.
- A description of the water quality standards.
- Effluent limitations.
- Mixing zone description.
- Uses for which the receiving water has been classified.

The permit application will remain on public notice for thirty days. During this time, any interested parties may submit views regarding the application and/ or MDEQ's tentative determination. At some time following the thirty-day comment period, MDEQ may then issue a NPDES permit, valid for up to a five-year period.

The MDEQ has divided the State of Michigan into watersheds. All of the dischargers within a watershed are required to renew their permits at the same time. Therefore, the initial permit may be required to be renewed prior to five years.

6.3 Pollutant Minimization Program Requirements

The most common toxic substances that require a PMP are Mercury and PCBs. The current water quality effluent limit for total Mercury is 1.3 ng/ L and 0.000026 µg/ L for total PCBs. If a current or proposed surface water discharge is expected to contain

concentrations of these substances above the water quality effluent limit, the NPDES permit will contain a special condition requiring a PMP. A separate PMP must be submitted for each substance.

When the MDEQ requires a Pollutant Minimization Program (PMP), the following items must be submitted:

- An annual review and periodic monitoring of potential sources of the toxic substance.
- Periodic monitoring for the toxic substance in the influent to the wastewater treatment plant
- A commitment by the POTW that reasonable cost-effective control measures will be implemented when sources of the toxic substance are discovered. Factors to be considered shall include all of the following:
  - Significance of sources.
  - Economic considerations.
  - Technical and treatability considerations.

Additionally, an annual status report on the progress of the PMP must be submitted to the MDEQ including the following:

- All minimization program monitoring results for the previous year.
- A list of potential sources of the toxic substance.
- A summary of all actions taken to reduce or eliminate the identified sources of the toxic substance.

When the POTW has determined that the PMP is complete, removal of the program may be requested from the MDEQ. Such a request and supporting documentation demonstrating that the goal is being achieved must be submitted in writing to the MDEQ. If the request is approved, the NPDES permit will be amended to remove the PMP requirement.

6.4 Antibacksliding

Because of the antibacksliding regulation, any new NPDES permit applicant must be careful in accepting the permit limits proposed by the MDEQ. That is, there is a limit on how far a permit limit may be allowed to backslide. If a permit is allowed to backslide from a previous permit requirement, the MDEQ may never allow a reissued permit to contain effluent limitations which are less stringent than the current effluent limitation guidelines for that pollutant, or which would cause the receiving waters to violate the applicable state water quality standard. Therefore, if a wastewater treatment plant accepts a proposed NPDES permit limitation, the limit will probably never be relaxed.

6.5 Sludge Disposal Procedures

6.5.1 Land Application

A valid permit is required before applying any biosolids to land. A permit application is required no less than 180 days before commencement of biosolids land application. Part of the permit application is the submittal of a residuals management program.

The residuals management program must contain the following information:

- Size and type of generating facility.
- One year of records representing the volume and concentrations of pollutants in the biosolids.
- Treatment process origin.
- Treatment process description.
- Storage volume.
- Transportation methods and spill prevention plan.
- Land application method.
- Land application site list.
- Land application plan.
- Pathogen reduction method.
- Vector attraction reduction method.
- Monitoring program.

The application limits for biosolids applied to agricultural lands, forests, public contact sites, or reclamation sites are projected in Table 17.

Table 17. Biosolids Land Application Limits.

Pollutant	Ceiling Concentration (mg/kg) on a dry weight basis	Pollutant Concentration (mg/kg) on a dry weight basis
Arsenic	75	41
Cadmium	85	39
Copper	4300	1500
Lead	840	300
Mercury	57	17
Molybdenum	75	--
Nickel	420	420
Selenium	100	100
Zinc	7500	2800

In Table 17, the 'ceiling concentration' applies to the maximum biosolids concentration allowed to be land applied. The amount of land applied biosolids that is at ceiling concentrations must be documented to assure the annual pollutant loading rate is not exceeded. The 'pollutant concentration' in Table 17 applies to bulk biosolids directly land applied and does not require documentation. There is no limit on the amount that can be land applied at the 'pollutant concentration'.

Biosolids must be monitored for requirement compliance related to pathogen density and vector attraction, as well as the following compounds:

- Total Nitrogen (TKN)
- Ammonium Nitrogen
- Nitrate Nitrogen
- Total Phosphorus
- Total Potassium
- Total Solids
- Arsenic
- Cadmium
- Copper
- Lead
- Mercury
- Molybdenum
- Nickel
- Selenium
- Zinc

The required frequency of monitoring, based on the amount of biosolids being land applied, is presented in Table 18.

Table 18. Monitoring Frequency for Land-Applied Biosolids.

Annual Application Rate (Metric Dry Tons per Year)	Monitoring Frequency
<290	Once per year
>=290 but <1500	Once per quarter
>=1500 but <15000	Once per 60 days
>=15000	Once per month

6.5.2 Incineration

A permit application is required by MDEQ prior to installation and operation of a municipal waste incinerator. According to MDEQ regulations, no municipal waste incinerator may be constructed within 1,000 feet of:

- Residential dwellings.
- Public or private elementary or secondary schools.
- Preschools.
- Hospitals.
- Nursing homes.

MDEQ requires that best available control technology for toxics (T-BACT) be installed to limit any impact from toxic air contaminants. MDEQ requires an estimate of the maximum uncontrolled and controlled emission rates (lbs./ hr. and tons/ year) for the following:

- particulate matter (as total suspended particulate and PM10)
- sulfur dioxide
- nitrogen oxides (expressed as NO2)
- carbon monoxide
- non-methane hydrocarbons (expressed as methane)
- lead
- mercury
- arsenic
- cadmium
- chromium (both total and hexavalent)
- total polychlorinated dibenzo-p-dioxins (PCDDs) (tetrachloro- through octachloro-isomers)
- total polychlroinated dibenzofurans (PCDFs) (tetrachloro- through octachloro-isomers)
- hydrogen chloride
- benzo(a)pyrene
- fluorides
- sulfuric acid

The air emissions from municipal waste incinerators are regulated under US EPA 40 CFR Part 60. The discharge limits for regulated pollutants are presented in Table 19. Certain pollutants have an alternative limitation to determine compliance. Where there is a limit and an alternate limit, the less stringent of the two limits applies.

Table 19. Air Quality Discharge Limitations for Municipal Waste Incinerators

Pollutant	Limit (per dry standard cubic meter, corrected to 7 percent oxygen)	Alternate Limit (per dry standard cubic meter, corrected to 7 percent oxygen)
Particulate Matter	24 milligrams	-------
Opacity	10 percent (6-minute average)	-------
Cadmium	0.020 milligrams	-------
Lead	0.20 milligrams	-------
Mercury	0.080 milligrams	15 percent of potential mercury emission concentration (85 percent reduction by weight)
Sulfur dioxide	30 parts per million by volume	20 percent of potential sulfur dioxide emission concentration (80 percent reduction by weight)
Hydrogen chloride	25 parts per million by volume	5 percent of potential hydrogen chloride emission concentration (95 percent reduction by weight)
Dioxin/furan total mass	13 nanograms	-------
Nitrogen oxides	180 parts per million by volume (first year of operation)	-------
Nitrogen oxides	150 parts per million by volume (after first year of operation)	-------

6.5.3 Landfill

Disposing of biosolids in a landfill requires that the sludge be dewatered to acceptable levels (by passing a 'paint filter test') for transportation and acceptance by the landfill operators.

Any disposal option may result in that disposal method placing more stringent pollutant limitations on the wastewater discharge than the water quality based effluent limits. This in turn will affect the local limits for that particular pollutant.

6.6 Projected IPP Local Limits

The substances for which projected local limits were calculated make up 30 of the 132 GLI parameters that currently have limits. These thirty substances are considered the most likely of concern at a treatment plant.

The current DWSD local limits are based on MDEQ Rule 57 (Michigan Water Quality Values) and do not include methodologies implemented by the GLI. The projected local limits presented in Table 20 illustrate a scenario based on the differing watersheds within the DWSD service area with the following assumptions:

- MDEQ Rule 57 including GLI water quality methodologies.
- Significant Industrial User (SIU) pollutant allocation distributed using the Uniform Allocation Method (i.e. equal distribution among all SIU's discharging every regulated pollutant at the maximum limit).
- The proposed wastewater treatment plant would have an average discharge of 50 mgd.
- Five million gallons would be attributable to Significant Industrial Users.
- The published EPA treatment plant removal efficiencies for each pollutant were used.
- Background concentrations from domestic sources are based on 1994 values for the DWSD service area.
- All limits are in µg/ L.
- The discharge was assumed to be at the main branch of watershed.
- Pertinent receiving stream parameters, as presented in Table 21.

Table 20. Current / Projected Local Limits.

Substance	Current DWSD local limit	Discharge to Detroit River Local Limit	Discharge to Rouge River Local Limit	Discharge to Clinton River Local Limit	Discharge to Lake St. Clair Local Limit
Arsenic	1,000	900	900	900	900
Cadmium	2,000	230	130	170	120
Chromium (Total)	25,000	3,200	3,200	3,200	3,200
Copper	4,500	870	670	870	640
Cyanides	2,000	670	160	210	150
Lead	1,000	10,000	1,100	1,400	1,000
Mercury	5	0	0	0	0
Nickel	5,000	5,200	780	1,100	750
Silver	2,000	380	33	48	32
Zinc	15,000	5,200	5,200	5,200	5,200
PCBs	1	0	0	0	0
Benzene	--	5,300	5,300	5,300	5,300
Phenol	0.5	39,000	39,000	39,000	38,000
Selenium	--	1,700	93	120	90
Lindane	--	1	1	1	1
Pentachlorophenol	--	870	190	240	130
2,3,7,8-TCDD (dioxin)	--	0	0	0	0
Aldrin	--	0	0	0	0
Chlordane	--	0	0	0	0
4,4'-DDT	--	0	0	0	0
Dieldrin	--	0	0	0	0
Endosulfan	--	3	3	3	3
Endrin	--	2	0	0	0
Heptachlor	--	23	0	0	0
Hexachlorobenzene	--	0	0	0	0
Hexachloroethane	--	2,500	300	400	240
Parathion	--	1	0	0	0
Toxaphene	--	0	0	0	0
Methylene Chloride	--	46,000	21,000	28,000	21,000
Trichloroethylene	--	40	40	40	40

Table 21. Receiving Stream Parameters.

	Detroit River	Rouge River	Clinton River	Lake St. Clair
95% Exceedance Flow	120,000 cfs	13 cfs	140 cfs	0 cfs
Harmonic Mean	205,000 cfs	200 cfs	330 cfs	0 cfs
90Q10	130,000 cfs	20 cfs	170 cfs	0 cfs
PH	8.2	8	8.2	8.2
Hardness (mg/l as $CaCO_3$	100	250	190	100

7. DWSD Local Limits Software

DWSD currently uses a software program that allows for the calculation of local limits within the DWSD service area. This program was reviewed to determine its ability to model local limits for a proposed treatment plant that may discharge to varying watersheds.

The software developed for DWSD under Contract CS-1224 contains four main functions

- Perform Calculations – user selects pollutant of concern and program calculates local limits.
- View Calculations – user can search and display previous local limits calculations.
- Industrial Users – displays all available data for a given industrial user.
- Administration – allows an administrator to change data in the pollutant and industrial user database.

The software program developed for DWSD in 1995 contains a list of approximately 500 pollutants for which local limits may be calculated. The program allows DWSD to pick any of the 500 pollutants and calculate a local limit. The database of the 500 pollutants contains only DWSD-specific water, air and sludge quality values, not the means to calculate these values.

Due to the many changes in water quality regulations, air quality regulations and sludge quality regulations, the approximately 500 pollutants have out-of-date limits. Therefore, in order for the pollutant table to be brought up to the most current limits, a program would need to be run to calculate the new limits based on:

- GLI acute and chronic values.
- The flow of the Detroit River.
- The pH and hardness of the Detroit River.
- The discharge rate of the DWSD WWTP.
- The sludge flow at the DWSD WWTP.
- Updated plant removal efficiencies.
- Updated background sampling data.

Since the current DWSD software program is run with Paradox software, the resulting pollutant table would need to be saved in the correct form of Paradox.

Because the current DWSD program limits are specific to only the DWSD WWTP, it would be difficult to model various watersheds with the software. For every watershed (including different streams within the watershed) and varying WWTP flows, a different pollutant limits table would need to be calculated and exported into Paradox. Though not impossible to do, the many different combinations of variables that may be encountered when looking at different watersheds and streams/ lakes within that watershed could make this a time consuming process.

The current DWSD software is also only designed to calculate toxic pollutants. Any local limits calculations regarding compatible pollutants (BOD, SS, Phosphorus, Ammonia-Nitrogen, and Oil and Grease) would need to be performed outside of the DWSD software. The compatible pollutants could be important factors in local limits calculations, since most of the watersheds in the DWSD service area are impaired for at least one of the compatible pollutants.

8. Issues For Further Discussion

8.1 MDEQ

As discussed, a significant potential influence on the allowable pollutant loading from a new or increased wastewater discharge will be the policies regarding TMDLs. Since the MDEQ is in charge of implementing such TMDLs, it would be beneficial to command some detailed understanding of such issues. The MDEQ can address issues such as when the specific proposed TMDLs be implemented, what the precursors are before implementation, how pollutant loads would be measured, which pollutants are to be studied, as well as other associated factors that are to be considered with an increased pollutant discharge.

The MDEQ is also the issuing authority for preliminary effluent limitations for any proposed NPDES permit. The MDEQ will need to know projected wastewater flow, type of wastewater treatment technologies to be utilized and the exact location of any discharge point. The MDEQ will determine if any new or additional discharges will be allowed to a particular watershed. If the discharge is allowed, the MDEQ will respond with the water quality based effluent limitations that the discharge would be expected to meet.

Regulations for an alleged discharge site are location specific. Discharge limits can therefore only be determined once a specific site and receiving water is chosen. NPDES permitted discharges will have further limitations on sections of the water body that require a TMDL. Thus, any wastewater discharges, present or future, at or upstream of a designated TMDL area, must conform to these potentially more stringent requirements. The current NPDES permit limitations, shown tables 2-xx, do not include the impact of such TMDLs. Further discussion with the MDEQ is needed to understand the impacts of these TMDLs and how they could affect future NPDES limitations.

The National Environmental Policy Act (NEPA) of 1969 illustrates a need to protect the harmony between humans and the environment. To facilitate protection efforts, the act requires any facility receiving state and/ or federal funds to undergo an environmental assessment by the MDEQ. This assessment, more often than not, concludes with a Finding of No Significant Impact (FONSI) and the process stops there. However, if there is a potential of a significant environmental impact, an Environmental Impact Statement (EIS) must be prepared. Further discussion with the

MDEQ would provide beneficial insight toward these regulations, requirements, and limitations.

8.2 DWSD

DWSD should be kept aware of potential changes on local limits created by an additional wastewater treatment plant. For example, industrial users within the new treatment facility service area will have to meet different limitations than a similar one in the existing service area.

Another issue for discussion with DWSD relates to the possibility of collaborating with existing plants. Other plants that are presently operating within the DWSD service area (i.e., Pontiac, Mt. Clemens, etc.) may be able to provide further capacity and/ or may have room for possible expansion.

9. Conclusion

Poor water quality currently poses serious concerns for most of the watersheds in southeast Michigan, especially with the anticipated population and urban growth in the years to come. The implementation of the TMDL's will probably pose the most significant limitations on any impending discharge plans, notably when concerning a potential expansion or construction of a new wastewater treatment plant. The limit values illustrated herein provide an opportunity to visualize how the current watersheds are maintained; yet, the inclusion of TMDL values will present a totally different picture. With the expected urban growth in mind, the ambient water quality, at the time of NPDES permitting, will provide a reasonable indicator to such limitations. Whether or not the designated uses are provided for at the time of the NPDES permit application submittal, will provide an idea as to what limitations will be set by such TMDL's, as well as the NPDES and IPP Local Limit discharge values.

Aside from the standard construction permits required to build a new plant or to expand on an existing facility, any construction would have to comply with the Michigan Natural Resources and Environmental Protection Act of 1994. Part of this law requires a Statement of Anti-degradation. The Anti-degradation Statement must identify the social and economic development benefits, and point out potential community- and industry-benefit opportunity costs if the new or increased discharge is not allowed.

The method of biosolids disposal by a wastewater treatment plant must also comply with applicable federal and state regulations, whether by methods of land application, incineration, or disposal of the biosolids into a landfill.

In an effort for the state to maintain water quality standards, and thereby protect wildlife, habitat, and human prosperity, future regulations must and will continue to become more stringent. To avoid any potential water quality concerns, an overall picture must be upheld illustrating the benefits of any expansion or construction to all

concerned parties. Any potential expansion or construction of a treatment plant will need to be designed to not only meet, but exceed, existing regulations.