Detroit Water and Sewerage Department

Wastewater Master Plan

DWSD Project No. CS-1314

Flow Needs for DWSD Customers Through 2050

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Flow Needs for DWSD Customers through 2050

1. Introduction

The purpose of the flow needs analysis is to project the total flows that are expected to be generated within the DWSD sewer service area. These projections have been used for the DWSD Wastewater Master Planning purposes by providing a technical basis for evaluating the sewer system capacity issues that currently exist or might arise in the future. The analysis includes projecting both dry and wet weather flows for DWSD customers through 2050, the planning horizon of the Wastewater Master Plan. The results of this analysis have been provided to the Contract Work Group for their use in future contract negotiations.

The development of the flow projections and flow needs has been supported by a subcommittee of the WWMP Technical Work Group. Subcommittee meetings were held on August 1, August 15, and September 23, 2002, to review the approach and results. Preliminary results were provided to the Technical Work Group on September 27, 2002. This memo summarizes the determination of average daily flow and maximum month flows for the years 2000 through 2050 by decade using meter flow data. It also includes peak flows that were calculated by the WWMP Model for a 10-year, 1-hour design storm event. Calculated treatment rates based on input from the SSO Work Group analyses are also discussed and provided.

2. Approach

2.1 Projection of Future Flows

Wastewater flows for which projections are required are considered to consist of three components: Sanitary, Dry Weather Inflow/Infiltration (DWII), and Wet Weather Flow (WWF). These three components are projected to future years separately, based on the factors that impact these flows.

Sanitary flow includes residential flow, commercial/business/institutional flow and significant industrial users flow. Residential flow has been determined to be approximately 77 gallons per capita per day (gpcd). This rate is determined to be an average rate for the DWSD service area based on water use from selected communities during winter months (three-year average). It is anticipated that this rate may decrease in the future with the increase use of water saving devices, however, for purposes of estimating future residential flow, this rate is assumed to be a constant. Future residential flow is then simply the future population times the unit rate of 77 gpcd.

Commercial, business, and institutional flow has been related to employed populations within the service area. A rate of 50 gallons per employee per day (gped) is determined to be an average rate based on the same methodology as used for determining a residential water use rate. It is assumed that this rate will not change in

the future. Future commercial/business/institutional flow is then simply the future employed population times the unit rate of 50 gped.

The current Significant Industrial Users (SIUs) flows were obtained from the year 2000 data set constructed by CH2M HILL; they are further described in the Task A report. It is anticipated that the SIU flows will decrease in the future as industries adopt improved processes or possibly relocate out of the DWSD service area. For purposes of projecting to future conditions, it is assumed that the current SIU flow generation will remain a constant over the 50-year planning horizon of the WWMP. Because flows from employed populations that work at SIUs are included in the SIU's flow, calculation of employed population flow requires subtracting out the SIU employed population to avoid double counting flows.

Sanitary flow for any decade is thus calculated as the sum of these three components as follows:

$Qs = \text{Residential} * 77 \text{ gpcd} + (\text{Employee} - \text{SIU Employee}) * 50 \text{ gped} + Q_{SIU}$

Where the residential and employed populations are set for the year for which a projection is desired.

DWII and WWF are a function of a number of variables, including sewer density, soil types, construction methods, presence of footing drains, ground water levels, and annual precipitation. While the sanitary flow component is considered to be related primarily to population and SIUs, the DWII and WWF components are considered to be more of a function of the sewered area. For purposes of the Master Plan, these components are assumed to remain constant in the future for the existing sewered areas. That is, any increase in these flows that might be expected due to systems getting older is anticipated to be offset by maintenance of the systems.

For areas to be sewered in the future, a unit DWII rate based on an average DWII rate of selected areas was use to project these flows. Initially, a unit DWII flow rate determined from an adjacent sewered area was used for predicting flows from future sewered areas. This approach had a shortcoming in that the adjacent areas in some cases included older sewered areas that have higher unit rates than what might be expected for new areas to be sewered using newer construction materials and methods. The approach was modified by considering the unit rates of a number of communities to determine an average fixed unit rate based on new sewer construction to use for all new areas to be sewered. This approach provided an added benefit of having a consistent rate for all new areas versus a variable rate.
The use of a unit rate approach applies to the projection of the average day and peak month flows. For the 10-year peak flows, the wet weather response factors in the model are assumed to apply to any increase in tributary area.

For this analysis, the sanitary flow is assumed to be constant on an average day basis over the year. The changes in flow levels observed within the system during the year and from year to year are assumed to be due to changes in DWII and WWF.

2.2 Flow Data

The flow data used for this analysis were obtained from the GDRSS Flow Monitoring project. Flow data for a number of meters have been collected under a rigorous quality control program for the last several years. Out of the 4 years of data available (1998 through 2001), the year 2001 flow had the highest average flow, as determined by flows at the WWTP. The average daily flow for the year 2001 and the four-year averages are provided in Table 1 for both total flow and dry weather only flow. Additional years of data would be required to determine how these flow levels might be considered within a 20-year or longer data set. That is, the year 2001 flow levels might be an average level if reviewed within a 20-year span of data.

As a number of additional meters were added to the program in the year 2000, the year 2001 data set was used as a basis for the analysis. Projections using the average of the four years of data were also made, but these projections required correlations to be developed for many of the meter districts for which meter data was not available before 2001.

Table 1. WWTP Influent Flows (MGD)*

Type of Flow	1-Year Average (2001)	4-Year Average (1998 – 2001)
Average Daily Total Flow	724	669
Average Daily Dry Weather Flow	605	549

*Flows given do not include recycled flows

2.3 Population and Tributary Area

The WWMP GIS was used to provide populations and sewered areas by decade within the DWSD service area through the year 2050.

A map of the projected sewered areas was prepared. The map is based on data from SEMCOG and new data collected for this master plan. The map shows future sewer service areas for 2010, 2030, and 2050. A variety of information was obtained from SEMCOG and used to project sewer service area extensions to 2050 including: Southeast Regional Sewer Service map, projected population and employment data 2000- 2050, Regional Future Land Use map, 1990 Traffic Analysis Zones (TAZ) map and the 2030 Regional Development Forecast.
In addition, information obtained from communities and analysis of soil suitability for on-site sewage systems was incorporated.

Land uses were aggregated into several land use classifications. These classifications are provided in Table 2 along with the total area associated with each classification. These areas are also shown in Figure 1 (attached).

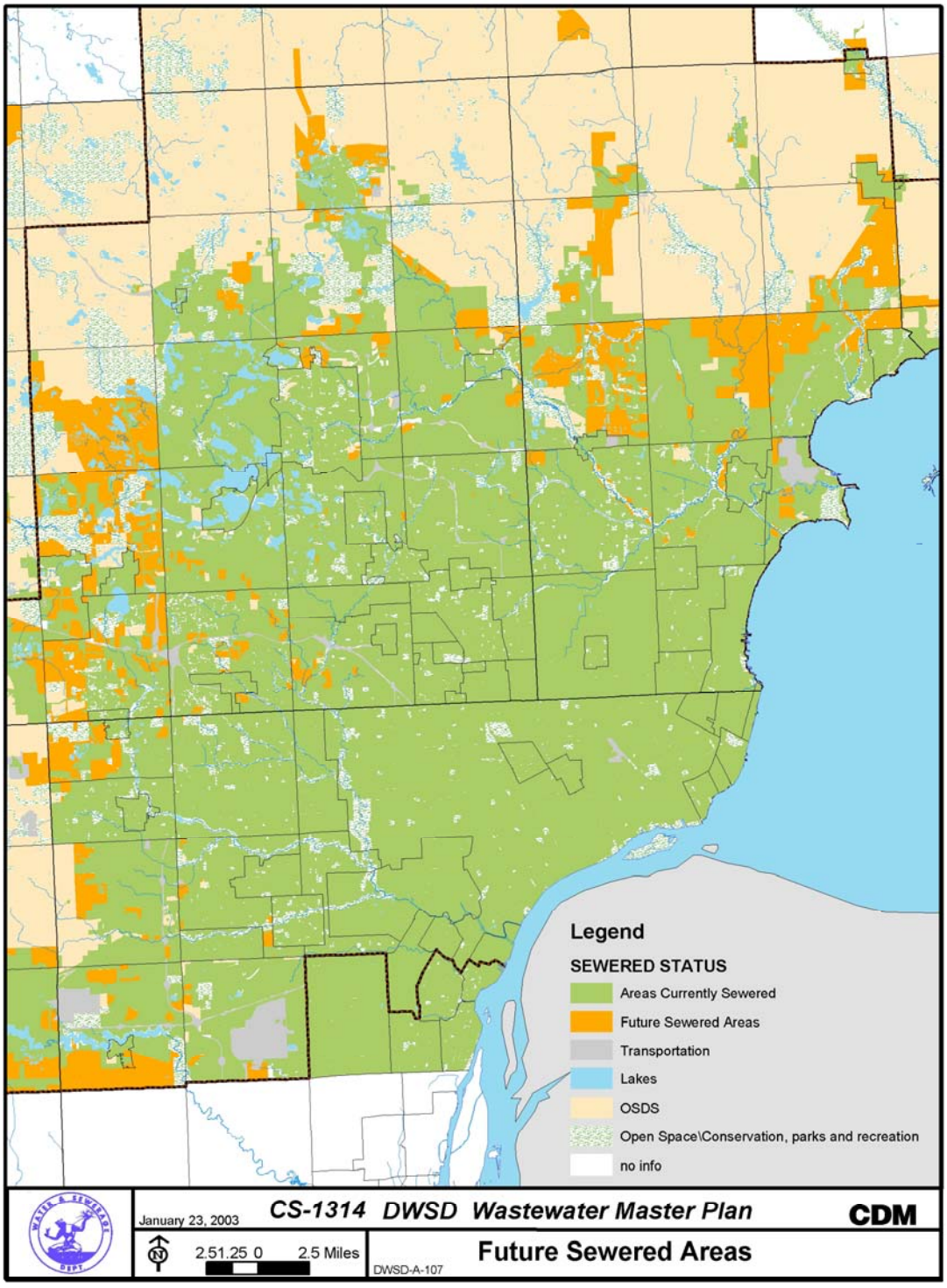

Figure 1. Land Use in the Planning Area

Table 2. Sewered Areas and Other Land Use Classification within DWSD Service Area

Land Use Classification	Acres	Sq. Miles
Currently Sewered	505,230	789
Sewered between 2000 & 2010	29,126	46
Sewered between 2010 & 2030	17,300	27
Sewered between 2030 & 2050	10,075	16
Airfields	2,269	4
Lake	14,432	23
No info	3,516	5
Open Space\Conservation	43,229	68
On-site sewage disposal	14,753	23
Parks and recreation	4,425	7
Transportation	4,819	8
Total	649,174	1,014

The projected sewer service area layer was intersected with SEMCOG's projected population distributed by TAZ layer, the DWSD Meter District layer, the subarea (model related) layer, and the First Tier Customer layer. The resulting attribute data table allows determining the populations and areas by decade for these layers.

3. Average Day and Peak Month Flows

3.1 Year 2001 Data

Table 3 (attached) lists the meters for which data were available. It also provides various statistics of the flow data for the year 2001: Annual average, Maximum month, Peak day, and minimum day, for all flow and for dry flow. Dry flow is flow corresponding to days selected as dry days. The criteria used for the selection of these days reflect what was in use by the GDRSS Metering project prior to October 2002. An updated version of these criteria was used for the selection of dry days for the 4-year period of record.

The locations of these meters and their associated tributary area (meter district) are shown in Figure 2. These districts in some cases represent an incremental tributary area. Flow for the incremental area is determined by subtracting the upstream meter(s) from the downstream meter. This calculation results in the flow for just the meter area, referred to as the incremental flow.

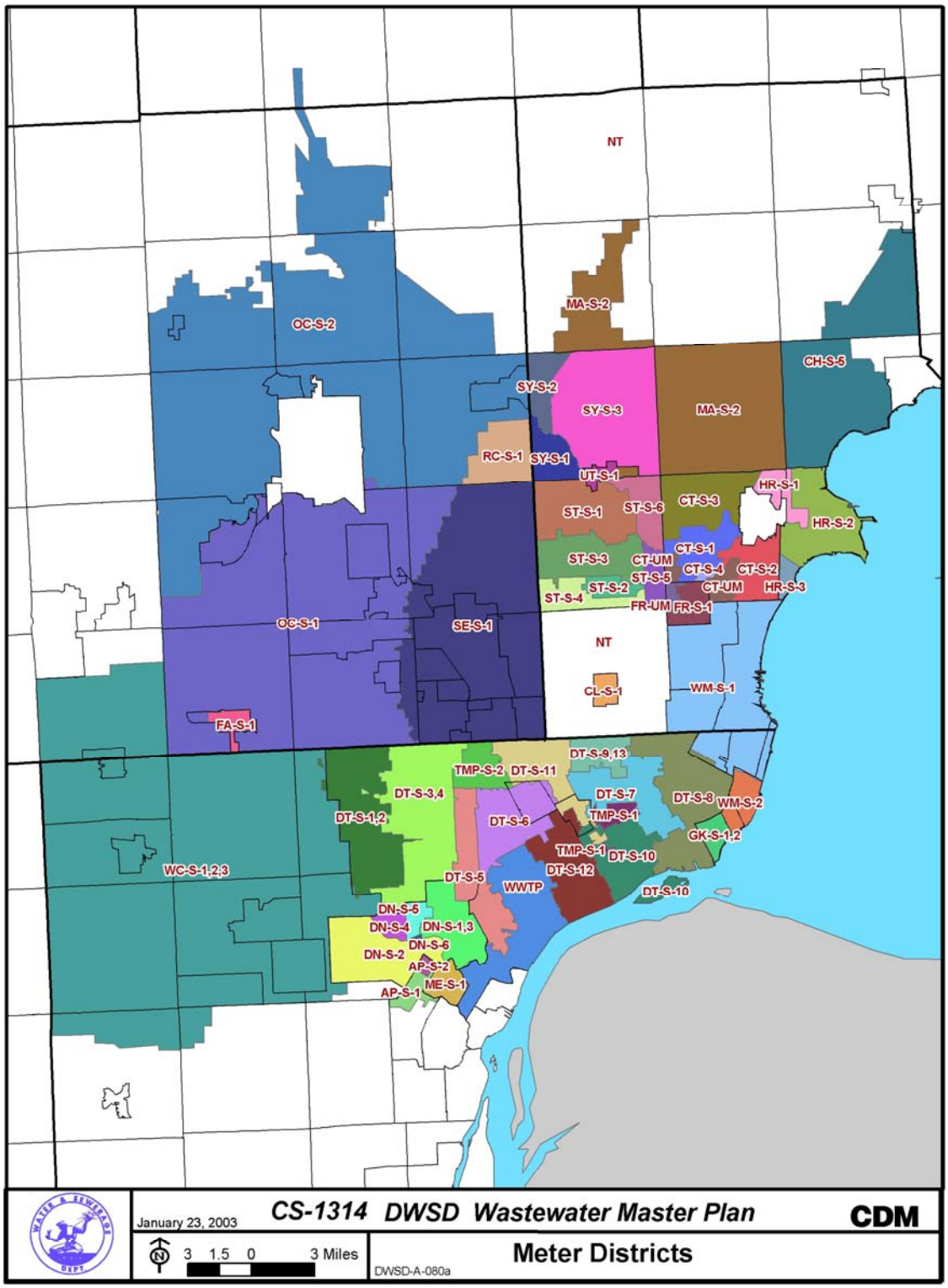

Figure 2. DWSD Meter Districts

Four types or sets of flows were determined as follows:

- Annual average daily total flow
- Annual average daily dry weather flow
- Peak month average total flow
- Peak month average dry weather flow

For the peak month flow, the month of February was used as this month had the highest flow of all the months in the year for both all flow (dry and wet days) and dry flow (dry days only considered).

The incremental flow calculation for each meter district is provided in Table 4a through 4d (attached) for these four sets of flows. In some cases, meter flows were combined to represent a meter district. Allen Park flows, for instance, are measured by two meters. However, the flows from these two meters are combined in the table to represent Allen Park as one district. There are also 3 unmetered districts and 1 meter district without data. For these districts, the average flows of an adjacent district were used as a surrogate. Finally, three areas had temporary meters that are no longer in place. For these areas, a correlation was used to determine their flows.

For areas without upstream tributary area(s), the incremental calculation is simply the flow of the meter. For the WWTP incremental area, the calculation is quite complex as a number of meter flows are subtracted to obtain the incremental flow. The second column of Table 4 gives the total flow for the meter while the last column gives the incremental flow.

The flow data are associated with meter districts, but the flow projections are made by First-Tier Customers (FTC). The four sets of flows for each meter district are allocated to FTCs as follows. The sanitary component is calculated directly, as the populations (residential and employed) and SIU flows are available in the database by customer district. The DWII and the WWF are distributed in proportion to sewered areas. The FTCs are shown in Figure 3.

3.2 Future Flows

Future flows are determined as follows. The sanitary flow component is calculated directly using Equation 1 with future populations. The DWII and the WWF flows for existing areas are assumed to not change over time, as previously discussed.

For future areas to be sewered, the following was done. For each set of flows, the sanitary flow was subtracted and the remaining flow was converted to units of gallons per day per acre (gpd/acre). A chart showing the Annual Average Dry Weather Inflow/Infiltration (DWII) for separate sewer service meter districts is shown in Figure 4 (some meter districts are grouped by community or sewer district).

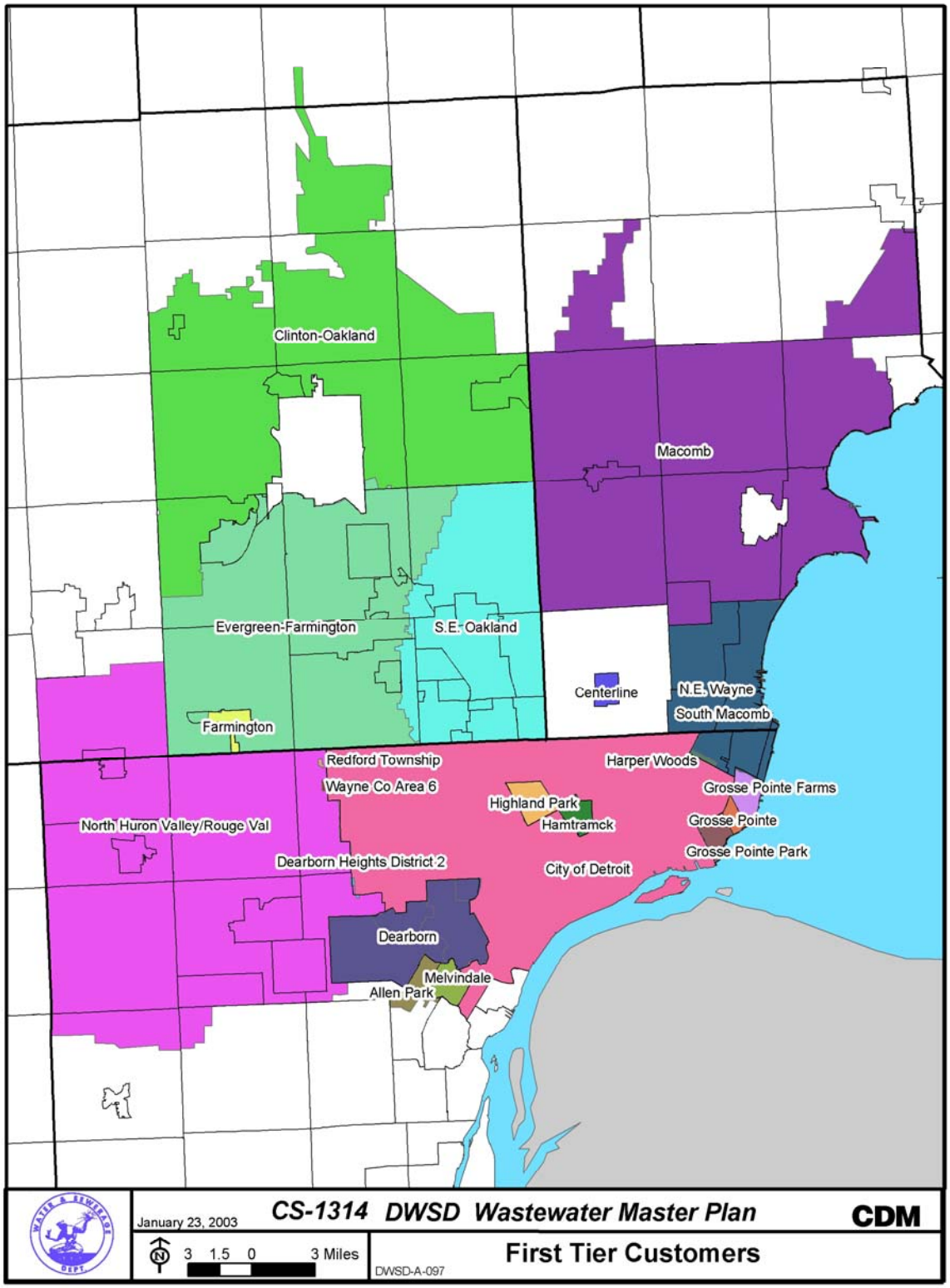

Figure 3. DWSD First Tier Customers

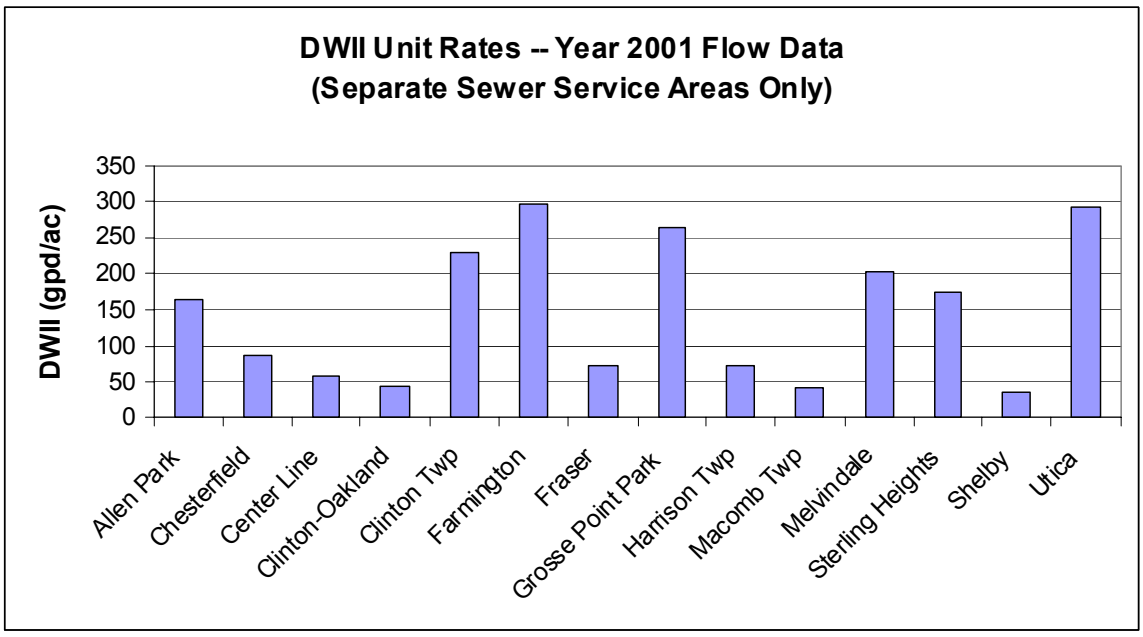

Figure 4. DWII Unit Rates for Separate Sewer Service Systems

As can be seen, the rate varies from below 50 up to 300 gpd/acre. In general, the higher rates are associated with older communities. It is expected that rates from new sewered areas will correspond to the lower unit rates depicted in the chart.

The above chart does not show results for individual meters districts as the data is grouped by community and/or sewer district. For 5 meter areas, the DWII component was calculated to be negative. This result generally is assumed to be due to inaccurate population estimates where the traffic analysis zones (TAZs) used to determine population and corresponding sanitary flow do not always line up exactly with the meter tributary area, resulting in some discrepancies. In addition, the unit rate of 77 and 50 gpd/person for residential and employed population may not be appropriate in some small areas as these rates reflect overall averages.

For the DWII component, it was decided to use the average of all the positive meter flows below 100 gpd/acre. The average of the positive unit flows below 100 gpd/acre is 53 gpd/acre for DWII.

The number of meter districts with positive unit flow rates less than 100 gpd/acre was seven. This approach was used for determining unit rates for the other three sets of flows. For these other sets of flows, the lowest seven positive flows were used to determine an average unit rate. The results for all four sets of flows are provided in Table 5.

Table 5. Unit Rates for Projection of Flows for New Sewered Areas*

Type of Flow	Unit Rate (gpd/ac)
Annual Average DWII	53
Annual Average DWII & WWF	81
Peak Month DWII	70
Peak Month DWII & WWF	86

*Based on average of lowest 7 meter districts

The total sewered area (as opposed to service area) in the year 2000 is estimated to be 505,230 acres (789 sq. miles). The projected sewered area in 2050 is 561,731 acres (877 sq. miles), an increase of 56,501 acres (88 sq. miles). The existing DWII has been determined to be 388 cfs based on year 2001 meter data. Using the unit rate of 53 gpd/acre for newly sewered areas, the DWII is projected to increase by 5 cfs to 393 cfs. This increase is quite small, being just over 1 percent of existing DWII.

3.3 Four-Year Average Analysis

In addition to projecting from the year 2001 data, a 4-year average was also used for projecting future flows. This analysis required using correlations to the WWTP flows as a complete data set is not available for all the meters used in this analysis. Dry weather flow data for the year 2001 have been correlated to the WWTP flow data for each meter being reviewed. The resulting correlations enable the use of flows at the plant to generate flows for other current years, not for flow projections to future years. These average flows are divided into sanitary, DWII and WWF components using methodology as previously defined.

The flows at the plant for these four-year averages are provided in Table 6.

Table 6. Four-year average flows at the WWTP

Type of Flow	Flow (MGD)
Annual Average DWF	549
Annual Average DWF & WWF	669
Peak Month DWF	599
Peak Month DWF & WWF	720

The peak dry weather flow month used in this case was March. Table 7 (attached) gives the correlations developed for the meters and the calculated flow for each meter district for the four types of flows.

3.4 Results

The current and projected baseline data related to all of the First Tier Customers (FTC) that are currently being served by DWSD sewer system are presented in Table 8 (attached). This table consists of a series of 6 sub-tables labeled **a** through **f** that corresponds to the decades 2000 through 2050. These tables includes the following items.

- **Customer Tributary Area**: Represents the sewered area in acres of the district

- **Resident Population**: Number of people who reside within the District's sewered area.

- **Employment Population**: Number of people who are employed within the FTC tributary area.

- **Significant Industrial Users (SIU) Population**: Number of people employed by a SIU. The flows attributed to this population are part of the SIU flows, therefore, they are subtracted from the number of employed population when calculating employed population flow or an equivalent population (see below).

- **Significant Industrial Users (SIU) Flow:** Flow generated by the SIUs.

- **Equivalent Population:** A theoretical number of people that would generate the same flow as generated by the resident population, the employed population less the SIU employed, and the SIU flows. It is calculated as follows:

  Eqv. = Res. + (Emp. - SIU Emp.) * (50/77) + SIU Flow (gpd) / 77 (2)
  This calculation uses the 77 gpcd for residential population and 50 gpcd for Employed population as determined elsewhere in the Master Plan project.

Tables 9 through 12 (attached) give the average daily flows and peak month flows as projected based on year 2001 data and on years 1998 through 2001 (4-year average) data. The following table is provided as a key to the terms used in these tables.

	Flow Components				
Type of Flow	**Sanitary Flow**	**DWII**	**DWF**	**WWF**	**Total Flow**
Average Daily	A	B	A+B	C	A+B+C
Maximum Month	D	E	D+E	F	D+E+F

Tables 9a through 5f present the Average Daily Flows (ADF) discharged by the First Tier Customers (FTCs) into the DWSD sewer system for the years 2000 through 2050 by decade. The 2001 flow rates collected by the GDRSS Metering project are assumed to represent the year 2000 flows.

The three components of the meter flows, Sanitary, Dry Weather Inflow Infiltration (DWII) and Wet Weather II (WWF) are denoted as A, B and C, respectively. The following is a further explanation of the terms used in the tables:

- **Average Daily Flow (ADF) (A+B+C):** is the average of the total daily flows throughout the year.
- **Dry Weather Flow (DWF) (A+B):** is the average of the dry weather flows over the dry days of the year only.

- **Sanitary Flow (A):** is the flow generated by the resident and employed population and the SIUs. It is calculated as follows:
- Sanitary Flow (MGD) = Equivalent Population x 77/1,000,000
- **Dry Weather Inflow/Infiltration (DWII) (B):** is the inflow/infiltration that enters the sewer system during dry weather periods. It is calculated by subtracting the Sanitary Flow (A) from the Dry Weather Flow (A+B).
- **Wet Weather Flow (WWF) (C):** is the flow of storm water or rain-dependent inflow/infiltration that enters the sewer system during wet weather periods. It is calculated by subtracting the Dry Weather Flow (A+B) from the Wet Weather Flow (A+B+C).

The Maximum Monthly Flows (MMF) discharged by the FTCs into the DWSD sewer system are provided in Tables 10a-f. As previously mentioned, the flow rates for the month of February in the year 2001 are assumed to represent the year 2000 flows. The three components of the meter flows, Sanitary, Dry Weather Inflow Infiltration (DWII) and Wet Weather Flow (WWF) are denoted as D, E and F respectively. The following is a further explanation of the terms used in the tables:

Maximum Monthly Flow (D+E+F): is the average daily flow for one month of the year that represents the highest total monthly amount of flow compared to the other months of the year. In this study the maximum month was February of 2001. It is calculated by adding (D+E+F).

Maximum Monthly Dry Weather Flow (D+E): is the average daily flow of dry days only for one month of the year that recorded the highest total monthly amount of flow compared to the other months of the year. It is calculated by adding (D+E).

Maximum Monthly Sanitary Flow (D): is the maximum monthly flow generated by the resident population and the employment population after subtracting the SIU employment population, then adding the flow generated by the SIU employment. In this study, (D) was assumed to be equal to the Average Daily Sanitary Flow (A) between 2000-2050.

Maximum Monthly Dry Weather Inflow/Infiltration (E): is the maximum monthly flow of groundwater that leaks into or enters the sewer system.

Maximum Monthly Wet Weather Flow (F): is the maximum monthly flow of surface water or storm water that leaks into or otherwise enters the sewer system

Tables 11a-f present the average daily flow discharged by the First Tier Customers (FTCs) into the DWSD sewer system as projected by using the average of the 1998-2001 WWTP average daily flow and the correlations developed from the year 2001 data. Tables 12a-f present the maximum monthly flows as projected by using the average of the 1998-2001 WWTP flow meter data and the same correlations developed from the year 2001 data.

4. Peak Day and Peak Hour Flows (Dry Weather)

In addition to determining existing average daily flows and maximum monthly flows and projecting these flows through 2050, peak day flows and peak hour flows during dry weather conditions were also determined for existing and future conditions. The peak day dry weather flow for existing conditions is based on February 24, 2001. This day had the highest total flow at the WWTP of all the days classified as DWF days in the year 2001. Results of this analysis are provided in Table 13 (attached). The total peak day dry weather flow increases from 757 MGD in the year 2000 to 789 MGD in the year 2050. The projections were based on using an estimate of 67 gpd/acre for peak day DWII for areas to be sewered in the future. It should be noted that the peak day selected, February 24, 2001, did not always correlate to the maximum day for individual customers. That is, for some customers, the peak day flow is less than the peak month flow.

The total of the projected peak day flow through 2050 is projected to be less than the secondary capacity of 830 MGD, which is the estimated secondary capacity without recycle flows. A review of the peak hour flow was also done to check for whether the diurnal variations in the influent flow would result in flow rates exceeding the secondary capacity of the plant. Results of this analysis are provided in Technical Memorandum *Diurnal Flow Analysis of Wastewater Treatment Plant Influent*. In summary, it was found that the projected peak hour flows through 2050 would not exceed the plant's capacity during dry weather. Additional details of the assumptions and method to develop these results are in the aforementioned memo.

5. Peak Wet Weather Flows

The flow needs analysis initially included a review of the meter data for determination of peak day and peak hour flows for wet weather flows as well as dry weather flows. For areas without meters, the peak flow was allocated proportionally by the tributary area. The city of Detroit's flows were determined as the difference between the summation of all the suburban meters and the WWTP capacity.

Based on input from the flow needs sub committee, it was determined that this information would not be helpful for several reasons. First of all, the timing of the peak of the flows would not be factored into the analysis – the peak treatment capacity available at the plant for Detroit cannot be computed as simply the difference between the total treatment capacity at the plant and the total suburban peak flows due to travel time and in-system storage effects on the peak flows. The use of the peak treatment capacity at the plant also does not account for the CSO facilities within the system where some flows would receive some level of treatment. Finally, determining peak flows for non-metered areas on the basis of percent area was considered to not be accurate or helpful in understanding peak flows for these communities.

It was decided within the subcommittee to use peak flows from the model to investigate flow needs. Several events were proposed for review, but eventually the 10-year, 1-hour design event was selected based on input from the SSO Work Group.

Peak flows for the First Tier Customers (FTCs) are provided in Table 14 (attached). These flows are from the WWMP Model resulting from a 10-year, 1-hour design storm event under summer (growth) conditions. Peak flows are provided only for those communities for which the sewer system, at least at the point of connection to the DWSD system, are hydraulically modeled. Several FTCs are represented only hydrologically; peak flow rates are noted as not available in the table for these customers.

6. Flow Needs Investigation

The average flows, the peak month flows, the peak day and hour dry weather flows, and the peak wet weather flows resulting from a 10-year, 1-hour summer storm event indicate the expected flows needs of the communities. To understand what peak wet weather flows would be reasonable for Detroit to accept, a standard was develop to established an upper peak flow limit that would be accepted by DWSD. This standard was developed by the SSO Work Group to develop limits that would provide equity among the first tier customers.

The standard was developed based on review of current peak flows resulting from a 10-year, 1-hour design event for growth (summer) antecedent conditions from each community within the DWSD service area for which data and model results were available. The peak rates, after removing employed and SIU flows, were unitized using residential population solely for purposes of being able to compare the peak rates on a common basis. These peak rates were then plotted against the percent of homes with connected footing drains within each community.

The percent of footing drains connected accounts for the degree of wetness in the system, which typically can be related to the age of the system and/or the type of construction methods. In this case, the presence of footing drains being connected to the sanitary sewer system was used to define the degree of wetness.

A linear regression was performed on the data with outliers removed. A tolerance of 0.1 cfs (~25%) was added to get a line that ranged from 0.4 cfs/1000 residents for 0% of footing drains connected to 0.8 cfs/1000 residents for 100% of footing drains connected. This analysis and resulting residential unit-rate limit line is shown in Figure 5 (attached). As can be seen, systems that have footing drains connected are allowed a higher standard than systems without connected footing drains. The equation for the line is as follows:

$$\text{Residential Unit Rate Limit (cfs/1000)} = FD\% * 0.4 + 0.4$$

In addition to defining an allowable unit rate for separated areas, a unit rate of 0.5 cfs/1000 residents was set as an allowable unit rate for combined areas. This rate is based on historical design criteria used for combined areas to sized interceptors. Table 15 (attached) presents the type of sewer service and the comparable unit rate as calculated for each First-Tier Customer and Detroit. The second column gives the total area sewered as determined for the year 2000. This area is broken down into

combined, separate with footing drains, and separate without footing drains in the following columns. The comparable unit rate (UR) provided in the last column is calculated as follows:

UR = [0.5 (Combined) + 0.4 (Separate) + 0.8 (Separate w/FD)]/Area

Thus, for customers with multiple sewer service areas, the unit rate is effectively weighted averaged by area. This precludes the need to calculate a percent of area with footing drains connected to the sanitary sewer system.

The flow limit as defined by the comparable unit rate is calculated as follows:

Qr = Unit Rate * Residents/1000

The subscript r denotes that the flow limit as calculated reflects the residential flow needs only. The allowable limit, termed as the calculated wet weather treatment peak, is defined as this flow limit plus an allowance for Significant Industrial Users (SIUs) and employed population (50 gpd/employed) as follows:

Qp = Qr + (Emp. – SIU Emp.) * 50 gped * (1.5472E10-6) + SIU flows

This peak defines what is considered to be a reasonable discharge from a community to the DWSD system during the peak of a 10-year, 1-hour event. For very small separated areas with sewered areas less than 2,000 acres, a peaking factor was applied to the employed and SIU flows. A value of 3 was used as a peaking factor to account for the potential of these flows occurring during 8 hours out of 24-hour day (24/8 = 3).

The calculated wet weather treatment peaks are provided in Tables 16a through 16f (attached) for each decade from 2000 through 2050. These tables also include a "Treatment + Transport Peak (TTP)" column. The TTP column recognizes that some communities have what can be understood to be transport needs in addition to treatment needs. That is, their contract peak rates were not intended to represent expected treatment rates, but rather the transport of storm flows through the DWSD collection and/or intercetor sewer system to a downstream facilities with potential for overflow to a receiving water during wet weather conditions. Hamtramck, for instance, does not have access to a receiving stream whereby its combined system could be relieved during wet weather. Its contract peak of 1244.5 cfs allows for storm flows to be directed towards the Detroit River Interceptor (DRI) via the DWSD sewer collection system. A portion of this flow would be intercepted at the DRI, along with Detroit's flows, for treatment. Storm flows in excess of the interceptor capacity would be discharged to the Detroit River.

The peak flows as determined by the model for a 10-year, 1-hour summer event are provided for reference. In addition, the existing contract criteria and peak rates as currently understood are also provided. The final two columns provide the peak capacity limits used for evaluation of capacity issues that currently exist or that might arise in the future in support to the master planning. These two columns are the two

alternatives that were developed for these evaluations. The first alternative, Alternative A, used the larger of the calculated wet weather treatment peak and the existing contract peak rate. Alternative B investigated the impact of allowing a higher peak flow rate than what the standard would allow for Allen Park, Center Line, and Melvindale.

7. Summary

The flow needs for the First Tier Customers of DWSD have been determined for average day, peak month, peak day, and peak hour through the year 2050. These flows are based on analyses that included projecting flow needs for both dry and wet weather conditions. Dry weather flow needs were developed based on meter data and projected to future conditions based on populations and sewer area growth. Wet weather flow needs were calculated based on the standard developed by the SSO Work Group. This standard was utilized to determine a reasonable peak hour rate to be accepted by DWSD for treatment. Recognition of existing contracts and existing facilities within the system was made by defining a transport flow need in addition to a treatment need.

Two alternatives have been developed for further review and evaluations of capacity issues within the DWSD sewer collection system that currently exist or that might arise in the future. The one alternative uses the larger of the existing contract limit or the limit based on the SSO Work Group standard. The other alternative reviews the potential for the regional system to accept additional SSO flows from the customers without causing potential for additional basement flooding or other adverse impacts to the regional system.

This information has been provided to the contracts work group for their use in future contract negotiations.

Appendix

Tables and Figures

Figure 5. Modeled Peak Rates and Proposed Residential Unit Rate Standard

10-year, 1-hour Growth Design Event

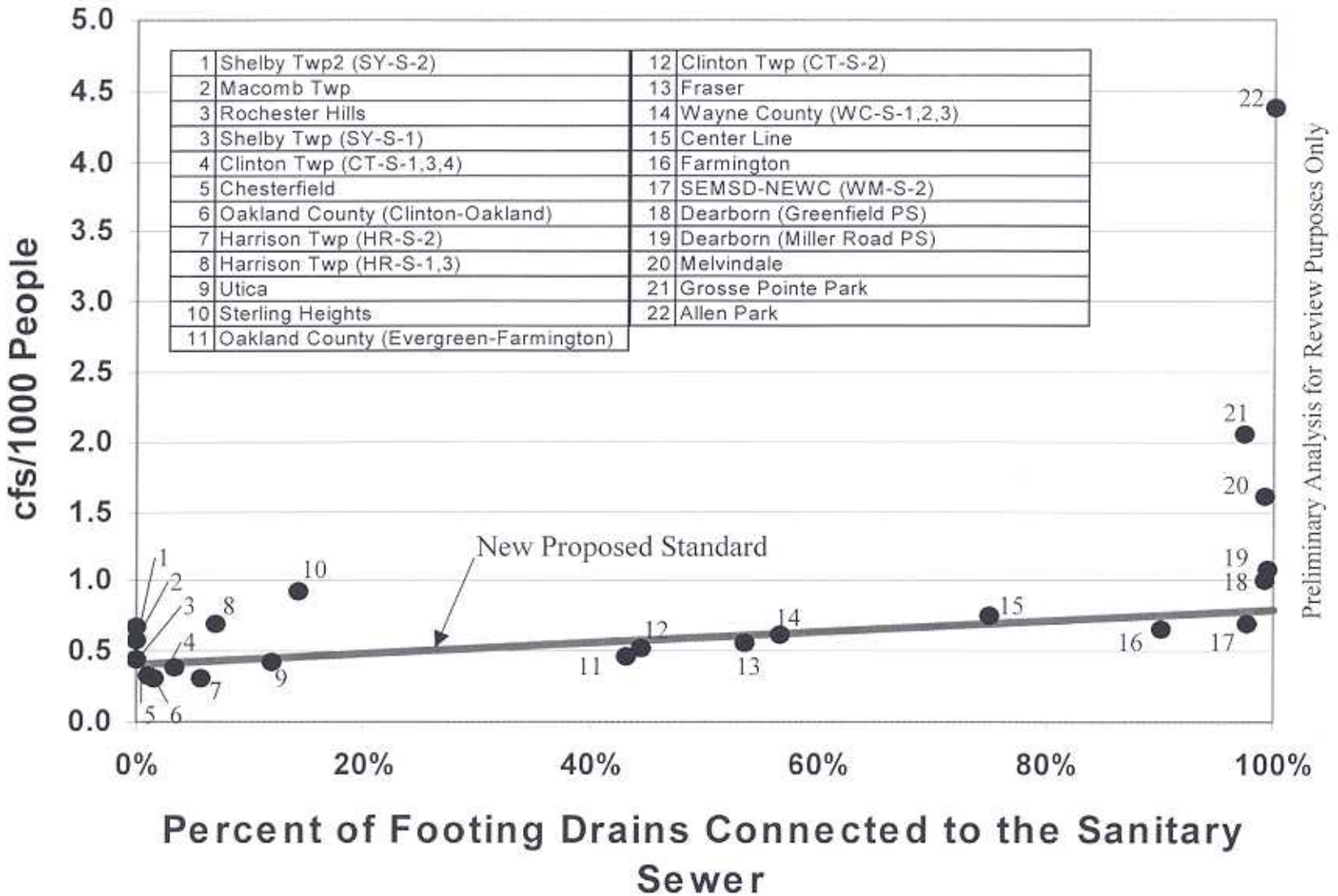

Table 3. Various Statistics of Flow Data from Major DWSD Collection System Flow Meters for Year 2001 (cfs)

Meter	Annual Average		Maximum Month (Feb)		Peak Day*		Minimum Day	
	All Flow	Dry Flow	All Flow	Dry Flow	All Flow	Dry Flow	All Flow	Dry Flow
AP-S-1	2.38	2.31	2.37	2.31	4.26	3.22	1.25	1.25
AP-S-2	0.28	0.26	0.31	0.30	0.48	0.39	0.03	0.08
CH-S-5	6.91	6.60	8.38	7.42	14.95	8.48	5.25	5.25
CL-S-1	2.16	1.84	3.74	2.95	14.82	7.92	1.30	1.30
CT-S-1	3.48	3.24	4.54	3.99	7.94	4.35	2.46	2.46
CT-S-2	5.05	4.59	6.86	5.70	14.41	6.95	3.46	3.46
CT-S-3	4.81	4.68	5.47	5.13	8.94	5.56	3.97	3.97
CT-S-4	0.47	0.40	0.58	0.51	1.89	0.65	0.31	0.31
DN-S-1	14.47	11.31	16.13	13.71	43.31	16.46	(0.00)	3.79
DN-S-2	18.62	15.82	14.35	14.72	36.72	22.06	6.96	7.83
DN-S-3	2.52	0.86	4.03	1.38	35.24	5.70	0.35	0.35
DN-S-4	1.09	1.03	1.16	1.13	1.53	1.43	0.54	0.54
DN-S-5	0.76	0.73	0.87	0.86	1.12	1.06	0.44	0.44
DN-S-6	0.02	0.02	0.02	0.02	0.04	0.03	0.01	0.01
DN-S-7	0.03	0.03	0.04	0.04	0.12	0.05	0.01	0.01
DT-S-1	37.06	30.81	48.65	39.31	114.83	44.00	10.83	15.25
DT-S-10	243.47	210.20	290.56	282.95	444.06	305.87	58.87	125.16
DT-S-11	132.38	93.65	189.68	138.87	513.99	197.71	18.74	18.74
DT-S-12	278.46	236.85	241.23	205.40	632.92	339.41	97.38	97.38
DT-S-13	21.32	17.06	27.05	21.29	100.09	33.17	9.77	9.77
DT-S-2	41.39	33.74	54.23	42.10	175.33	50.98	22.14	22.14
DT-S-3&4	55.86	39.83	83.07	45.94	323.86	72.29	30.17	31.17
DT-S-5	87.14	73.51	105.40	77.54	208.45	100.48	48.05	51.14
DT-S-6	26.85	20.93	33.82	24.82	156.08	61.29	8.02	8.02
DT-S-7	60.51	50.83	68.74	46.03	242.80	75.94	26.25	26.25
DT-S-8	198.48	175.65	217.09	187.97	365.42	241.12	131.75	132.25
FA-S-1	2.54	2.15	3.91	3.38	5.52	3.98	0.92	0.92
FR-S-1	3.16	2.70	4.36	3.51	11.78	4.41	1.84	1.84
GK-S-1	0.56	0.17	0.36	0.35	33.92	1.41	(0.00)	(0.00)
GK-S-2	2.35	2.07	2.90	2.93	5.20	3.20	0.72	0.72
HR-S-1	1.10	0.97	1.41	1.22	3.72	1.46	0.69	0.69
HR-S-2	3.03	2.81	3.64	3.24	8.15	3.72	2.43	2.48
HR-S-3	0.98	0.91	1.11	0.95	2.87	1.09	0.76	0.76
MA-S-1	11.44	11.37	12.14	12.15	16.20	13.09	9.64	9.64
MC-S-1	41.74	38.74	39.59	38.47	100.16	50.51	14.28	14.28
ME-S-1	2.82	2.48	4.01	3.13	9.78	3.54	1.60	1.60
OC-S-1	74.54	65.80	93.69	73.82	160.72	79.20	57.33	57.33
OC-S-2	47.16	45.32	55.23	48.42	110.02	51.21	38.99	38.99
OM-S-1	69.89	68.44	76.82	76.63	112.35	77.54	16.99	55.07
OM-S-2	134.15	127.61	159.56	136.70	280.10	159.24	92.17	92.17
RC-S-1	3.18	3.06	3.74	3.31	6.68	3.66	2.50	2.50
SE-S-1	100.70	73.11	138.53	93.45	262.04	105.22	50.57	50.57
ST-S-1	7.56	7.23	9.69	8.61	15.06	9.31	4.75	4.75
ST-S-2	3.26	3.00	3.97	3.51	8.35	4.04	2.26	2.26
ST-S-3	9.67	8.91	11.62	10.38	21.95	11.86	6.97	6.97
ST-S-4	2.26	2.03	2.69	2.52	6.90	2.78	1.52	1.52
ST-S-5	1.72	1.59	2.07	1.82	5.33	2.14	1.35	1.35
ST-S-6	3.02	2.98	3.14	3.02	3.83	3.53	2.68	2.68
SY-S-1	1.27	1.24	1.38	1.39	1.61	1.44	1.02	1.02
TMP-S-6	0.89	0.87	1.08	1.08	1.34	1.14	0.51	0.52
UT-S-1	1.28	1.25	1.75	1.52	3.90	1.68	0.87	0.87
WC-S-1	87.18	77.55	128.15	95.17	215.34	103.62	44.75	44.75
WC-S-2	17.72	14.89	49.40	27.47	114.22	35.91	1.79	5.78
WC-S-3	16.14	12.52	18.14	17.11	89.76	31.78	4.28	4.28
WM-S-1	55.12	38.10	79.60	49.25	126.96	74.00	28.18	28.18
WM-S-2	64.96	45.26	99.92	63.71	186.77	90.36	26.65	26.65
WWTP	1,119.58	935.33	1,369.92	1,056.24	2,312.93	1,163.73	771.10	771.10
WWTP_MGD	*723.61*	*604.53*	*885.42*	*682.68*	*1,494.92*	*752.15*	*498.38*	*498.38*

*Peak day as determined individually for each meter

Table 4a. Incremental Flows -- Annual Avg_All

Meter Name	Annual Avg_All	Comment	Flow Balance Calculation	Incremental Flow Annual Avg_All
AP-S-1&2	2.67	meters combined	= AP-S-1&2	2.67
CH-S-5	6.91		= CH-S-5	6.91
CL-S-1	2.16		= CL-S-1	2.16
CT-S-1	3.48		= CT-S-1	3.48
CT-UM-A**	1.11		= CT-UM-A**	1.11
CT-S-2	5.05		= CT-S-2	5.05
CT-UM-B**	1.65		= CT-UM-B**	1.65
CT-S-3	4.81		= CT-S-3	4.81
CT-S-4	0.47		= CT-S-4	0.47
DN-S-1&3	16.99	meters combined	= DN-S-1&3	16.99
DN-S-2	18.62		= DN-S-2	18.62
DN-S-4..7	1.90	meters combined	= DN-S-4..7	1.90
DT-S-1	37.06		= DTS1 - (FA-S-1)	34.53
DT-S-3&4	55.86	meters combined	= DT-S-3&4	55.86
DT-S-5	87.14		= DT-S-5 - (DN-S-1&3 +DT-S-6)	43.30
DT-S-6	26.85		= DT-S-6 + (TMP-S-5)	27.69
DT-S-7	60.51		= DT-S-7 - (DT-S-9)	39.19
DT-S-8	198.48		= DT-S-8 - (GK-S-1&2+WM-S-2+DT-S-7)	70.10
DT-S-9=DT-S-13	21.32	use DT-S-13	= DT-S-9 - (CL-S-1)	19.16
DT-S-10	243.47		= DTS10 - (DT-S-8)	45.00
DT-S-11	132.38		= DTS11 - (SE-S-1)	31.67
DT-S-12	278.46	not used due to unc	= DTS12 - (DT-S-10+TMP-S-3)	na
FA-S-1	2.54		= FA-S-1	2.54
FR-S-1	3.16		= FR-S-1	3.16
FR-UM-A**	0.70		= FR-UM-A**	0.70
GK-S-1&2	2.91	meters combined	= GK-S-1&2	2.91
HR-S-1	1.10		= HR-S-1	1.10
HR-S-2	3.03		= HR-S-2	3.03
HR-S-3	0.98		= HR-S-3	0.98
MA-S-1	11.44		= MA-S-1	11.44
ME-S-1	2.82		= ME-S-1	2.82
OC-S-1	74.54		= OC-S-1	74.54
OC-S-2	47.16		= OC-S-2	47.16
OM-S-2	134.15		DWII in DWSD Interceptors in Macomb	8.75
RC-S-1	3.18		= RC-S-1	3.18
SE-S-1	100.70		= SE-S-1	100.70
ST-S-1	7.56		= ST-S-1	7.56
ST-S-2	3.26		= ST-S-2	3.26
ST-S-3	9.67		= ST-S-3	9.67
ST-S-4	2.26		= ST-S-4	2.26
ST-S-5	1.72		= ST-S-5	1.72
ST-S-6	3.02		= ST-S-6	3.02
SY-S-1	1.27		= SY-S-1	1.27
SY-S-2**	1.13		= SY-S-2**	1.13
TMP-S-1	4.90	correlated data	= $0.0029*(DTS7)^2-0.2303*(DTS7)+8.2136$	4.90
TMP-S-2	89.41	correlated data	= 1.5372*(OC-S-1) - 25.178 - (OC-S-1)	14.87
TMP-S-5	0.84	fixed value	included with DT-S-6	na
UT-S-1	1.28		= UT-S-1	1.28
WC-S-1..3	121.04	meters combined	= WC-S-1..3	121.04
WM-S-1	55.12		= WM-S-1	55.12
WM-S-2	64.96		= WM-S-2 - (WM-S-1)	9.84
WWTP	1,119.58		See below for equation***	187.31
			Total of Incremental Flows:	1119.58

**No flow data available. Flow values were determined by multiplying the ratio of the unmetered tributary area under investigation to a corresponding metered tributary area by the average flow of the metered area

*** WWTP_flow balance = WWTP - (AP-S-1&2 + DN-S-2 + DN-S-4..7 + ME-S-1 + OM-S-2 + WC-S-1..3 + DT-S-1 + DT-S-3&4 + DT-S-11 + DT-S-10 + DT-S-5 + TMP-S-1 + TMP-S-2 + TMP-S-5)

Table 4b. Incremental Flows -- Annual Avg_Dry

Meter Name	Annual Avg_Dry	Comment	Flow Balance Calculation	Incremental Flow Annual Avg_Dry
AP-S-1&2	2.58	meters combined	= AP-S-1&2	2.58
CH-S-5	6.60		= CH-S-5	6.60
CL-S-1	1.84		= CL-S-1	1.84
CT-S-1	3.24		= CT-S-1	3.24
CT-UM-A**	1.04		= CT-UM-A**	1.04
CT-S-2	4.59		= CT-S-2	4.59
CT-UM-B**	1.50		= CT-UM-B**	1.50
CT-S-3	4.68		= CT-S-3	4.68
CT-S-4	0.40		= CT-S-4	0.40
DN-S-1&3	12.16	meters combined	= DN-S-1&3	12.16
DN-S-2	15.82		= DN-S-2	15.82
DN-S-4..7	1.81	meters combined	= DN-S-4..7	1.81
DT-S-1	30.81		= DTS1 - (FA-S-1)	28.66
DT-S-3&4	39.83	meters combined	= DT-S-3&4	39.83
DT-S-5	73.51		= DT-S-5 - (DN-S-1&3 +DT-S-6)	40.42
DT-S-6	20.93		= DT-S-6 + (TMP-S-5)	21.77
DT-S-7	50.83		= DT-S-7 - (DT-S-9)	33.77
DT-S-8	175.65		= DT-S-8 - (GK-S-1&2+WM-S-2+DT-S-7)	77.31
DT-S-9=DT-S-13	17.06	use DT-S-13	= DT-S-9 - (CL-S-1)	15.22
DT-S-10	210.20		= DTS10 - (DT-S-8)	34.55
DT-S-11	93.65		= DTS11 - (SE-S-1)	20.54
DT-S-12	236.85	not used due to unc	= DTS12 - (DT-S-10+TMP-S-3)	na
FA-S-1	2.15		= FA-S-1	2.15
FR-S-1	2.70		= FR-S-1	2.70
FR-UM-A**	0.60		= FR-UM-A**	0.60
GK-S-1&2	2.24	meters combined	= GK-S-1&2	2.24
HR-S-1	0.97		= HR-S-1	0.97
HR-S-2	2.81		= HR-S-2	2.81
HR-S-3	0.91		= HR-S-3	0.91
MA-S-1	11.37		= MA-S-1	11.37
ME-S-1	2.48		= ME-S-1	2.48
OC-S-1	65.80		= OC-S-1	65.80
OC-S-2	45.32		= OC-S-2	45.32
OM-S-2	127.61		DWII in DWSD Interceptors in Macomb	8.48
RC-S-1	3.06		= RC-S-1	3.06
SE-S-1	73.11		= SE-S-1	73.11
ST-S-1	7.23		= ST-S-1	7.23
ST-S-2	3.00		= ST-S-2	3.00
ST-S-3	8.91		= ST-S-3	8.91
ST-S-4	2.03		= ST-S-4	2.03
ST-S-5	1.59		= ST-S-5	1.59
ST-S-6	2.98		= ST-S-6	2.98
SY-S-1	1.24		= SY-S-1	1.24
SY-S-2**	1.10		= SY-S-2**	1.10
TMP-S-1	4.00	correlated data	= 0.0029*(DTS7)^3-0.2303*(DTS7)+8.2136	4.00
TMP-S-2	75.97	correlated data	= 1.5372*(OC-S-1) - 25.178 - (OC-S-1)	10.17
TMP-S-5	0.84	fixed value	included with DT-S-6	na
UT-S-1	1.25		= UT-S-1	1.25
WC-S-1..3	104.96	meters combined	= WC-S-1..3	104.96
WM-S-1	38.10		= WM-S-1	38.10
WM-S-2	45.26		= WM-S-2 - (WM-S-1)	7.16
WWTP	935.33		See below for equation***	151.26
			Total of Incremental Flows:	935.33

**No flow data available. Flow values were determined by multiplying the ratio of the unmetered tributary area under investigation to a corresponding metered tributary area by the average flow of the metered area

*** WWTP_flow balance = WWTP - (AP-S-1&2 + DN-S-2 + DN-S-4..7 + ME-S-1 + OM-S-2 + WC-S-1..3 + DT-S-1 + DT-S-3&4 + DT-S-11 + DT-S-10 + DT-S-5 + TMP-S-1 + TMP-S-2 + TMP-S-5)

Table 4c. Incremental Flows -- Max Month_All

Meter Name	Max Month_All	Comment	Flow Balance Calculation	Incremental Flow Max Month_All
AP-S-1&2	2.69	meters combined	= AP-S-1&2	2.69
CH-S-5	8.38		= CH-S-5	8.38
CL-S-1	3.74		= CL-S-1	3.74
CT-S-1	4.54		= CT-S-1	4.54
CT-UM-A**	1.45		= CT-UM-A**	1.45
CT-S-2	6.86		= CT-S-2	6.86
CT-UM-B**	2.25		= CT-UM-B**	2.25
CT-S-3	5.47		= CT-S-3	5.47
CT-S-4	0.58		= CT-S-4	0.58
DN-S-1&3	20.16	meters combined	= DN-S-1&3	20.16
DN-S-2	14.35		= DN-S-2	14.35
DN-S-4..7	2.09	meters combined	= DN-S-4..7	2.09
DT-S-1	48.65		= DTS1 - (FA-S-1)	44.73
DT-S-3&4	83.07	meters combined	= DT-S-3&4	83.07
DT-S-5	105.40		= DT-S-5 - (DN-S-1&3 +DT-S-6)	51.42
DT-S-6	33.82		= DT-S-6 + (TMP-S-5)	34.66
DT-S-7	68.74		= DT-S-7 - (DT-S-9)	41.69
DT-S-8	217.09		= DT-S-8 - (GK-S-1&2+WM-S-2+DT-S-7)	45.16
DT-S-9=DT-S-13	27.05	use DT-S-13	= DT-S-9 - (CL-S-1)	23.31
DT-S-10	290.56		= DTS10 - (DT-S-8)	73.47
DT-S-11	189.68		= DTS11 - (SE-S-1)	51.15
DT-S-12	241.23	not used due to unc	= DTS12 - (DT-S-10+TMP-S-3)	na
FA-S-1	3.91		= FA-S-1	3.91
FR-S-1	4.36		= FR-S-1	4.36
FR-UM-A**	0.96		= FR-UM-A**	0.96
GK-S-1&2	3.26	meters combined	= GK-S-1&2	3.26
HR-S-1	1.41		= HR-S-1	1.41
HR-S-2	3.64		= HR-S-2	3.64
HR-S-3	1.11		= HR-S-3	1.11
MA-S-1	12.14		= MA-S-1	12.14
ME-S-1	4.01		= ME-S-1	4.01
OC-S-1	93.69		= OC-S-1	93.69
OC-S-2	55.23		= OC-S-2	55.23
OM-S-2	159.56		DWII in DWSD Interceptors in Macomb	9.91
RC-S-1	3.74		= RC-S-1	3.74
SE-S-1	138.53		= SE-S-1	138.53
ST-S-1	9.69		= ST-S-1	9.69
ST-S-2	3.97		= ST-S-2	3.97
ST-S-3	11.62		= ST-S-3	11.62
ST-S-4	2.69		= ST-S-4	2.69
ST-S-5	2.07		= ST-S-5	2.07
ST-S-6	3.14		= ST-S-6	3.14
SY-S-1	1.38		= SY-S-1	1.38
SY-S-2**	1.23		= SY-S-2**	1.23
TMP-S-1	6.09	correlated data	= $0.0029*(DTS7)^2$-0.2303*(DTS7)+8.2136	6.09
TMP-S-2	118.84	correlated data	= 1.5372*(OC-S-1) - 25.178 - (OC-S-1)	25.15
TMP-S-5	0.84	fixed value	included with DT-S-6	na
UT-S-1	1.75		= UT-S-1	1.75
WC-S-1..3	195.69	meters combined	= WC-S-1..3	195.69
WM-S-1	79.60		= WM-S-1	79.60
WM-S-2	99.92		= WM-S-2 - (WM-S-1)	20.32
WWTP incr +12	1,369.92		See below for equation***	148.41
			Total of Incremental Flows:	1369.92

**No flow data available. Flow values were determined by multiplying the ratio of the unmetered tributary area under investigation to a corresponding metered tributary area by the average flow of the metered area

*** WWTP_flow balance = WWTP - (AP-S-1&2 + DN-S-2 + DN-S-4..7 + ME-S-1 + OM-S-2 + WC-S-1..3 + DT-S-1 + DT-S-3&4 + DT-S-11 + DT-S-10 + DT-S-5 + TMP-S-1 + TMP-S-2 + TMP-S-5)

Table 4d. Incremental Flows -- Max Month_Dry

Meter Name	Max Month_Dry	Comment	Flow Balance Calculation	Incremental Flow Max Month_Dry
AP-S-1&2	2.61	meters combined	= AP-S-1&2	2.61
CH-S-5	7.42		= CH-S-5	7.42
CL-S-1	2.95		= CL-S-1	2.95
CT-S-1	3.99		= CT-S-1	3.99
CT-UM-A**	1.28		= CT-UM-A**	1.28
CT-S-2	5.70		= CT-S-2	5.70
CT-UM-B**	1.87		= CT-UM-B**	1.87
CT-S-3	5.13		= CT-S-3	5.13
CT-S-4	0.51		= CT-S-4	0.51
DN-S-1&3	15.09	meters combined	= DN-S-1&3	15.09
DN-S-2	14.72		= DN-S-2	14.72
DN-S-4..7	2.04	meters combined	= DN-S-4..7	2.04
DT-S-1	39.31		= DTS1 - (FA-S-1)	35.93
DT-S-3&4	45.94	meters combined	= DT-S-3&4	45.94
DT-S-5	77.54		= DT-S-5 - (DN-S-1&3 +DT-S-6)	37.63
DT-S-6	24.82		= DT-S-6 + (TMP-S-5)	25.66
DT-S-7	46.03		= DT-S-7 - (DT-S-9)	24.74
DT-S-8	187.97		= DT-S-8 - (GK-S-1&2+WM-S-2+DT-S-7)	74.96
DT-S-9=DT-S-13	21.29	use DT-S-13	= DT-S-9 - (CL-S-1)	18.34
DT-S-10	282.95		= DTS10 - (DT-S-8)	94.97
DT-S-11	138.87		= DTS11 - (SE-S-1)	45.42
DT-S-12	205.40	not used due to unc	= DTS12 - (DT-S-10+TMP-S-3)	na
FA-S-1	3.38		= FA-S-1	3.38
FR-S-1	3.51		= FR-S-1	3.51
FR-UM-A**	0.77		= FR-UM-A**	0.77
GK-S-1&2	3.28	meters combined	= GK-S-1&2	3.28
HR-S-1	1.22		= HR-S-1	1.22
HR-S-2	3.24		= HR-S-2	3.24
HR-S-3	0.95		= HR-S-3	0.95
MA-S-1	12.15		= MA-S-1	12.15
ME-S-1	3.13		= ME-S-1	3.13
OC-S-1	73.82		= OC-S-1	73.82
OC-S-2	48.42		= OC-S-2	48.42
OM-S-2	136.70		DWII in DWSD Interceptors in Macomb	3.24
RC-S-1	3.31		= RC-S-1	3.31
SE-S-1	93.45		= SE-S-1	93.45
ST-S-1	8.61		= ST-S-1	8.61
ST-S-2	3.51		= ST-S-2	3.51
ST-S-3	10.38		= ST-S-3	10.38
ST-S-4	2.52		= ST-S-4	2.52
ST-S-5	1.82		= ST-S-5	1.82
ST-S-6	3.02		= ST-S-6	3.02
SY-S-1	1.39		= SY-S-1	1.39
SY-S-2**	1.23		= SY-S-2**	1.23
TMP-S-1	3.76	correlated data	= $0.0029*(DTS7)^2-0.2303*(DTS7)+8.2136$	3.76
TMP-S-2	88.30	correlated data	= 1.5372*(OC-S-1) - 25.178 - (OC-S-1)	14.48
TMP-S-5	0.84	fixed value	included with DT-S-6	na
UT-S-1	1.52		= UT-S-1	1.52
WC-S-1..3	139.75	meters combined	= WC-S-1..3	139.75
WM-S-1	49.25		= WM-S-1	49.25
WM-S-2	63.71		= WM-S-2 - (WM-S-1)	14.46
WWTP	1,056.24		See below for equation***	79.78
			Total of Incremental Flows:	1056.24

**No flow data available. Flow values were determined by multiplying the ratio of the unmetered tributary area under investigation to a corresponding metered tributary area by the average flow of the metered area

*** WWTP_flow balance = WWTP - (AP-S-1&2 + DN-S-2 + DN-S-4..7 + ME-S-1 + OM-S-2 + WC-S-1..3 + DT-S-1 + DT-S-3&4 + DT-S-11 + DT-S-10 + DT-S-5 + TMP-S-1 + TMP-S-2 + TMP-S-5)

Table 7. Average and Peak Month Flows by Meters for Years 1998-2001					
Meter Name	Correlations	Average Flow		Peak Month	
		Dry	All	Dry	All
AP-S-1 & 2	y = 0.0001x + 2.5158	2.57	2.59	2.58	2.59
CH-S-5	y = 0.00472x + 3.73	6.29	7.02	6.59	7.33
CL-S-1	y = 0.0029x + 0.0479	1.62	2.07	1.81	2.26
CT-S-1	y = 0.00476x + 0.37	2.95	3.68	3.25	4.00
CT-S-2	y = 0.00791x - 0.17	4.11	5.33	4.62	5.85
CT-S-3	y = 0.00338x + 2.64	4.47	4.99	4.69	5.22
CT-S-4	y = 0.0007x - 0.02	0.36	0.47	0.40	0.51
CT-UM-A	y = 0.0016x + 0.1231	0.99	1.24	1.09	1.34
CT-UM-B	y = 0.002706x - 0.06	1.41	1.82	1.58	2.00
DN-S-1 & 3	y = 0.0098x + 6.2448	11.55	13.07	12.18	13.71
DN-S-2	y = 0.019x + 4.3396	14.63	17.57	15.85	18.81
DN-S-4...7	y = 0.0004x + 1.5721	1.79	1.85	1.81	1.88
DT-S-1,2	y = 0.0431x + 2.6961	26.03	32.70	28.81	35.53
DT-S-10	y = 0.0594x - 8.4831	23.68	32.87	27.51	36.77
DT-S-11	y = 0.0553x - 10.169	19.77	28.33	23.34	31.96
DT-S-3&4	y = 0.0321x + 20.518	37.90	42.86	39.97	44.97
DT-S-5	y = 0.0203x + 25.818	36.81	39.95	38.12	41.28
DT-S-6	y=0.0071994x+17.39	21.29	22.40	21.75	22.87
DT-S-7	y = 0.0402x + 9.7428	31.51	37.73	34.10	40.37
DT-S-8	y = 0.0366x + 54.866	74.68	80.34	77.04	82.75
DT-S-9,13	y = 0.0096x+7.8123	13.01	14.50	13.63	15.13
FA-S-1	y = 0.0071x - 2.0157	1.83	2.93	2.29	3.39
FR-S-1	y = 0.0051x - 0.38	2.38	3.17	2.71	3.51
FR-UM	y=0.00117x-.09	0.54	0.72	0.62	0.80
GK-S-1 & 2	y = 0.0054x - 1.0184	1.91	2.74	2.25	3.10
HR-S-1	y = 0.000964x + 0.38	0.90	1.05	0.96	1.11
HR-S-2	y = 0.002995x + 1.00	2.62	3.08	2.81	3.28
HR-S-3	y = 0.00061x + 0.54	0.87	0.96	0.91	1.00
MA-S-1	y = 0.00773x + 6.7	10.89	12.08	11.38	12.59
ME-S-1	y=0.0051x-0.61	2.15	2.94	2.48	3.28
OC-S-1	y=0.0763x+19.71	61.02	72.82	65.94	77.84
OC-S-2	y=0.0338x+24.92	43.22	48.45	45.40	50.67
RC-S-1	y=0.0028231x+1.36	2.89	3.33	3.07	3.51
SE-S-1	y=0.1791274x-34.91	62.08	89.78	73.63	101.56
ST-S-1	y=0.0146x-1.57	6.34	8.59	7.28	9.55
ST-S-2	y=0.0036x+0.82	2.77	3.33	3.00	3.56
ST-S-3	y=0.00914x+3.38	8.33	9.74	8.92	10.34
ST-S-4	y=0.0032x+0.05	1.78	2.28	1.99	2.49
ST-S-5	y=0.00191x+0.44	1.47	1.77	1.60	1.90
ST-S-6	y=0.00127x+2.21	2.90	3.09	2.98	3.18
SY-S-1	y=0.0001576x+1.15	1.24	1.26	1.25	1.27
SY-S-2	y=0.0001548x+1.12	1.20	1.23	1.21	1.24
TMP-S-1	y=0.00125x+3.51	4.19	4.38	4.27	4.46
TMP-S-2	y = 0.0192x	10.40	13.37	11.63	14.63
UT-S-1	y=0.0029158x-0.50	1.08	1.53	1.27	1.72
WC-S-1...3	y=0.239722x-39.68	90.12	127.20	105.57	142.95
WM-S-1	y=0.0956201x-19.61	32.17	46.95	38.33	53.24
WM-S-2	y = 0.0193x - 4.6011	5.85	8.83	7.09	10.10
WWTP+DT-S-12	y = 0.0714x + 103.54	142.20	153.24	146.80	157.94
OM-S2	y = 0.02723x - 8.09	6.65	10.87	8.41	12.65
Total		549.00	669.00	599.00	720.00
x		541.48	696.12	605.91	761.84
Target		549.00	669.00	599.00	720.00
Difference		0.00	0.00	0.00	0.00

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 8a: Baseline Data for 2000

	First Tier Wholesale Customer	Customer Tributary Area (acres)	Residential Population	Employment Population	SIU Employment Population	SIU Flow (MGD)	Equivalent Population(1)
1	Allen Park	1,716	2,822	10,767	1,858	0.72	17,990
2	Centerline	1,031	8,523	9,366	29	0.01	14,712
3	City of Detroit	82,397	948,886	343,240	70,038	24.53	1,444,917
4	Clinton-Oakland	81,587	243,861	146,367	20,427	3.02	364,815
5	Dearborn	14,823	98,314	108,251	17,490	3.39	201,297
6	Dearborn Heights District 2	39	409	28	0	0.00	427
7	Evergreen-Farmington	68,644	271,572	280,227	2,788	0.38	456,709
8	Farmington	1,376	7,941	7,257	6	0.01	12,731
9	Grosse Pointe	684	5,638	6,957	0	0.00	10,156
10	Grosse Pointe Farms	1,384	9,164	6,233	750	0.09	13,893
11	Grosse Pointe Park	1,281	12,037	2,789	1,200	0.11	14,432
12	Hamtramck	1,347	22,967	5,894	126	0.07	27,670
13	Harper Woods	188	1,712	225	0	0.00	1,858
14	Highland Park	1,870	16,638	7,583	220	0.08	22,435
15	Macomb	84,247	365,546	150,562	24,143	4.40	504,783
16	Melvindale	1,757	10,773	3,403	305	0.26	16,126
17	N.E. Wayne	20,405	175,878	65,303	583	0.22	220,732
18	North Huron Valley/Rouge Val(2)	98,123	518,755	293,947	24,385	4.06	746,480
19	Redford Township	49	337	119	0	0.00	414
20	S.E. Oakland	42,200	295,336	267,954	20,838	3.51	501,387
21	Wayne Co Area 6	81	912	127	0	0.00	994
	Total	**505,230**	**3,018,021**	**1,716,599**	**185,186**	**44.85**	**4,594,959**
	WTUA(2)	29,460	110,700	54,395	618	0.10	146,931

Notes:
1- Equivalent Population = Residential Population + (Employment Population - SIU Employment Population)*(50/77) + SIU Flow (gpd) / 77
2. The values for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2005.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 8b: Baseline Data for 2010

	First Tier Wholesale Customer	Customer Tributary Area (acres)	Residential Population	Employment Population	SIU Employment Population	SIU Flow (MGD)	Equivalent Population(1)
1	Allen Park	1,716	2,768	10,300	1,858	0.72	17,633
2	Centerline	1,031	8,168	8,979	29	0.01	14,106
3	City of Detroit	82,397	906,528	318,354	70,038	24.53	1,386,399
4	Clinton-Oakland	86,025	260,863	176,525	20,427	3.02	401,400
5	Dearborn	14,823	101,855	111,733	17,490	3.39	207,099
6	Dearborn Heights District 2	39	408	22	0	0.00	422
7	Evergreen-Farmington	70,196	269,367	305,975	2,786	0.38	471,224
8	Farmington	1,377	7,717	7,030	6	0.01	12,359
9	Grosse Pointe	684	5,400	7,129	0	0.00	10,029
10	Grosse Pointe Farms	1,384	8,650	6,355	750	0.09	13,459
11	Grosse Pointe Park	1,281	11,397	2,852	1,200	0.11	13,833
12	Hamtramck	1,347	24,009	5,472	126	0.07	28,438
13	Harper Woods	188	1,666	175	0	0.00	1,780
14	Highland Park	1,870	12,489	7,503	220	0.08	18,234
15	Macomb	101,818	438,403	172,776	24,143	4.40	592,065
16	Melvindale	1,757	10,284	3,146	305	0.26	15,470
17	N.E. Wayne	20,405	167,566	63,913	583	0.22	211,518
18	North Huron Valley/Rouge Val(2)	103,648	534,036	331,281	23,767	3.96	786,004
19	Redford Township	49	315	110	0	0.00	386
20	S.E. Oakland	42,241	281,469	273,056	20,838	3.51	490,833
21	Wayne Co Area 6	81	876	123	0	0.00	956
	Total	**534,356**	**3,054,234**	**1,812,809**	**184,568**	**44.85**	**4,693,646**
	WTUA(2)	30,798	122,850	69,855	618	0.10	169,120

Notes:
1- Equivalent Population = Residential Population + (Employment Population - SIU Employment Population)*(50/77) + SIU Flow (gpd) / 77
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 8c: Baseline Data for 2020

	First Tier Wholesale Customer	Customer Tributary Area (acres)	Residential Population	Employment Population	SIU Employment Population	SIU Flow (MGD)	Equivalent Population(1)
1	Allen Park	1,716	2,713	9,833	1,858	0.72	17,275
2	Centerline	1,031	8,136	8,694	29	0.01	13,888
3	City of Detroit	82,397	884,744	310,578	70,038	24.53	1,359,566
4	Clinton-Oakland	87,235	270,335	190,027	20,427	3.02	419,639
5	Dearborn	14,823	104,230	113,061	17,490	3.39	210,336
6	Dearborn Heights District 2	39	420	20	0	0.00	433
7	Evergreen-Farmington	70,786	267,255	314,156	2,788	0.38	474,424
8	Farmington	1,378	7,777	6,879	6	0.01	12,321
9	Grosse Pointe	684	5,331	7,076	0	0.00	9,925
10	Grosse Pointe Farms	1,384	8,408	6,355	750	0.09	13,216
11	Grosse Pointe Park	1,281	11,114	2,845	1,200	0.11	13,545
12	Hamtramck	1,347	25,929	5,319	126	0.07	30,259
13	Harper Woods	188	1,729	162	0	0.00	1,833
14	Highland Park	1,870	11,909	6,980	220	0.08	17,315
15	Macomb	106,763	488,941	185,863	24,143	4.40	651,101
16	Melvindale	1,757	10,059	3,007	305	0.26	15,154
17	N.E. Wayne	20,405	163,153	62,454	583	0.22	206,157
18	North Huron Valley/Rouge Val(2)	105,551	544,168	345,319	23,767	3.96	805,251
19	Redford Township	49	305	100	0	0.00	370
20	S.E. Oakland	42,241	271,381	272,738	20,838	3.51	480,538
21	Wayne Co Area 6	81	877	121	0	0.00	955
	Total	**543,006**	**3,088,911**	**1,851,587**	**184,568**	**44.85**	**4,753,503**
	WTUA(2)	31,641	131,854	77,894	618	0.10	183,345

Notes:
1- Equivalent Population = Residential Population + (Employment Population - SIU Employment Population)*(50/77) + SIU Flow (gpd) / 77
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 8d: Baseline Data for 2030

	First Tier Wholesale Customer	Customer Tributary Area (acres)	Residential Population	Employment Population	SIU Employment Population	SIU Flow (MGD)	Equivalent Population(1)
1	Allen Park	1,716	2,659	9,366	1,858	0.72	16,917
2	Centerline	1,031	8,103	8,410	29	0.01	13,671
3	City of Detroit	82,397	862,960	302,802	70,038	24.53	1,332,732
4	Clinton-Oakland	88,445	279,807	203,528	20,427	3.02	437,879
5	Dearborn	14,823	106,605	114,390	17,490	3.39	213,574
6	Dearborn Heights District 2	39	432	18	0	0.00	444
7	Evergreen-Farmington	71,375	265,143	322,336	2,788	0.38	477,624
8	Farmington	1,380	7,837	6,728	6	0.01	12,283
9	Grosse Pointe	684	5,261	7,023	0	0.00	9,821
10	Grosse Pointe Farms	1,384	8,165	6,354	750	0.09	12,973
11	Grosse Pointe Park	1,281	10,830	2,838	1,200	0.11	13,257
12	Hamtramck	1,347	27,849	5,167	126	0.07	32,080
13	Harper Woods	188	1,791	148	0	0.00	1,887
14	Highland Park	1,870	11,329	6,458	220	0.08	16,396
15	Macomb	111,709	539,479	198,950	24,143	4.40	710,137
16	Melvindale	1,757	9,833	2,868	305	0.26	14,839
17	N.E. Wayne	20,405	158,740	60,995	583	0.22	200,797
18	North Huron Valley/Rouge Val(2)	107,454	554,300	359,357	23,767	3.05	824,499
19	Redford Township	49	295	90	0	0.00	353
20	S.E. Oakland	42,241	261,292	272,420	20,838	3.51	470,243
21	Wayne Co Area 6	81	878	118	0	0.00	955
	Total	**551,656**	**3,123,588**	**1,890,364**	**184,568**	**44.85**	**4,813,360**
	WTUA(2)	32,484	140,857	85,933	618	0.10	197,568

Notes:
1- Equivalent Population = Residential Population + (Employment Population - SIU Employment Population)*(50/77) + SIU Flow (gpd) / 77
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 3e: Baseline Data for 2040

	First Tier Wholesale Customer	Customer Tributary Area (acres)	Residential Population	Employment Population	SIU Employment Population	SIU Flow (MGD)	Equivalent Population(1)
1	Allen Park	1,716	2,604	8,899	1,858	0.72	16,559
2	Centerline	1,031	8,309	8,289	29	0.01	13,798
3	City of Detroit	82,397	853,103	300,312	70,038	24.53	1,321,259
4	Clinton-Oakland	90,305	289,463	209,775	20,427	3.02	451,591
5	Dearborn	14,823	107,369	115,109	17,490	3.39	214,804
6	Dearborn Heights District 2	39	438	17	0	0.00	449
7	Evergreen-Farmington	71,510	268,191	324,273	2,788	0.38	481,929
8	Farmington	1,380	7,871	6,625	6	0.01	12,250
9	Grosse Pointe	684	5,277	6,998	0	0.00	9,821
10	Grosse Pointe Farms	1,384	8,171	6,363	750	0.09	12,984
11	Grosse Pointe Park	1,281	10,841	2,832	1,200	0.11	13,264
12	Hamtramck	1,347	28,273	5,079	126	0.07	32,447
13	Harper Woods	188	1,802	141	0	0.00	1,893
14	Highland Park	1,870	12,184	6,179	220	0.08	17,069
15	Macomb	113,131	567,215	207,152	24,143	4.40	743,199
16	Melvindale	1,757	9,922	2,844	305	0.26	14,912
17	N.E. Wayne	20,405	159,910	60,448	583	0.22	201,612
18	North Huron Valley/Rouge Val(2)	109,075	576,216	366,009	23,767	3.96	850,734
19	Redford Township	49	293	84	0	0.00	347
20	S.E. Oakland	42,241	262,217	272,081	20,838	3.51	470,947
21	Wayne Co Area 6	81	910	116	0	0.00	985
	Total	**556,694**	**3,180,574**	**1,909,624**	**184,568**	**44.85**	**4,882,853**
	WTUA(2)	33,777	151,379	85,933	618	0.10	208,090

Notes:
1- Equivalent Population = Residential Population + (Employment Population - SIU Employment Population)*(50/77) + SIU Flow (gpd) / 77
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North HuronRouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 8f: Baseline Data for 2050

	First Tier Wholesale Customer	Customer Tributary Area (acres)	Residential Population	Employment Population	SIU Employment Population	SIU Flow (MGD)	Equivalent Population(1)
1	Allen Park	1,716	2,550	8,432	1,858	0.72	16,202
2	Centerline	1,031	8,514	8,167	29	0.01	13,925
3	City of Detroit	82,397	843,246	297,823	70,038	24.53	1,309,785
4	Clinton-Oakland	92,165	299,119	216,021	20,427	3.02	465,303
5	Dearborn	14,823	108,132	115,828	17,490	3.39	216,035
6	Dearborn Heights District 2	39	444	17	0	0.00	455
7	Evergreen-Farmington	71,645	271,239	326,210	2,788	0.38	486,235
8	Farmington	1,380	7,904	6,522	6	0.01	12,217
9	Grosse Pointe	684	5,292	6,973	0	0.00	9,820
10	Grosse Pointe Farms	1,384	8,176	6,372	750	0.09	12,995
11	Grosse Pointe Park	1,281	10,851	2,826	1,200	0.11	13,270
12	Hamtramck	1,347	28,697	4,990	126	0.07	32,813
13	Harper Woods	188	1,812	135	0	0.00	1,900
14	Highland Park	1,870	13,038	5,899	220	0.08	17,742
15	Macomb	114,552	594,951	215,354	24,143	4.40	776,261
16	Melvindale	1,757	10,011	2,819	305	0.26	14,985
17	N.E. Wayne	20,405	161,080	59,901	583	0.22	202,427
18	North Huron Valley/Rouge Val(2)	110,696	598,131	372,661	23,767	3.96	876,969
19	Redford Township	49	290	78	0	0.00	341
20	S.E. Oakland	42,241	263,141	271,742	20,838	3.51	471,652
21	Wayne Co Area 6	81	942	114	0	0.00	1,016
	Total	**561,731**	**3,237,560**	**1,928,885**	**184,568**	**44.85**	**4,952,346**
	WTUA(2)	35,070	161,900	95,116	618	0.10	224,574

Notes:
1- Equivalent Population = Residential Population + (Employment Population - SIU Employment Population)*(50/77) + SIU Flow (gpd) / 77
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006

489,000
595,000 7 MGD

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 9a: Average Daily Flow (ADF) for 2000
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.72	1.67	1.39	0.34	0.28	0.06
2	Centerline	1.39	1.19	1.13	0.26	0.06	0.20
3	City of Detroit	355.55	296.43	111.26	244.29	185.17	59.12
4	Clinton-Oakland	32.54	31.27	28.09	4.45	3.18	1.26
5	Dearborn	27.27	22.06	15.50	11.77	6.56	5.21
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	48.18	42.53	35.17	13.02	7.36	5.65
8	Farmington	1.64	1.39	0.98	0.66	0.41	0.25
9	Grosse Pointe	2.27	1.70	0.78	1.49	0.92	0.57
10	Grosse Pointe Farms	4.09	2.93	1.07	3.02	1.86	1.16
11	Grosse Pointe Park	1.88	1.45	1.11	0.77	0.34	0.43
12	Hamtramck	6.68	4.99	2.13	4.55	2.86	1.69
13	Harper Woods	0.76	0.84	0.14	0.61	0.70	-0.09
14	Highland Park	4.51	3.41	1.73	2.78	1.69	1.09
15	Macomb	54.17	51.20	38.87	15.30	12.34	2.97
16	Melvindale	1.82	1.60	1.24	0.58	0.36	0.22
17	N.E. Wayne	35.63	24.63	17.00	18.63	7.63	11.00
18	North Huron Valley/Rouge Val[2]	78.09	67.70	57.48	20.61	10.22	10.39
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	65.09	47.25	38.61	26.48	8.65	17.84
21	Wayne Co Area 6	0.19	0.16	0.08	0.12	0.08	0.03
	Total	**723.66**	**604.56**	**353.81**	**369.85**	**250.75**	**119.10**
	WTUA[2]	17.50	14.38	11.31	6.19	3.07	3.12

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 9b: Average Daily Flow (ADF) for 2010
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.70	1.64	1.36	0.34	0.28	0.06
2	Centerline	1.35	1.14	1.09	0.26	0.06	0.20
3	City of Detroit	351.04	291.92	106.75	244.29	185.17	59.12
4	Clinton-Oakland	35.72	34.33	30.91	4.81	3.42	1.39
5	Dearborn	27.71	22.50	15.95	11.77	6.56	5.21
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	49.43	43.73	36.28	13.14	7.45	5.69
8	Farmington	1.61	1.36	0.95	0.66	0.41	0.25
9	Grosse Pointe	2.26	1.69	0.77	1.49	0.92	0.57
10	Grosse Pointe Farms	4.05	2.90	1.04	3.02	1.86	1.16
11	Grosse Pointe Park	1.83	1.40	1.07	0.77	0.34	0.43
12	Hamtramck	6.74	5.05	2.19	4.55	2.86	1.69
13	Harper Woods	0.75	0.84	0.14	0.61	0.70	-0.09
14	Highland Park	4.18	3.09	1.40	2.78	1.69	1.09
15	Macomb	62.32	58.86	45.59	16.73	13.27	3.46
16	Melvindale	1.77	1.55	1.19	0.58	0.36	0.22
17	N.E. Wayne	34.92	23.92	16.29	18.63	7.63	11.00
18	North Huron Valley/Rouge Val[2]	81.58	71.03	60.52	21.06	10.51	10.55
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	64.28	46.44	37.79	26.49	8.65	17.84
21	Wayne Co Area 6	0.19	0.16	0.07	0.12	0.08	0.03
	Total	**733.62**	**613.70**	**361.41**	**372.21**	**252.29**	**119.92**
	WTUA[2]	19.31	16.16	13.02	6.29	3.14	3.15

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 9c: Average Daily Flow (ADF) for 2020
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.67	1.61	1.33	0.34	0.28	0.06
2	Centerline	1.33	1.13	1.07	0.26	0.06	0.20
3	City of Detroit	348.97	289.85	104.69	244.29	185.17	59.12
4	Clinton-Oakland	37.22	35.80	32.31	4.91	3.48	1.42
5	Dearborn	27.96	22.75	16.20	11.77	6.56	5.21
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	49.72	44.01	36.53	13.19	7.48	5.71
8	Farmington	1.61	1.36	0.95	0.66	0.41	0.25
9	Grosse Pointe	2.25	1.68	0.76	1.49	0.92	0.57
10	Grosse Pointe Farms	4.03	2.88	1.02	3.02	1.86	1.16
11	Grosse Pointe Park	1.81	1.38	1.04	0.77	0.34	0.43
12	Hamtramck	6.88	5.19	2.33	4.55	2.86	1.69
13	Harper Woods	0.75	0.84	0.14	0.61	0.70	-0.09
14	Highland Park	4.11	3.02	1.33	2.78	1.69	1.09
15	Macomb	67.26	63.66	50.13	17.13	13.53	3.60
16	Melvindale	1.75	1.53	1.17	0.58	0.36	0.22
17	N.E. Wayne	34.51	23.51	15.87	18.63	7.63	11.00
18	North Huron Valley/Rouge Val[2]	83.22	72.62	62.00	21.21	10.61	10.60
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	63.49	45.65	37.00	26.49	8.65	17.84
21	Wayne Co Area 6	0.19	0.16	0.07	0.12	0.08	0.03
	Total	**738.93**	**618.77**	**366.02**	**372.91**	**252.75**	**120.16**
	WTUA[2]	20.48	17.30	14.12	6.36	3.18	3.18

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 9d: Average Daily Flow (ADF) for 2030
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.64	1.58	1.30	0.34	0.28	0.06
2	Centerline	1.31	1.11	1.05	0.26	0.06	0.20
3	City of Detroit	346.91	287.79	102.62	244.29	185.17	59.12
4	Clinton-Oakland	38.72	37.26	33.72	5.00	3.55	1.46
5	Dearborn	28.21	23.00	16.45	11.77	6.56	5.21
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	50.01	44.29	36.78	13.24	7.51	5.73
8	Farmington	1.61	1.36	0.95	0.66	0.41	0.25
9	Grosse Pointe	2.25	1.67	0.76	1.49	0.92	0.57
10	Grosse Pointe Farms	4.02	2.86	1.00	3.02	1.86	1.16
11	Grosse Pointe Park	1.79	1.36	1.02	0.77	0.34	0.43
12	Hamtramck	7.02	5.33	2.47	4.55	2.86	1.69
13	Harper Woods	0.76	0.85	0.15	0.61	0.70	-0.09
14	Highland Park	4.04	2.95	1.26	2.78	1.69	1.09
15	Macomb	72.21	68.47	54.68	17.53	13.79	3.74
16	Melvindale	1.72	1.50	1.14	0.58	0.36	0.22
17	N.E. Wayne	34.09	23.09	15.46	18.63	7.63	11.00
18	North Huron Valley/Rouge Val[2]	84.85	74.20	63.49	21.37	10.71	10.66
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	62.70	44.86	36.21	26.49	8.65	17.84
21	Wayne Co Area 6	0.19	0.16	0.07	0.12	0.08	0.03
	Total	**744.24**	**623.84**	**370.63**	**373.61**	**253.21**	**120.40**
	WTUA[2]	21.64	18.44	15.21	6.43	3.22	3.20

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 9e: Average Daily Flow (ADF) for 2040
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.61	1.56	1.28	0.34	0.28	0.06
2	Centerline	1.32	1.12	1.06	0.26	0.06	0.20
3	City of Detroit	346.02	286.90	101.74	244.29	185.17	59.12
4	Clinton-Oakland	39.93	38.42	34.77	5.15	3.65	1.51
5	Dearborn	28.31	23.10	16.54	11.77	6.56	5.21
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	50.36	44.63	37.11	13.25	7.52	5.73
8	Farmington	1.60	1.35	0.94	0.66	0.41	0.25
9	Grosse Pointe	2.25	1.67	0.76	1.49	0.92	0.57
10	Grosse Pointe Farms	4.02	2.86	1.00	3.02	1.86	1.16
11	Grosse Pointe Park	1.79	1.36	1.02	0.77	0.34	0.43
12	Hamtramck	7.05	5.36	2.50	4.55	2.86	1.69
13	Harper Woods	0.76	0.85	0.15	0.61	0.70	-0.09
14	Highland Park	4.09	3.00	1.31	2.78	1.69	1.09
15	Macomb	74.87	71.09	57.23	17.64	13.87	3.78
16	Melvindale	1.73	1.51	1.15	0.58	0.36	0.22
17	N.E. Wayne	34.16	23.16	15.52	18.63	7.63	11.00
18	North Huron Valley/Rouge Val[2]	87.01	76.30	65.51	21.50	10.80	10.70
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	62.75	44.91	36.26	26.49	8.65	17.84
21	Wayne Co Area 6	0.19	0.16	0.08	0.12	0.08	0.03
	Total	**750.00**	**629.46**	**375.98**	**374.02**	**253.48**	**120.54**
	WTUA[2]	22.55	19.32	16.02	6.53	3.29	3.24

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 9f: Average Daily Flow (ADF) for 2050
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.59	1.53	1.25	0.34	0.28	0.06
2	Centerline	1.33	1.13	1.07	0.26	0.06	0.20
3	City of Detroit	345.14	286.02	100.85	244.29	185.17	59.12
4	Clinton-Oakland	41.13	39.57	35.83	5.30	3.74	1.56
5	Dearborn	28.40	23.19	16.63	11.77	6.56	5.21
6	Dearborn Heights District 2	0.09	0.07	0.04	0.06	0.04	0.02
7	Evergreen-Farmington	50.70	44.96	37.44	13.26	7.52	5.73
8	Farmington	1.60	1.35	0.94	0.66	0.41	0.25
9	Grosse Pointe	2.25	1.67	0.76	1.49	0.92	0.57
10	Grosse Pointe Farms	4.02	2.86	1.00	3.02	1.86	1.16
11	Grosse Pointe Park	1.79	1.36	1.02	0.77	0.34	0.43
12	Hamtramck	7.08	5.39	2.53	4.55	2.86	1.69
13	Harper Woods	0.76	0.85	0.15	0.61	0.70	-0.09
14	Highland Park	4.15	3.05	1.37	2.78	1.69	1.09
15	Macomb	77.53	73.71	59.77	17.76	13.94	3.82
16	Melvindale	1.74	1.51	1.15	0.58	0.36	0.22
17	N.E. Wayne	34.22	23.22	15.59	18.63	7.63	11.00
18	North Huron Valley/Rouge Val[2]	89.16	78.41	67.53	21.63	10.88	10.75
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	62.81	44.97	36.32	26.49	8.65	17.84
21	Wayne Co Area 6	0.20	0.16	0.08	0.12	0.08	0.03
	Total	**755.76**	**635.07**	**381.33**	**374.43**	**253.74**	**120.68**
	WTUA[2]	23.93	20.65	17.29	6.64	3.36	3.27

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 10a: Maximum Monthly Flow (MMF) for 2000

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.74	1.69	1.39	0.35	0.30	0.05
2	Centerline	2.42	1.91	1.13	1.29	0.78	0.51
3	City of Detroit	387.30	309.01	111.26	276.04	197.75	78.29
4	Clinton-Oakland	38.12	33.44	28.09	10.02	5.34	4.68
5	Dearborn	27.30	23.17	15.50	11.80	7.67	4.13
6	Dearborn Heights District 2	0.12	0.09	0.03	0.09	0.06	0.02
7	Evergreen-Farmington	60.56	47.71	35.17	25.39	12.55	12.84
8	Farmington	2.53	2.19	0.98	1.55	1.20	0.34
9	Grosse Pointe	4.51	3.26	0.78	3.73	2.48	1.25
10	Grosse Pointe Farms	8.62	6.09	1.07	7.55	5.02	2.54
11	Grosse Pointe Park	2.11	2.12	1.11	1.00	1.01	-0.01
12	Hamtramck	8.48	7.28	2.13	6.35	5.15	1.19
13	Harper Woods	0.46	0.81	0.14	0.31	0.67	-0.36
14	Highland Park	5.89	4.27	1.73	4.17	2.55	1.62
15	Macomb	65.02	54.92	38.87	26.15	16.06	10.10
16	Melvindale	2.59	2.02	1.24	1.35	0.78	0.57
17	N.E. Wayne	51.45	31.83	17.00	34.46	14.84	19.62
18	North Huron Valley/Rouge Val[2]	126.35	90.19	57.48	68.87	32.71	36.16
19	Redford Township	0.14	0.11	0.03	0.11	0.08	0.03
20	S.E. Oakland	89.54	60.40	38.61	50.93	21.80	29.14
21	Wayne Co Area 6	0.25	0.20	0.08	0.18	0.13	0.05
	Total	**885.49**	**682.72**	**353.81**	**531.68**	**328.91**	**202.77**
	WTUA[2]	31.99	21.13	11.31	20.68	9.82	10.86

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 10b: Maximum Monthly Flow (MMF) for 2010
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.71	1.66	1.36	0.35	0.30	0.05
2	Centerline	2.37	1.86	1.09	1.29	0.78	0.51
3	City of Detroit	382.80	304.50	106.75	276.04	197.75	78.29
4	Clinton-Oakland	41.31	36.56	30.91	10.41	5.66	4.75
5	Dearborn	27.75	23.62	15.95	11.80	7.67	4.13
6	Dearborn Heights District 2	0.12	0.09	0.03	0.09	0.06	0.02
7	Evergreen-Farmington	61.81	48.94	36.28	25.52	12.66	12.87
8	Farmington	2.50	2.16	0.95	1.55	1.20	0.34
9	Grosse Pointe	4.50	3.25	0.77	3.73	2.48	1.25
10	Grosse Pointe Farms	8.59	6.05	1.04	7.55	5.02	2.54
11	Grosse Pointe Park	2.06	2.07	1.07	1.00	1.01	-0.01
12	Hamtramck	8.54	7.34	2.19	6.35	5.15	1.19
13	Harper Woods	0.45	0.81	0.14	0.31	0.67	-0.36
14	Highland Park	5.57	3.95	1.40	4.17	2.55	1.62
15	Macomb	73.25	62.87	45.59	27.66	17.29	10.38
16	Melvindale	2.54	1.97	1.19	1.35	0.78	0.57
17	N.E. Wayne	50.74	31.12	16.29	34.46	14.84	19.62
18	North Huron Valley/Rouge Val[2]	129.86	93.62	60.52	69.34	33.09	36.25
19	Redford Township	0.14	0.11	0.03	0.11	0.08	0.03
20	S.E. Oakland	88.73	59.59	37.79	50.94	21.80	29.14
21	Wayne Co Area 6	0.25	0.20	0.07	0.18	0.13	0.05
	Total	**895.59**	**692.36**	**361.41**	**534.18**	**330.96**	**203.23**
	WTUA[2]	33.79	22.93	13.02	20.77	9.90	10.87

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The values for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan

Task C.1.a - Approach to Flow Needs

Table 10c: Maximum Monthly Flow (MMF) for 2020

(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.68	1.63	1.33	0.35	0.30	0.05
2	Centerline	2.36	1.84	1.07	1.29	0.78	0.51
3	City of Detroit	380.73	302.44	104.69	276.04	197.75	78.29
4	Clinton-Oakland	42.82	38.05	32.31	10.51	5.74	4.77
5	Dearborn	28.00	23.87	16.20	11.80	7.67	4.13
6	Dearborn Heights District 2	0.12	0.09	0.03	0.09	0.06	0.02
7	Evergreen-Farmington	62.10	49.23	36.53	25.57	12.70	12.88
8	Farmington	2.50	2.15	0.95	1.55	1.21	0.34
9	Grosse Pointe	4.49	3.24	0.76	3.73	2.48	1.25
10	Grosse Pointe Farms	8.57	6.03	1.02	7.55	5.02	2.54
11	Grosse Pointe Park	2.04	2.05	1.04	1.00	1.01	-0.01
12	Hamtramck	8.68	7.48	2.33	6.35	5.15	1.19
13	Harper Woods	0.45	0.81	0.14	0.31	0.67	-0.36
14	Highland Park	5.50	3.88	1.33	4.17	2.55	1.62
15	Macomb	78.22	67.77	50.13	28.09	17.63	10.46
16	Melvindale	2.52	1.95	1.17	1.35	0.78	0.57
17	N.E. Wayne	50.33	30.71	15.87	34.46	14.84	19.62
18	North Huron Valley/Rouge Val[2]	131.51	95.23	62.00	69.51	33.23	36.28
19	Redford Township	0.14	0.10	0.03	0.11	0.08	0.03
20	S.E. Oakland	87.94	58.80	37.00	50.94	21.80	29.14
21	Wayne Co Area 6	0.25	0.20	0.07	0.18	0.13	0.05
	Total	**900.95**	**697.58**	**366.02**	**534.93**	**331.66**	**203.37**
	WTUA[2]	34.96	24.08	14.12	20.84	9.96	10.88

Notes:

1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 10d: Maximum Monthly Flow (MMF) for 2030
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.65	1.61	1.30	0.35	0.30	0.05
2	Centerline	2.34	1.83	1.05	1.29	0.78	0.51
3	City of Detroit	378.66	300.37	102.62	276.04	197.75	78.29
4	Clinton-Oakland	44.33	39.54	33.72	10.61	5.83	4.79
5	Dearborn	28.24	24.12	16.45	11.80	7.67	4.13
6	Dearborn Heights District 2	0.12	0.09	0.03	0.09	0.06	0.02
7	Evergreen-Farmington	62.40	49.52	36.78	25.62	12.74	12.89
8	Farmington	2.50	2.15	0.95	1.55	1.21	0.34
9	Grosse Pointe	4.49	3.23	0.76	3.73	2.48	1.25
10	Grosse Pointe Farms	8.55	6.01	1.00	7.55	5.02	2.54
11	Grosse Pointe Park	2.02	2.03	1.02	1.00	1.01	-0.01
12	Hamtramck	8.82	7.62	2.47	6.35	5.15	1.19
13	Harper Woods	0.46	0.82	0.15	0.31	0.67	-0.36
14	Highland Park	5.43	3.81	1.26	4.17	2.55	1.62
15	Macomb	83.19	72.66	54.68	28.51	17.98	10.54
16	Melvindale	2.49	1.92	1.14	1.35	0.78	0.57
17	N.E. Wayne	49.92	30.30	15.46	34.46	14.84	19.62
18	North Huron Valley/Rouge Val[2]	133.16	96.85	63.49	69.67	33.36	36.31
19	Redford Township	0.13	0.10	0.03	0.11	0.08	0.03
20	S.E. Oakland	87.15	58.01	36.21	50.94	21.80	29.14
21	Wayne Co Area 6	0.25	0.20	0.07	0.18	0.13	0.05
	Total	**906.30**	**702.79**	**370.63**	**535.67**	**332.16**	**203.51**
	WTUA[2]	36.13	25.23	15.21	20.91	10.02	10.89

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 10e: Maximum Monthly Flow (MMF) for 2040
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.63	1.58	1.28	0.35	0.30	0.05
2	Centerline	2.35	1.84	1.06	1.29	0.78	0.51
3	City of Detroit	377.78	299.49	101.74	276.04	197.75	78.29
4	Clinton-Oakland	45.55	40.73	34.77	10.77	5.96	4.82
5	Dearborn	28.34	24.21	16.54	11.80	7.67	4.13
6	Dearborn Heights District 2	0.12	0.09	0.03	0.09	0.06	0.02
7	Evergreen-Farmington	62.74	49.86	37.11	25.64	12.75	12.89
8	Farmington	2.49	2.15	0.94	1.55	1.21	0.34
9	Grosse Pointe	4.49	3.23	0.76	3.73	2.48	1.25
10	Grosse Pointe Farms	8.55	6.02	1.00	7.55	5.02	2.54
11	Grosse Pointe Park	2.02	2.03	1.02	1.00	1.01	-0.01
12	Hamtramck	8.84	7.65	2.50	6.35	5.15	1.19
13	Harper Woods	0.46	0.82	0.15	0.31	0.67	-0.36
14	Highland Park	5.48	3.86	1.31	4.17	2.55	1.62
15	Macomb	85.86	75.30	57.23	28.64	18.08	10.56
16	Melvindale	2.50	1.93	1.15	1.35	0.78	0.57
17	N.E. Wayne	49.98	30.36	15.52	34.46	14.84	19.62
18	North Huron Valley/Rouge Val[2]	135.32	98.98	65.51	69.81	33.47	36.34
19	Redford Township	0.13	0.10	0.03	0.11	0.08	0.03
20	S.E. Oakland	87.20	58.06	36.26	50.94	21.80	29.14
21	Wayne Co Area 6	0.25	0.20	0.08	0.18	0.13	0.05
	Total	**912.08**	**708.49**	**375.98**	**536.10**	**332.51**	**203.59**
	WTUA[2]	37.05	26.13	16.02	21.03	10.11	10.91

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 10f: Maximum Monthly Flow (MMF) for 2050
(Projected from 2001 Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.60	1.55	1.25	0.35	0.30	0.05
2	Centerline	2.36	1.85	1.07	1.29	0.78	0.51
3	City of Detroit	376.90	298.60	100.85	276.04	197.75	78.29
4	Clinton-Oakland	46.76	41.91	35.83	10.93	6.09	4.85
5	Dearborn	28.43	24.31	16.63	11.80	7.67	4.13
6	Dearborn Heights District 2	0.12	0.10	0.04	0.09	0.06	0.02
7	Evergreen-Farmington	63.09	50.20	37.44	25.65	12.76	12.89
8	Farmington	2.49	2.15	0.94	1.55	1.21	0.34
9	Grosse Pointe	4.49	3.23	0.76	3.73	2.48	1.25
10	Grosse Pointe Farms	8.55	6.02	1.00	7.55	5.02	2.54
11	Grosse Pointe Park	2.02	2.03	1.02	1.00	1.01	-0.01
12	Hamtramck	8.87	7.68	2.53	6.35	5.15	1.19
13	Harper Woods	0.46	0.82	0.15	0.31	0.67	-0.36
14	Highland Park	5.53	3.91	1.37	4.17	2.55	1.62
15	Macomb	88.53	77.95	59.77	28.76	18.18	10.58
16	Melvindale	2.50	1.94	1.15	1.35	0.78	0.57
17	N.E. Wayne	50.04	30.42	15.59	34.46	14.84	19.62
18	North Huron Valley/Rouge Val[2]	137.47	101.11	67.53	69.95	33.59	36.36
19	Redford Township	0.13	0.10	0.03	0.11	0.08	0.03
20	S.E. Oakland	87.26	58.12	36.32	50.94	21.80	29.14
21	Wayne Co Area 6	0.26	0.20	0.08	0.18	0.13	0.05
	Total	**917.87**	**714.20**	**381.33**	**536.54**	**332.87**	**203.67**
	WTUA[2]	38.43	27.49	17.29	21.14	10.20	10.93

Notes:
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 11a: Average Daily Flow (ADF) for 1998-2001

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.67	1.66	1.39	0.29	0.28	0.01
2	Centerline	1.34	1.05	1.13	0.20	-0.09	0.29
3	City of Detroit	311.70	273.95	111.26	200.44	162.69	37.75
4	Clinton-Oakland	33.46	29.80	28.09	5.37	1.71	3.66
5	Dearborn	23.76	20.60	15.50	8.26	5.10	3.16
6	Dearborn Heights District 2	0.08	0.07	0.03	0.05	0.03	0.02
7	Evergreen-Farmington	47.07	39.44	35.17	11.90	4.28	7.63
8	Farmington	1.89	1.18	0.98	0.91	0.20	0.71
9	Grosse Pointe	2.06	1.42	0.78	1.28	0.64	0.64
10	Grosse Pointe Farms	3.65	2.36	1.07	2.58	1.29	1.29
11	Grosse Pointe Park	1.77	1.23	1.11	0.66	0.12	0.54
12	Hamtramck	5.74	4.61	2.13	3.61	2.48	1.13
13	Harper Woods	0.88	0.81	0.14	0.74	0.67	0.07
14	Highland Park	3.61	3.33	1.73	1.88	1.61	0.28
15	Macomb	57.73	46.88	38.87	18.86	8.01	10.85
16	Melvindale	1.90	1.39	1.24	0.66	0.15	0.51
17	N.E. Wayne	30.35	20.79	17.00	13.35	3.79	9.56
18	North Huron Valley/Rouge Val[2]	82.07	58.11	57.48	24.59	0.63	23.96
19	Redford Township	0.10	0.07	0.03	0.06	0.04	0.02
20	S.E. Oakland	58.03	40.13	38.61	19.43	1.52	17.91
21	Wayne Co Area 6	0.18	0.14	0.06	0.11	0.07	0.04
	Total	**669.04**	**549.02**	**353.81**	**315.23**	**195.21**	**120.02**
	WTUA[2]	18.70	11.50	11.31	7.38	0.19	7.19

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 11b: Average Daily Flow (ADF) for 2010
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1)]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.64	1.63	1.36	0.29	0.28	0.01
2	Centerline	1.29	1.00	1.09	0.20	-0.09	0.29
3	City of Detroit	307.19	269.44	106.75	200.44	162.69	37.75
4	Clinton-Oakland	36.64	32.86	30.91	5.73	1.95	3.79
5	Dearborn	24.20	21.04	15.95	8.26	5.10	3.16
6	Dearborn Heights District 2	0.08	0.06	0.03	0.05	0.03	0.02
7	Evergreen-Farmington	48.31	40.64	36.28	12.03	4.36	7.67
8	Farmington	1.86	1.15	0.95	0.91	0.20	0.71
9	Grosse Pointe	2.05	1.41	0.77	1.28	0.64	0.64
10	Grosse Pointe Farms	3.62	2.33	1.04	2.58	1.29	1.29
11	Grosse Pointe Park	1.73	1.19	1.07	0.66	0.12	0.54
12	Hamtramck	5.80	4.67	2.19	3.61	2.48	1.13
13	Harper Woods	0.87	0.81	0.14	0.74	0.67	0.07
14	Highland Park	3.29	3.01	1.40	1.88	1.61	0.28
15	Macomb	65.87	54.53	45.59	20.28	8.94	11.34
16	Melvindale	1.85	1.34	1.19	0.66	0.15	0.51
17	N.E. Wayne	29.64	20.08	16.29	13.35	3.79	9.56
18	North Huron Valley/Rouge Val[(2)]	85.56	61.44	60.52	25.04	0.92	24.12
19	Redford Township	0.09	0.07	0.03	0.06	0.04	0.02
20	S.E. Oakland	57.22	39.32	37.79	19.43	1.52	17.91
21	Wayne Co Area G	0.18	0.14	0.07	0.11	0.07	0.04
	Total	**679.00**	**558.17**	**361.41**	**317.59**	**196.76**	**120.83**
	WTUA[(2)]	20.51	13.28	13.02	7.48	0.26	7.22

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 11c: Average Daily Flow (ADF) for 2020
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.62	1.61	1.33	0.29	0.28	0.01
2	Centerline	1.27	0.98	1.07	0.20	-0.09	0.29
3	City of Detroit	305.12	267.38	104.69	200.44	162.69	37.75
4	Clinton-Oakland	38.14	34.32	32.31	5.83	2.01	3.82
5	Dearborn	24.45	21.29	16.20	8.26	5.10	3.16
6	Dearborn Heights District 2	0.08	0.07	0.03	0.05	0.03	0.02
7	Evergreen-Farmington	48.61	40.92	36.53	12.08	4.39	7.69
8	Farmington	1.86	1.15	0.95	0.91	0.20	0.71
9	Grosse Pointe	2.04	1.40	0.76	1.28	0.64	0.64
10	Grosse Pointe Farms	3.60	2.31	1.02	2.58	1.29	1.29
11	Grosse Pointe Park	1.70	1.16	1.04	0.66	0.12	0.54
12	Hamtramck	5.94	4.81	2.33	3.61	2.48	1.13
13	Harper Woods	0.88	0.81	0.14	0.74	0.67	0.07
14	Highland Park	3.22	2.94	1.33	1.88	1.61	0.28
15	Macomb	70.82	59.34	50.13	20.68	9.21	11.48
16	Melvindale	1.83	1.32	1.17	0.66	0.15	0.51
17	N.E. Wayne	29.23	19.67	15.87	13.35	3.79	9.56
18	North Huron Valley/Rouge Val[2]	87.20	63.03	62.00	25.19	1.02	24.17
19	Redford Township	0.09	0.07	0.03	0.06	0.04	0.02
20	S.E. Oakland	56.43	38.52	37.00	19.43	1.52	17.91
21	Wayne Co Area 6	0.18	0.14	0.07	0.11	0.07	0.04
	Total	**684.31**	**563.23**	**366.02**	**318.29**	**197.21**	**121.08**
	WTUA[2]	21.67	14.42	14.12	7.55	0.30	7.25

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 11d: Projected Average Daily Flow (ADF) for 2030
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.59	1.58	1.30	0.29	0.28	0.01
2	Centerline	1.26	0.97	1.05	0.20	-0.09	0.29
3	City of Detroit	303.06	265.31	102.62	200.44	162.69	37.75
4	Clinton-Oakland	39.65	35.79	33.72	5.93	2.08	3.85
5	Dearborn	24.70	21.54	16.45	8.26	5.10	3.16
6	Dearborn Heights District 2	0.09	0.07	0.03	0.05	0.03	0.02
7	Evergreen-Farmington	48.90	41.20	36.78	12.12	4.42	7.70
8	Farmington	1.86	1.15	0.95	0.91	0.20	0.71
9	Grosse Pointe	2.03	1.39	0.76	1.28	0.64	0.64
10	Grosse Pointe Farms	3.58	2.29	1.00	2.58	1.29	1.29
11	Grosse Pointe Park	1.68	1.14	1.02	0.66	0.12	0.54
12	Hamtramck	6.08	4.95	2.47	3.61	2.48	1.13
13	Harper Woods	0.88	0.81	0.15	0.74	0.67	0.07
14	Highland Park	3.14	2.87	1.26	1.88	1.61	0.28
15	Macomb	75.76	64.15	54.68	21.08	9.47	11.62
16	Melvindale	1.80	1.29	1.14	0.66	0.15	0.51
17	N.E. Wayne	28.81	19.26	15.46	13.35	3.79	9.56
18	North Huron Valley/Rouge Val[2]	88.83	64.61	63.49	25.35	1.12	24.22
19	Redford Township	0.09	0.07	0.03	0.06	0.04	0.02
20	S.E. Oakland	55.64	37.73	36.21	19.43	1.52	17.91
21	Wayne Co Area 6	0.18	0.14	0.07	0.11	0.07	0.04
	Total	**689.62**	**568.30**	**370.63**	**318.99**	**197.67**	**121.32**
	WTUA[2]	22.83	15.56	15.21	7.62	0.35	7.27

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 11e: Average Daily Flow (ADF) for 2040
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.56	1.55	1.28	0.29	0.28	0.01
2	Centerline	1.27	0.98	1.06	0.20	-0.09	0.29
3	City of Detroit	302.17	264.43	101.74	200.44	162.69	37.75
4	Clinton-Oakland	40.85	36.95	34.77	6.08	2.17	3.91
5	Dearborn	24.80	21.64	16.54	8.26	5.10	3.16
6	Dearborn Heights District 2	0.09	0.07	0.03	0.05	0.03	0.02
7	Evergreen-Farmington	49.24	41.54	37.11	12.14	4.43	7.71
8	Farmington	1.86	1.15	0.94	0.91	0.20	0.71
9	Grosse Pointe	2.03	1.39	0.76	1.28	0.64	0.64
10	Grosse Pointe Farms	3.58	2.29	1.00	2.58	1.29	1.29
11	Grosse Pointe Park	1.68	1.14	1.02	0.66	0.12	0.54
12	Hamtramck	6.11	4.98	2.50	3.61	2.48	1.13
13	Harper Woods	0.88	0.81	0.15	0.74	0.67	0.07
14	Highland Park	3.20	2.92	1.31	1.88	1.61	0.28
15	Macomb	78.43	66.77	57.23	21.20	9.54	11.66
16	Melvindale	1.81	1.30	1.15	0.66	0.15	0.51
17	N.E. Wayne	28.88	19.32	15.52	13.35	3.79	9.56
18	North Huron Valley/Rouge Val[2]	90.98	66.72	65.51	25.48	1.21	24.27
19	Redford Township	0.09	0.07	0.03	0.06	0.04	0.02
20	S.E. Oakland	55.69	37.79	36.26	19.43	1.52	17.91
21	Wayne Co Area 6	0.18	0.14	0.08	0.11	0.07	0.04
	Total	**695.38**	**573.92**	**375.98**	**319.40**	**197.94**	**121.46**
	WTUA[2]	23.75	16.44	16.02	7.73	0.42	7.31

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 11f: Average Daily Flow (ADF) for 2050
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered ADF	Metered DWF	Sanitary ADF[1]	DWII+WWF	DWII	WWF
		A+B+C (MGD)	A+B (MGD)	A (MGD)	B+C (MGD)	B (MGD)	C (MGD)
1	Allen Park	1.53	1.52	1.25	0.29	0.28	0.01
2	Centerline	1.28	0.99	1.07	0.20	-0.09	0.29
3	City of Detroit	301.29	263.54	100.85	200.44	162.69	37.75
4	Clinton-Oakland	42.06	38.10	35.83	6.23	2.27	3.96
5	Dearborn	24.89	21.73	16.63	8.26	5.10	3.16
6	Dearborn Heights District 2	0.09	0.07	0.04	0.05	0.03	0.02
7	Evergreen-Farmington	49.59	41.88	37.44	12.15	4.44	7.71
8	Farmington	1.85	1.14	0.94	0.91	0.20	0.71
9	Grosse Pointe	2.03	1.39	0.76	1.28	0.64	0.64
10	Grosse Pointe Farms	3.58	2.29	1.00	2.58	1.29	1.29
11	Grosse Pointe Park	1.68	1.14	1.02	0.66	0.12	0.54
12	Hamtramck	6.14	5.01	2.53	3.61	2.48	1.13
13	Harper Woods	0.88	0.81	0.15	0.74	0.67	0.07
14	Highland Park	3.25	2.97	1.37	1.88	1.61	0.28
15	Macomb	81.09	69.39	59.77	21.31	9.62	11.70
16	Melvindale	1.81	1.30	1.15	0.66	0.15	0.51
17	N.E. Wayne	28.94	19.38	15.59	13.35	3.79	9.56
18	North Huron Valley/Rouge Val[2]	93.14	68.82	67.53	25.61	1.29	24.31
19	Redford Township	0.09	0.07	0.03	0.06	0.04	0.02
20	S.E. Oakland	55.75	37.84	36.32	19.43	1.52	17.91
21	Wayne Co Area 6	0.18	0.15	0.08	0.11	0.07	0.04
	Total	**701.14**	**579.54**	**381.33**	**319.81**	**198.21**	**121.60**
	WTUA[2]	25.12	17.78	17.29	7.83	0.49	7.34

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 12a: Maximum Monthly Flow (MMF) for 1998-2001

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.68	1.67	1.39	0.29	0.28	0.01
2	Centerline	1.46	1.17	1.13	0.33	0.03	0.29
3	City of Detroit	327.74	289.68	111.26	216.48	178.42	38.06
4	Clinton-Oakland	35.02	31.33	28.09	6.93	3.24	3.69
5	Dearborn	25.10	21.91	15.50	9.60	6.41	3.19
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	50.31	42.62	35.17	15.14	7.45	7.69
8	Farmington	2.19	1.48	0.98	1.21	0.50	0.72
9	Grosse Pointe	2.33	1.69	0.78	1.55	0.90	0.64
10	Grosse Pointe Farms	4.20	2.90	1.07	3.13	1.83	1.30
11	Grosse Pointe Park	2.00	1.46	1.11	0.89	0.35	0.54
12	Hamtramck	6.22	5.08	2.13	4.09	2.95	1.14
13	Harper Woods	0.91	0.84	0.14	0.77	0.70	0.07
14	Highland Park	3.73	3.45	1.73	2.00	1.72	0.28
15	Macomb	62.34	51.40	38.87	23.47	12.53	10.94
16	Melvindale	2.12	1.60	1.24	0.88	0.36	0.51
17	N.E. Wayne	34.41	24.77	17.00	17.41	7.78	9.64
18	North Huron Valley/Rouge Val[2]	92.25	68.09	57.48	34.78	10.61	24.16
19	Redford Township	0.11	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	65.64	47.59	38.61	27.04	8.98	18.06
21	Wayne Co Area 6	0.20	0.16	0.08	0.12	0.08	0.04
	Total	**720.05**	**599.03**	**353.81**	**366.24**	**245.22**	**121.02**
	WTUA[2]	21.75	14.50	11.31	10.44	3.19	7.25

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 12b: Maximum Monthly Flow (MMF) for 2010
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.65	1.64	1.36	0.29	0.28	0.01
2	Centerline	1.41	1.12	1.09	0.33	0.03	0.29
3	City of Detroit	323.23	285.17	106.75	216.48	178.42	38.06
4	Clinton-Oakland	38.22	34.46	30.91	7.31	3.55	3.76
5	Dearborn	25.55	22.36	15.95	9.60	6.41	3.19
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	51.56	43.85	36.28	15.28	7.56	7.72
8	Farmington	2.16	1.45	0.95	1.21	0.50	0.72
9	Grosse Pointe	2.32	1.68	0.77	1.55	0.90	0.64
10	Grosse Pointe Farms	4.17	2.87	1.04	3.13	1.83	1.30
11	Grosse Pointe Park	1.95	1.41	1.07	0.89	0.35	0.54
12	Hamtramck	6.28	5.14	2.19	4.09	2.95	1.14
13	Harper Woods	0.90	0.83	0.14	0.77	0.70	0.07
14	Highland Park	3.40	3.13	1.40	2.00	1.72	0.28
15	Macomb	70.57	59.35	45.59	24.98	13.76	11.22
16	Melvindale	2.07	1.55	1.19	0.88	0.36	0.51
17	N.E. Wayne	33.70	24.06	16.29	17.41	7.78	9.64
18	North Huron Valley/Rouge Val[2]	95.77	71.52	60.52	35.25	11.00	24.25
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	64.83	46.78	37.79	27.04	8.98	18.06
21	Wayne Co Area 6	0.20	0.16	0.07	0.12	0.08	0.04
	Total	**730.15**	**608.67**	**361.41**	**368.74**	**247.26**	**121.49**
	WTUA[2]	23.57	16.30	13.02	10.54	3.28	7.27

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 12c: Maximum Monthly Flow (MMF) for 2020
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.62	1.61	1.33	0.29	0.28	0.01
2	Centerline	1.40	1.10	1.07	0.33	0.03	0.29
3	City of Detroit	321.17	283.10	104.69	216.48	178.42	38.06
4	Clinton-Oakland	39.73	35.95	32.31	7.41	3.63	3.78
5	Dearborn	25.80	22.61	16.20	9.60	6.41	3.19
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	51.86	44.13	36.53	15.33	7.60	7.72
8	Farmington	2.16	1.45	0.95	1.21	0.50	0.72
9	Grosse Pointe	2.31	1.67	0.76	1.55	0.90	0.64
10	Grosse Pointe Farms	4.15	2.85	1.02	3.13	1.83	1.30
11	Grosse Pointe Park	1.93	1.39	1.04	0.89	0.35	0.54
12	Hamtramck	6.42	5.28	2.33	4.09	2.95	1.14
13	Harper Woods	0.91	0.84	0.14	0.77	0.70	0.07
14	Highland Park	3.33	3.05	1.33	2.00	1.72	0.28
15	Macomb	75.54	64.24	50.13	25.41	14.11	11.30
16	Melvindale	2.04	1.53	1.17	0.88	0.36	0.51
17	N.E. Wayne	33.29	23.65	15.87	17.41	7.78	9.64
18	North Huron Valley/Rouge Val(2)	97.42	73.14	62.00	35.41	11.13	24.28
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	64.04	45.98	37.00	27.04	8.98	18.06
21	Wayne Co Area 6	0.20	0.16	0.07	0.12	0.08	0.04
	Total	**735.51**	**613.88**	**366.02**	**369.49**	**247.86**	**121.62**
	WTUA(2)	24.73	17.45	14.12	10.62	3.34	7.28

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 12d: Maximum Monthly Flow (MMF) for 2030
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.59	1.58	1.30	0.29	0.28	0.01
2	Centerline	1.38	1.09	1.05	0.33	0.03	0.29
3	City of Detroit	319.10	281.04	102.62	216.48	178.42	38.06
4	Clinton-Oakland	41.24	37.43	33.72	7.52	3.72	3.80
5	Dearborn	26.05	22.86	16.45	9.60	6.41	3.19
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	52.16	44.42	36.78	15.38	7.65	7.73
8	Farmington	2.16	1.44	0.95	1.21	0.50	0.72
9	Grosse Pointe	2.30	1.66	0.76	1.55	0.90	0.64
10	Grosse Pointe Farms	4.13	2.83	1.00	3.13	1.83	1.30
11	Grosse Pointe Park	1.91	1.37	1.02	0.89	0.35	0.54
12	Hamtramck	6.56	5.42	2.47	4.09	2.95	1.14
13	Harper Woods	0.91	0.84	0.15	0.77	0.70	0.07
14	Highland Park	3.26	2.98	1.26	2.00	1.72	0.28
15	Macomb	80.51	69.13	54.68	25.83	14.45	11.38
16	Melvindale	2.02	1.50	1.14	0.88	0.36	0.51
17	N.E. Wayne	32.88	23.24	15.46	17.41	7.78	9.64
18	North Huron Valley/Rouge Val(2)	99.06	74.75	63.49	35.58	11.27	24.31
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	63.25	45.19	36.21	27.04	8.98	18.06
21	Wayne Co Area 6	0.20	0.16	0.07	0.12	0.08	0.04
	Total	**740.86**	**619.10**	**370.63**	**370.23**	**248.47**	**121.76**
	WTUA(2)	25.90	18.61	15.21	10.69	3.39	7.30

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 12e: Maximum Monthly Flow (MMF) for 2040
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.57	1.56	1.28	0.29	0.28	0.01
2	Centerline	1.39	1.10	1.06	0.33	0.03	0.29
3	City of Detroit	318.22	280.15	101.74	216.48	178.42	38.06
4	Clinton-Oakland	42.45	38.62	34.77	7.68	3.85	3.83
5	Dearborn	26.14	22.95	16.54	9.60	6.41	3.19
6	Dearborn Heights District 2	0.09	0.07	0.03	0.06	0.04	0.02
7	Evergreen-Farmington	52.50	44.76	37.11	15.39	7.65	7.74
8	Farmington	2.16	1.44	0.94	1.21	0.50	0.72
9	Grosse Pointe	2.30	1.66	0.76	1.55	0.90	0.64
10	Grosse Pointe Farms	4.13	2.83	1.00	3.13	1.83	1.30
11	Grosse Pointe Park	1.91	1.37	1.02	0.89	0.35	0.54
12	Hamtramck	6.59	5.45	2.50	4.09	2.95	1.14
13	Harper Woods	0.91	0.84	0.15	0.77	0.70	0.07
14	Highland Park	3.31	3.04	1.31	2.00	1.72	0.28
15	Macomb	83.18	71.78	57.23	25.95	14.55	11.40
16	Melvindale	2.02	1.51	1.15	0.88	0.36	0.51
17	N.E. Wayne	32.94	23.30	15.52	17.41	7.78	9.64
18	North Huron Valley/Rouge Val[2]	101.22	76.89	65.51	35.72	11.38	24.34
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	63.30	45.25	36.26	27.04	8.98	18.06
21	Wayne Co Area 6	0.20	0.16	0.08	0.12	0.08	0.04
	Total	**746.64**	**624.80**	**375.98**	**370.66**	**248.82**	**121.84**
	WTUA[2]	26.82	19.51	16.02	10.80	3.49	7.32

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

DWSD CS-1314; Wastewater Master Plan
Task C.1.a - Approach to Flow Needs
Table 12f: Maximum Monthly Flow (MMF) for 2050
(Projected from 1998-2001 Average Data)

	First Tier Wholesale Customer	Metered MMF	Metered MMDWF	Sanitary MMF(1)	DWII+WWF	DWII	WWF
		D+E+F (MGD)	D+E (MGD)	D (MGD)	E+F (MGD)	E (MGD)	F (MGD)
1	Allen Park	1.54	1.53	1.25	0.29	0.28	0.01
2	Centerline	1.40	1.11	1.07	0.33	0.03	0.29
3	City of Detroit	317.33	279.27	100.85	216.48	178.42	38.06
4	Clinton-Oakland	43.67	39.81	35.83	7.84	3.98	3.86
5	Dearborn	26.24	23.05	16.63	9.60	6.41	3.19
6	Dearborn Heights District 2	0.09	0.08	0.04	0.06	0.04	0.02
7	Evergreen-Farmington	52.84	45.10	37.44	15.40	7.66	7.74
8	Farmington	2.15	1.44	0.94	1.21	0.50	0.72
9	Grosse Pointe	2.30	1.66	0.76	1.55	0.90	0.64
10	Grosse Pointe Farms	4.13	2.83	1.00	3.13	1.83	1.30
11	Grosse Pointe Park	1.91	1.37	1.02	0.89	0.35	0.54
12	Hamtramck	6.62	5.48	2.53	4.09	2.95	1.14
13	Harper Woods	0.91	0.84	0.15	0.77	0.70	0.07
14	Highland Park	3.37	3.09	1.37	2.00	1.72	0.28
15	Macomb	85.85	74.43	59.77	26.08	14.65	11.42
16	Melvindale	2.03	1.52	1.15	0.88	0.36	0.51
17	N.E. Wayne	33.00	23.36	15.59	17.41	7.78	9.64
18	North Huron Valley/Rouge Val[2]	103.38	79.02	67.53	35.86	11.49	24.36
19	Redford Township	0.10	0.08	0.03	0.07	0.05	0.02
20	S.E. Oakland	63.36	45.30	36.32	27.04	8.98	18.06
21	Wayne Co Area G	0.20	0.16	0.08	0.12	0.08	0.04
	Total	**752.43**	**630.50**	**381.33**	**371.10**	**249.17**	**121.92**
	WTUA[2]	28.20	20.87	17.29	10.91	3.58	7.34

Notes:
* All data used in this Table were obtained from WWMP GIS
1. Sanitary ADF (MGD) = Equivalent Pop. x 77 / 1,000,000
2. The vaslues for WTUA are included in the North Huron/Rouge Valley. Broken out here for reference due to possible diversion in year 2006.

Table 13. Peak Dry Weather Day Flow (Projected from February 24, 2001 Data)

First Tier Wholesale Customer & Detroit	Projected Peak Dry Weather Day Flow (cfs)					
	2000	2010	2020	2030	2040	2050
Allen Park	2.4	2.4	2.3	2.3	2.2	2.2
Centerline	7.9	7.8	7.8	7.8	7.8	7.8
City of Detroit	550	543	540	537	536	534
Clinton-Oakland	51	56	58	61	63	64
Dearborn	35	36	36	37	37	37
Dearborn Heights District 2	0.1	0.1	0.1	0.1	0.1	0.1
Evergreen-Farmington	76	78	79	79	80	80
Farmington	3.9	3.9	3.9	3.9	3.9	3.9
Grosse Pointe	9.5	9.5	9.5	9.4	9.4	9.4
Grosse Pointe Farms	18	18	18	18	18	18
Grosse Pointe Park	3.5	3.4	3.4	3.3	3.3	3.3
Hamtramck	19	19	19	19	19	19
Harper Woods	0.0	0.0	0.0	0.0	0.0	0.0
Highland Park	16	16	16	15	16	16
Macomb	90	102	109	117	121	125
Melvindale	3.5	3.5	3.4	3.4	3.4	3.4
N.E. Wayne	50	49	48	48	48	48
North Huron Valley/Rouge Valley*	129	134	137	139	142	146
Redford Township	0.14	0.14	0.14	0.14	0.14	0.14
S.E. Oakland	105	104	103	102	102	102
Wayne Co Area 6	0.27	0.27	0.27	0.27	0.27	0.28
Total:	**1,172**	**1,187**	**1,195**	**1,203**	**1,211**	**1,220**
Total (MGD):	***757***	***767***	***772***	***777***	***783***	***789***
WTUA*	29	32	34	36	37	39

*The values for WTUA (Western Township Utility Authority) are included in the North Huron/Rouge Valley. Broken out below the total line for reference due to possible diversion in year 2006.

Table 14. Peak Wet Weather Flow

First-Tier Customer & Detroit	Peak Wet Weather Flow (Model -- 10yr, 1hr) cfs
Allen Park	not available
Center Line	7.1
City of Detroit	not available
Clinton-Oakland	93
Dearborn	100
Dearborn Heights District 2	not available
Evergreen-Farmington	148
Farmington	6.0
Grosse Pointe	192
Grosse Pointe Farms	342
Grosse Pointe Park	25
Hamtramck	not available
Harper Woods	not available
Highland Park	not available
Macomb	258
Melvindale	15
N.E. Wayne	127
North Huron Valley/Rouge Valley*	349
Redford Township	not available
S.E. Oakland	270
Wayne Co Area 6	not available

*Includes WTUA communities as part of the tributary area. Peak flow is sum of peaks at coincident time for the three connection points to DWSD.

Table 15. Area by Type of Sewer Service and Calculation of Comparable Unit Rate

First-Tier Customer & Detroit	Yr 2000 Sewered Area (acres)	Area by Type of Sewer Service*			Comparable cfs/1000 Unit Rate** cfs/1000
		Combined (acres)	Separate with FD (acres)	Separate with no FD (acres)	
Allen Park	1,716	-	1,716	-	0.80
Center Line	1,031	-	1,031	-	0.80
City of Detroit	82,397	82,397	-	-	0.50
Clinton-Oakland	81,587	-	683	80,904	0.40
Dearborn	14,823	9,547	5,276	-	0.61
Dearborn Heights District 2	39	39	-	-	0.50
Evergreen-Farmington	68,644	4,220	22,871	41,553	0.54
Farmington	1,376	-	1,376	-	0.80
Grosse Pointe	684	277	396	11	0.67
Grosse Pointe Farms	1,384	587	750	47	0.66
Grosse Pointe Park	1,281	0	1,281	-	0.80
Hamtramck	1,347	1,347	-	-	0.50
Harper Woods	188	-	188	-	0.80
Highland Park	1,870	1,870	-	-	0.50
Macomb	84,247	-	8,403	75,844	0.44
Melvindale	1,757	-	1,757	-	0.80
N.E. Wayne	20,405	8,185	12,220	-	0.68
NHV/RV without WTUA***	68,663	5,722	35,318	27,623	0.61
Redford Township	49	49	-	-	0.50
S.E. Oakland	42,200	23,255	5	18,941	0.46
Wayne Co Area 6	81	81	-	-	0.50
Total	**475,770**	**137,576**	**93,270**	**244,924**	
NHV/RV with WTUA***	98,123	6,228	49,773	42,122	0.61

*Based on information as provided by communities and as compiled in WWMP GIS database

**Unit Rate = 0.5 for combined areas, 0.8 for separated areas with footing drains, and 0.4 for areas without footing drains. For customers with multiple sewer service areas, the unit rates are weighted averaged by area. Unit rate is based on year 2000 conditions; not changed by decade.

***The values for North Huron Valley/Rouge Valley (NHV/RV) with Western Township Utility Authority (WTUA) are shown below the Total Line

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DWSD CS-1314 Wastewater Master Plan

Table 16a. Preliminary Wet Weather Flow Needs for DWSD Customers (2000)

A	B	C	D	E	F	G	H
First-Tier Customers & Detroit	Calculated Wet Weather Trtmt Peak cfs	Trtmt + Transport Peak cfs	Model 10-yr, 1-hr Peak cfs	Existing Contract Capacity		Peak Capacity for Hydraulic Analysis ALT. A (cfs)	Peak Capacity for Hydraulic Analysis ALT. B (cfs)
				Criteria cfs	Peak Rate cfs		
Allen Park	7.7		not available	.4cfs/1000 or Ind Hyd Eqv.	7.1**	7.1	30
Center Line	9.0		7.1	6.5	6.5	9.0	12
City of Detroit	534		not available	not applicable		not applicable	
Clinton-Oakland	113		93	.4 cfs/1000	98	113	
Dearborn	72	100 + 10yr storm[6]	100 + not available	324gpcd + unspecified	49	100 + 10-Yr Storm	
Dearborn Heights District 2	0.21	10 yr storm[1]	not available	none		10-Yr Storm	
Evergreen-Farmington	169		148	170	170	170	
Farmington	8.1		6.0	6.6	6.6	8.1	
Grosse Pointe	5.4	192[2]	192	192	192	192	
Grosse Pointe Farms	6.6	554[2]	342	554	554	554	
Grosse Pointe Park	9.9	84[3]	25	84	84	84	
Hamtramck	12.04	1244.5[4]	not available	1244.5	1244.5	1,244.5	
Harper Woods	1.4		not available	none		1.4	
Highland Park	9.0	10 yr storm[4]	not available	10 yr storm	n.a.	10-Yr Storm	
Macomb	177		258	.4cfs/1000	146	177	
Melvindale	10.5		15	.5cfs/1000	5.4	10.5	15
N.E. Wayne	125		127	127	127	127	
NHV/RV without WTUA*	273		not available	380	380	380	
Redford Township	0.18	10 yr storm[1]	not available	none		10-Yr Storm	
S.E. Oakland	159		270	260	260	260	
Wayne Co Area 6	0.47	10 yr storm[1]	not available	none		10-Yr Storm	
Total	**1,702**						
Total (MGD)	**1,100**						
NHV/RV with WTUA*	343		349	380	380	380*	

Notes:

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Col. B: Calc. Wet Weather Treatment Peak = Comparable Unit Rate * Residents/1000 + (Emp. - SIU Emp.) * 50 gped * 1.5472/1,000,000 + SIU flows; for very small separated areas (sewered area < 2,000 acres), a peaking factor of 3 was used on employed and SIU

Col. C: Some communities have what can be understood as transport capacity needs; the following notes indicate the path of these flows

[1]All flows directed towards Northwest Interceptor via DWSD collection sewers with potential for discharge to Joint Regional Tunnel

[2]All flows directed to Detroit River Interceptor via Fox Creek Enclosure, with potential for discharge via Conner Creek CSO basin

[3]All flows pumped directly into Detroit River Interceptor

[4]All flows directed to Detroit River Interceptor via DWSD collection & trunk sewers

[5]All flows directed towards North Interceptor-East Arm via Conant/Mt Elliot, with potential for discharge via Leib Screening & Disinfection

[6]Unmetered flows discharge to sewers tributary to Baby Creek Enclosure with potential for discharge via Baby Creek Screening & Disinfection Facility

Col. D: Peak flow as determined from GDRSS/WWMP Model for 10-year, 1-hour summer storm event. Provided for reference only; in some cases, peak flow is not available as internal hydraulics are not represented in the model.

Col. E & F: Existing Contract criteria and peak rate as understood in 2003.

Col. G & H: Peak Capacity used for review of capacity needs within the system. Alt. A uses the larger of Col B or F, while Alt. B reviewed impact of a larger contract capacity for Allen Park, Center Line, and Melvindale. Either Col. G or H is considered to defined the wet weather flow needs for the customers and will be provided to the Contracts Work Group for their use.

*The values for North Huron Valley/Rouge Valley (NHV/RV) are calculated with and without Western Township Utility Authority (WTUA) communities. WTUA flows assumed to be diverted to YCUA WWTP after year 2007. Regardless, any increase in flows from the WTUA communities are expected to be diverted to YCUA in the future.

**Based on methodology that takes into account industrial hydraulic equivalent

DWSD CS-1314 Wastewater Master Plan

Table 16b. Preliminary Wet Weather Flow Needs for DWSD Customers (2010)

A	B	C	D	E	F	G	H
First-Tier Customers & Detroit	Calculated Wet Weather Trtmt Peak cfs	Trtmt + Transport Peak cfs	Model 10-yr, 1-hr Peak cfs	Existing Contract Capacity		Peak Capacity for Hydraulic Analysis ALT. A (cfs)	Peak Capacity for Hydraulic Analysis ALT. B (cfs)
				Criteria cfs	Peak Rate cfs		
Allen Park	7.5		not available	.4cfs/1000 or Ind Hyd Eqv.	7.1**	7.1	30
Center Line	8.7		7.1	6.5	6.5	8.7	12
City of Detroit	510		not available	not applicable		not applicable	
Clinton-Oakland	122		93	.4 cfs/1000	104	122	
Dearborn	74	100 + 10yr storm[6]	100 + not available	324gpcd + unspecified	51	100 + 10-Yr Storm	
Dearborn Heights District 2	0.21	10 yr storm[1]	not available	none		10-Yr Storm	
Evergreen-Farmington	169		148	170	170	170	
Farmington	7.8		6.0	6.6	6.6	7.8	
Grosse Pointe	5.3	192[2]	192	192	192	192	
Grosse Pointe Farms	6.3	554[2]	342	554	554	554	
Grosse Pointe Park	9.4	84[3]	25	84	84	84	
Hamtramck	12.53	1244.5[4]	not available	1244.5	1244.5	1,244.5	
Harper Woods	1.4		not available	none		1.4	
Highland Park	6.9	10 yr storm[4]	not available	10 yr storm	n.a.	10-Yr Storm	
Macomb	211		258	.4cfs/1000	175	211	
Melvindale	10.1		15	.5cfs/1000	5.1	10.1	15
N.E. Wayne	119		127	127	127	127	
NHV/RV without WTUA*	277		not available	380	380	380	
Redford Township	0.17	10 yr storm[1]	not available	none		10-Yr Storm	
S.E. Oakland	153		270	260	260	260	
Wayne Co Area 6	0.45	10 yr storm[1]	not available	none		10-Yr Storm	
Total	**1,713**						
Total (MGD)	**1,107**						
NHV/RV with WTUA*	355		349	380	380	380*	

Notes:

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Col. B: Calc. Wet Weather Treatment Peak = Comparable Unit Rate * Residents/1000 + (Emp. - SIU Emp.) * 50 gped * 1.5472/1,000,000 + SIU flows; for very small separated areas (sewered area < 2,000 acres), a peaking factor of 3 was used on employed and SIU

Col. C: Some communities have what can be understood as transport capacity needs; the following notes indicate the path of these flows

[1]All flows directed towards Northwest Interceptor via DWSD collection sewers with potential for discharge to Joint Regional Tunnel

[2]All flows directed to Detroit River Interceptor via Fox Creek Enclosure, with potential for discharge via Conner Creek CSO basin

[3]All flows pumped directly into Detroit River Interceptor

[4]All flows directed to Detroit River Interceptor via DWSD collection & trunk sewers

[5]All flows directed towards North Interceptor-East Arm via Conant/Mt Elliot, with potential for discharge via Leib Screening & Disinfection

[6]Unmetered flows discharge to sewers tributary to Baby Creek Enclosure with potential for discharge via Baby Creek Screening & Disinfection Facility

Col. D: Peak flow as determined from GDRSS/WWMP Model for 10-year, 1-hour summer storm event. Provided for reference only; in some cases, peak flow is not available as internal hydraulics are not represented in the model.

Col. E & F: Existing Contract criteria and peak rate as understood in 2003.

Col. G & H: Peak Capacity used for review of capacity needs within the system. Alt. A uses the larger of Col B or F, while Alt. B reviewed impact of a larger contract capacity for Allen Park, Center Line, and Melvindale. Either Col. G or H is considered to defined the wet weather flow needs for the customers and will be provided to the Contracts Work Group for their use.

*The values for North Huron Valley/Rouge Valley (NHV/RV) are calculated with and without Western Township Utility Authority (WTUA) communities. WTUA flows assumed to be diverted to YCUA WWTP after year 2007. Regardless, any increase in flows from the WTUA communities are expected to be diverted to YCUA in the future.

**Based on methodology that takes into account industrial hydraulic equivalent

DWSD CS-1314 Wastewater Master Plan

Table 16c. Preliminary Wet Weather Flow Needs for DWSD Customers (2020)

A	B	C	D	E	F	G	H
First-Tier Customers & Detroit	Calculated Wet Weather Trtmt Peak cfs	Trtmt + Transport Peak cfs	Model 10-yr, 1-hr Peak cfs	Existing Contract Capacity		Peak Capacity for Hydraulic Analysis ALT. A (cfs)	Peak Capacity for Hydraulic Analysis ALT. B (cfs)
				Criteria cfs	Peak Rate cfs		
Allen Park	7.4		not available	.4cfs/1000 or Ind Hyd Eqv.	10.6**	10.6	30
Center Line	8.6		7.1	6.5	6.5	8.6	12
City of Detroit	499		not available	not applicable		not applicable	
Clinton-Oakland	127		93	.4 cfs/1000	108	127	
Dearborn	76	100 + 10yr storm[6]	100 + not available	324gpcd + unspecified	52	100 + 10-Yr Storm	
Dearborn Heights District 2	0.21	10 yr storm[1]	not available	none		10-Yr Storm	
Evergreen-Farmington	169		148	170	170	170	
Farmington	7.8		6.0	6.6	6.6	7.8	
Grosse Pointe	5.2	192[2]	192	192	192	192	
Grosse Pointe Farms	6.1	554[2]	342	554	554	554	
Grosse Pointe Park	9.2	84[3]	25	84	84	84	
Hamtramck	13.48	1244.5[4]	not available	1244.5	1244.5	1,244.5	
Harper Woods	1.4		not available	none		1.4	
Highland Park	6.6	10 yr storm[4]	not available	10 yr storm	n.a.	10-Yr Storm	
Macomb	234		258	.4cfs/1000	196	234	
Melvindale	9.9		15	.5cfs/1000	5.0	9.9	15
N.E. Wayne	116		127	127	127	127	
NHV/RV without WTUA*	278		not available	380	380	380	
Redford Township	0.16	10 yr storm[1]	not available	none		10-Yr Storm	
S.E. Oakland	148		270	260	260	260	
Wayne Co Area 6	0.45	10 yr storm[1]	not available	none		10-Yr Storm	
Total	**1,724**						
Total (MGD)	**1,114**						
NHV/RV with WTUA*	363		349	380	380	380*	

Notes:

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Col. B: Calc. Wet Weather Treatment Peak = Comparable Unit Rate * Residents/1000 + (Emp. - SIU Emp.) * 50 gped * 1.5472/1,000,000 + SIU flows; for very small separated areas (sewered area < 2,000 acres), a peaking factor of 3 was used on employed and SIU

Col. C: Some communities have what can be understood as transport capacity needs; the following notes indicate the path of these flows

[1]All flows directed towards Northwest Interceptor via DWSD collection sewers with potential for discharge to Joint Regional Tunnel

[2]All flows directed to Detroit River Interceptor via Fox Creek Enclosure, with potential for discharge via Conner Creek CSO basin

[3]All flows pumped directly into Detroit River Interceptor

[4]All flows directed to Detroit River Interceptor via DWSD collection & trunk sewers

[5]All flows directed towards North Interceptor-East Arm via Conant/Mt Elliot, with potential for discharge via Leib Screening & Disinfection

[6]Unmetered flows discharge to sewers tributary to Baby Creek Enclosure with potential for discharge via Baby Creek Screening & Disinfection Facility

Col. D: Peak flow as determined from GDRSS/WWMP Model for 10-year, 1-hour summer storm event. Provided for reference only; in some cases, peak flow is not available as internal hydraulics are not represented in the model.

Col. E & F: Existing Contract criteria and peak rate as understood in 2003.

Col. G & H: Peak Capacity used for review of capacity needs within the system. Alt. A uses the larger of Col B or F, while Alt. B reviewed impact of a larger contract capacity for Allen Park, Center Line, and Melvindale. Either Col. G or H is considered to defined the wet weather flow needs for the customers and will be provided to the Contracts Work Group for their use.

*The values for North Huron Valley/Rouge Valley (NHV/RV) are calculated with and without Western Township Utility Authority (WTUA) communities. WTUA flows assumed to be diverted to YCUA WWTP after year 2007. Regardless, any increase in flows from the WTUA communities are expected to be diverted to YCUA in the future.

**Based on methodology that takes into account industrial hydraulic equivalent

DWSD CS-1314 Wastewater Master Plan

Table 16d. Preliminary Wet Weather Flow Needs for DWSD Customers (2030)

A	B	C	D	E	F	G	H
First-Tier Customers & Detroit	Calculated Wet Weather Trtmt Peak cfs	Trtmt + Transport Peak cfs	Model 10-yr, 1-hr Peak cfs	Existing Contract Capacity		Peak Capacity for Hydraulic Analysis ALT. A (cfs)	Peak Capacity for Hydraulic Analysis ALT. B (cfs)
				Criteria cfs	Peak Rate cfs		
Allen Park	7.2		not available	.4cfs/1000 or Ind Hyd Eqv.	10.6**	10.6	30
Center Line	8.5		7.1	6.5	6.5	8.5	12
City of Detroit	487		not available	not applicable		not applicable	
Clinton-Oakland	132		93	.4 cfs/1000	112	132	
Dearborn	77	100 + 10yr storm[6]	100 + not available	324gpcd + unspecified	53	100 + 10-Yr Storm	
Dearborn Heights District 2	0.22	10 yr storm[1]	not available	none		10-Yr Storm	
Evergreen-Farmington	168		148	170	170	170	
Farmington	7.9		6.0	6.6	6.6	7.9	
Grosse Pointe	5.2	192[2]	192	192	192	192	
Grosse Pointe Farms	6.0	554[2]	342	554	554	554	
Grosse Pointe Park	9.0	84[3]	25	84	84	84	
Hamtramck	14.43	1244.5[4]	not available	1244.5	1244.5	1,244.5	
Harper Woods	1.5		not available	none		1.5	
Highland Park	6.3	10 yr storm[4]	not available	10 yr storm	n.a.	10-Yr Storm	
Macomb	258		258	.4cfs/1000	216	258	
Melvindale	9.7		15	.5cfs/1000	4.9	9.7	15
N.E. Wayne	113		127	127	127	127	
NHV/RV without WTUA*	279		not available	380	380	380	
Redford Township	0.15	10 yr storm[1]	not available	none		10-Yr Storm	
S.E. Oakland	144		270	260	260	260	
Wayne Co Area 6	0.45	10 yr storm[1]	not available	none		10-Yr Storm	
Total	**1,735**						
Total (MGD)	**1,121**						
NHV/RV with WTUA*	370		349	380	380	380*	

Notes:

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Col. B: Calc. Wet Weather Treatment Peak = Comparable Unit Rate * Residents/1000 + (Emp. - SIU Emp.) * 50 gped * 1.5472/1,000,000 + SIU flows; for very small separated areas (sewered area < 2,000 acres), a peaking factor of 3 was used on employed and SIU

Col. C: Some communities have what can be understood as transport capacity needs; the following notes indicate the path of these flows

[1]All flows directed towards Northwest Interceptor via DWSD collection sewers with potential for discharge to Joint Regional Tunnel

[2]All flows directed to Detroit River Interceptor via Fox Creek Enclosure, with potential for discharge via Conner Creek CSO basin

[3]All flows pumped directly into Detroit River Interceptor

[4]All flows directed to Detroit River Interceptor via DWSD collection & trunk sewers

[5]All flows directed towards North Interceptor-East Arm via Conant/Mt Elliot, with potential for discharge via Leib Screening & Disinfection

[6]Unmetered flows discharge to sewers tributary to Baby Creek Enclosure with potential for discharge via Baby Creek Screening & Disinfection Facility

Col. D: Peak flow as determined from GDRSS/WWMP Model for 10-year, 1-hour summer storm event. Provided for reference only; in some cases, peak flow is not available as internal hydraulics are not represented in the model.

Col. E & F: Existing Contract criteria and peak rate as understood in 2003.

Col. G & H: Peak Capacity used for review of capacity needs within the system. Alt. A uses the larger of Col B or F, while Alt. B reviewed impact of a larger contract capacity for Allen Park, Center Line, and Melvindale. Either Col. G or H is considered to defined the wet weather flow needs for the customers and will be provided to the Contracts Work Group for their use.

*The values for North Huron Valley/Rouge Valley (NHV/RV) are calculated with and without Western Township Utility Authority (WTUA) communities. WTUA flows assumed to be diverted to YCUA WWTP after year 2007. Regardless, any increase in flows from the WTUA communities are expected to be diverted to YCUA in the future.

**Based on methodology that takes into account industrial hydraulic equivalent

DWSD CS-1314 Wastewater Master Plan

Table 16e. Preliminary Wet Weather Flow Needs for DWSD Customers (2040)

A	B	C	D	E	F	G	H
First-Tier Customers & Detroit	Calculated Wet Weather Trtmt Peak cfs	Trtmt + Transport Peak cfs	Model 10-yr, 1-hr Peak cfs	Existing Contract Capacity		Peak Capacity for Hydraulic Analysis ALT. A (cfs)	Peak Capacity for Hydraulic Analysis ALT. B (cfs)
				Criteria cfs	Peak Rate cfs		
Allen Park	7.1		not available	.4cfs/1000 or Ind Hyd Eqv.	10.6**	10.6	30
Center Line	8.6		7.1	6.5	6.5	8.6	12
City of Detroit	482		not available	not applicable		not applicable	
Clinton-Oakland	136		93	.4 cfs/1000	116	136	
Dearborn	78	100 + 10yr storm[6]	100 + not available	324gpcd + unspecified	54	100 + 10-Yr Storm	
Dearborn Heights District 2	0.22	10 yr storm[1]	not available	none		10-Yr Storm	
Evergreen-Farmington	170		148	170	170	170	
Farmington	7.9		6.0	6.6	6.6	7.9	
Grosse Pointe	5.2	192[2]	192	192	192	192	
Grosse Pointe Farms	6.0	554[2]	342	554	554	554	
Grosse Pointe Park	9.0	84[3]	25	84	84	84	
Hamtramck	14.63	1244.5[4]	not available	1244.5	1244.5	1,244.5	
Harper Woods	1.5		not available	none		1.5	
Highland Park	6.7	10 yr storm[4]	not available	10 yr storm	n.a.	10-Yr Storm	
Macomb	270		258	.4cfs/1000	227	270	
Melvindale	9.7		15	.5cfs/1000	5.0	9.7	15
N.E. Wayne	114		127	127	127	127	
NHV/RV without WTUA*	286		not available	380	380	380	
Redford Township	0.15	10 yr storm[1]	not available	none		10-Yr Storm	
S.E. Oakland	144		270	260	260	260	
Wayne Co Area 6	0.46	10 yr storm[1]	not available	none		10-Yr Storm	
Total	**1,758**						
Total (MGD)	**1,136**						
NHV/RV with WTUA*	384		349	380	380	380*	

Notes:

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Col. B: Calc. Wet Weather Treatment Peak = Comparable Unit Rate * Residents/1000 + (Emp. - SIU Emp.) * 50 gped * 1.5472/1,000,000 + SIU flows; for very small separated areas (sewered area < 2,000 acres), a peaking factor of 3 was used on employed and SIU

Col. C: Some communities have what can be understood as transport capacity needs; the following notes indicate the path of these flows

[1]All flows directed towards Northwest Interceptor via DWSD collection sewers with potential for discharge to Joint Regional Tunnel

[2]All flows directed to Detroit River Interceptor via Fox Creek Enclosure, with potential for discharge via Conner Creek CSO basin

[3]All flows pumped directly into Detroit River Interceptor

[4]All flows directed to Detroit River Interceptor via DWSD collection & trunk sewers

[5]All flows directed towards North Interceptor-East Arm via Conant/Mt Elliot, with potential for discharge via Leib Screening & Disinfection

[6]Unmetered flows discharge to sewers tributary to Baby Creek Enclosure with potential for discharge via Baby Creek Screening & Disinfection Facility

Col. D: Peak flow as determined from GDRSS/WWMP Model for 10-year, 1-hour summer storm event. Provided for reference only; in some cases, peak flow is not available as internal hydraulics are not represented in the model.

Col. E & F: Existing Contract criteria and peak rate as understood in 2003.

Col. G & H: Peak Capacity used for review of capacity needs within the system. Alt. A uses the larger of Col B or F, while Alt. B reviewed impact of a larger contract capacity for Allen Park, Center Line, and Melvindale. Either Col. G or H is considered to defined the wet weather flow needs for the customers and will be provided to the Contracts Work Group for their use.

*The values for North Huron Valley/Rouge Valley (NHV/RV) are calculated with and without Western Township Utility Authority (WTUA) communities. WTUA flows assumed to be diverted to YCUA WWTP after year 2007. Regardless, any increase in flows from the WTUA communities are expected to be diverted to YCUA in the future.

**Based on methodology that takes into account industrial hydraulic equivalent

DWSD CS-1314 Wastewater Master Plan

Table 16f. Preliminary Wet Weather Flow Needs for DWSD Customers (2050)

A	B	C	D	E	F	G	H
First-Tier Customers & Detroit	Calculated Wet Weather Trtmt Peak cfs	Trtmt + Transport Peak cfs	Model 10-yr, 1-hr Peak cfs	Existing Contract Capacity		Peak Capacity for Hydraulic Analysis ALT. A (cfs)	Peak Capacity for Hydraulic Analysis ALT. B (cfs)
				Criteria cfs	Peak Rate cfs		
Allen Park	6.9		not available	.4cfs/1000 or Ind Hyd Eqv.	10.6**	10.6	30
Center Line	8.7		7.1	6.5	6.5	8.7	12
City of Detroit	477		not available	not applicable		not applicable	
Clinton-Oakland	140		93	.4 cfs/1000	120	140	
Dearborn	78	100 + 10yr storm[6]	100 + not available	324gpcd + unspecified	54	100 + 10-Yr Storm	
Dearborn Heights District 2	0.22	10 yr storm[1]	not available	none		10-Yr Storm	
Evergreen-Farmington	172		148	170	170	172	
Farmington	7.9		6.0	6.6	6.6	7.9	
Grosse Pointe	5.2	192[2]	192	192	192	192	
Grosse Pointe Farms	6.0	554[2]	342	554	554	554	
Grosse Pointe Park	9.0	84[3]	25	84	84	84	
Hamtramck	14.84	1244.5[4]	not available	1244.5	1244.5	1,244.5	
Harper Woods	1.5		not available	none		1.5	
Highland Park	7.1	10 yr storm[4]	not available	10 yr storm	n.a.	10-Yr Storm	
Macomb	283		258	.4cfs/1000	238	283	
Melvindale	9.8		15	.5cfs/1000	5.0	9.8	15
N.E. Wayne	114		127	127	127	127	
NHV/RV without WTUA*	294		not available	380	380	380	
Redford Township	0.15	10 yr storm[1]	not available	none		10-Yr Storm	
S.E. Oakland	145		270	260	260	260	
Wayne Co Area 6	0.48	10 yr storm[1]	not available	none		10-Yr Storm	
Total	**1,782**						
Total (MGD)	**1,152**						
NHV/RV with WTUA*	398		349	380	380	380*	

Notes:

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Col. B: Calc. Wet Weather Treatment Peak = Comparable Unit Rate * Residents/1000 + (Emp. - SIU Emp.) * 50 gped * 1.5472/1,000,000 + SIU flows; for very small separated areas (sewered area < 2,000 acres), a peaking factor of 3 was used on employed and SIU

Col. C: Some communities have what can be understood as transport capacity needs; the following notes indicate the path of these flows

[1]All flows directed towards Northwest Interceptor via DWSD collection sewers with potential for discharge to Joint Regional Tunnel

[2]All flows directed to Detroit River Interceptor via Fox Creek Enclosure, with potential for discharge via Conner Creek CSO basin

[3]All flows pumped directly into Detroit River Interceptor

[4]All flows directed to Detroit River Interceptor via DWSD collection & trunk sewers

[5]All flows directed towards North Interceptor-East Arm via Conant/Mt Elliot, with potential for discharge via Leib Screening & Disinfection

[6]Unmetered flows discharge to sewers tributary to Baby Creek Enclosure with potential for discharge via Baby Creek Screening & Disinfection Facility

Col. D: Peak flow as determined from GDRSS/WWMP Model for 10-year, 1-hour summer storm event. Provided for reference only; in some cases, peak flow is not available as internal hydraulics are not represented in the model.

Col. E & F: Existing Contract criteria and peak rate as understood in 2003.

Col. G & H: Peak Capacity used for review of capacity needs within the system. Alt. A uses the larger of Col B or F, while Alt. B reviewed impact of a larger contract capacity for Allen Park, Center Line, and Melvindale. Either Col. G or H is considered to defined the wet weather flow needs for the customers and will be provided to the Contracts Work Group for their use.

*The values for North Huron Valley/Rouge Valley (NHV/RV) are calculated with and without Western Township Utility Authority (WTUA) communities. WTUA flows assumed to be diverted to YCUA WWTP after year 2007. Regardless, any increase in flows from the WTUA communities are expected to be diverted to YCUA in the future.

**Based on methodology that takes into account industrial hydraulic equivalent