Detroit Water and Sewerage Department

# Wastewater Master Plan

DWSD Project No. CS-1314

# Flow Needs for DWSD Customers Through 2050

**Technical Memorandum**
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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).

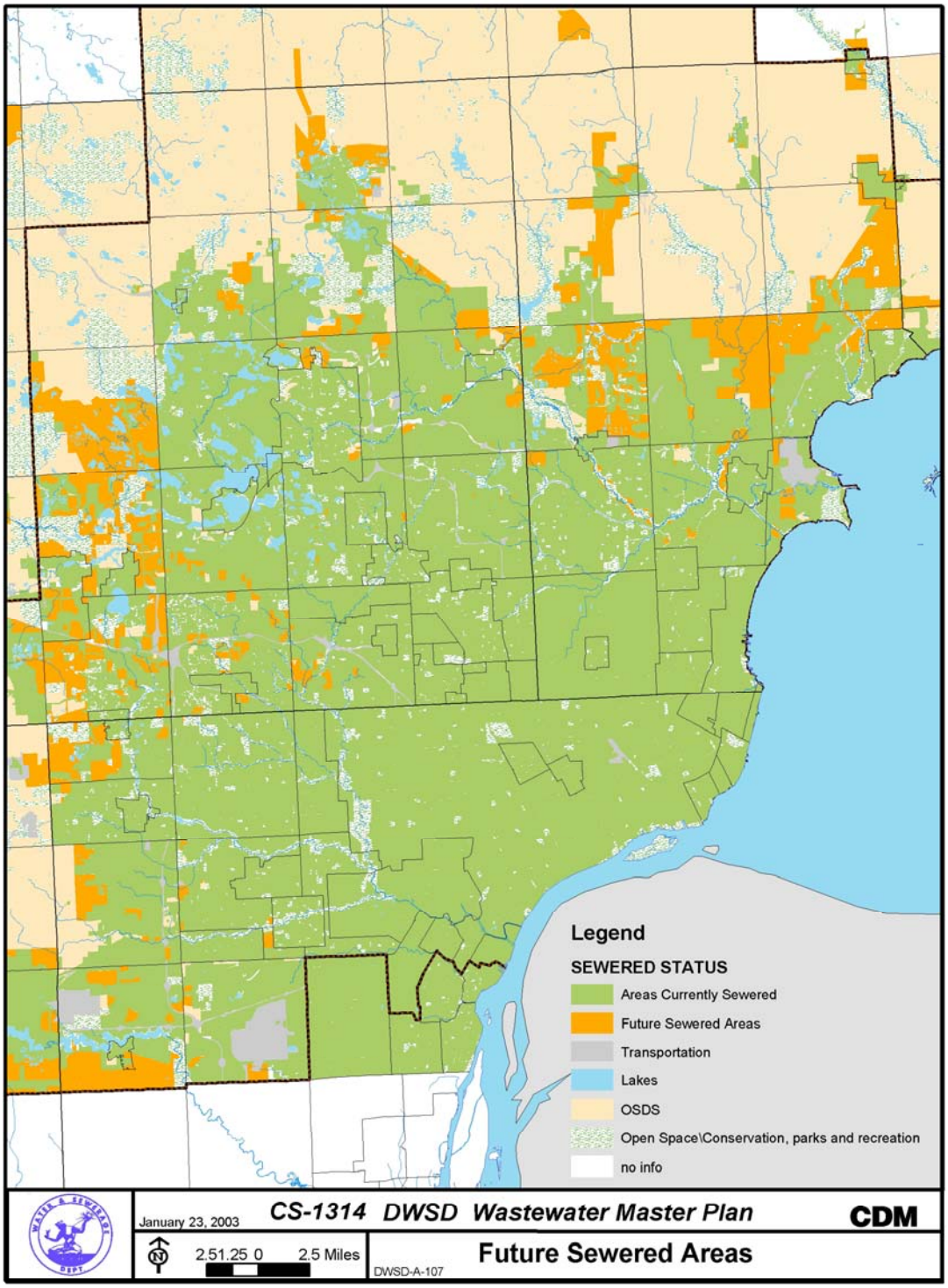


**Figure 1. Land Use in the Planning Area**

**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.

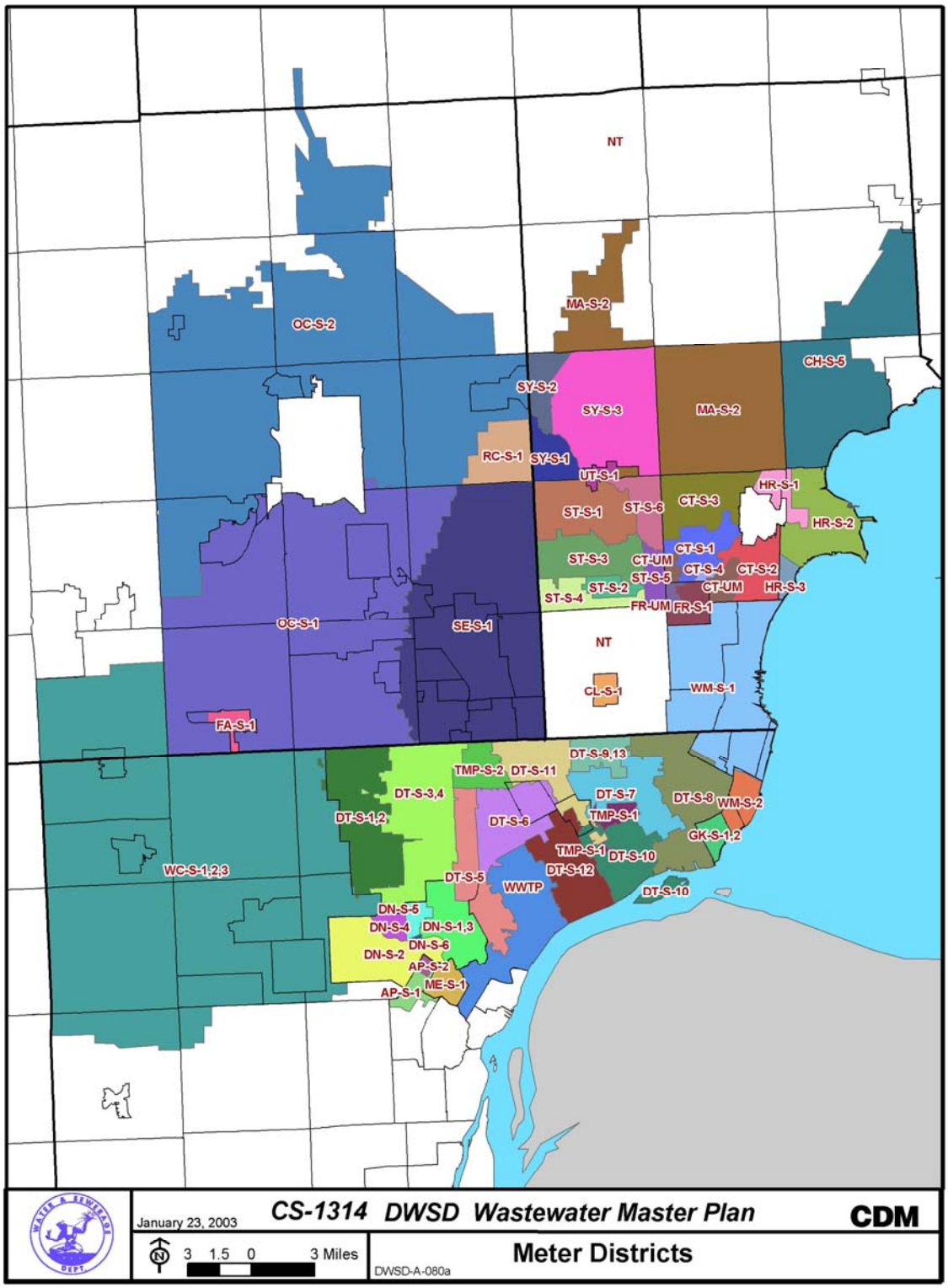


**Figure 2. DWSD Meter Districts**

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).

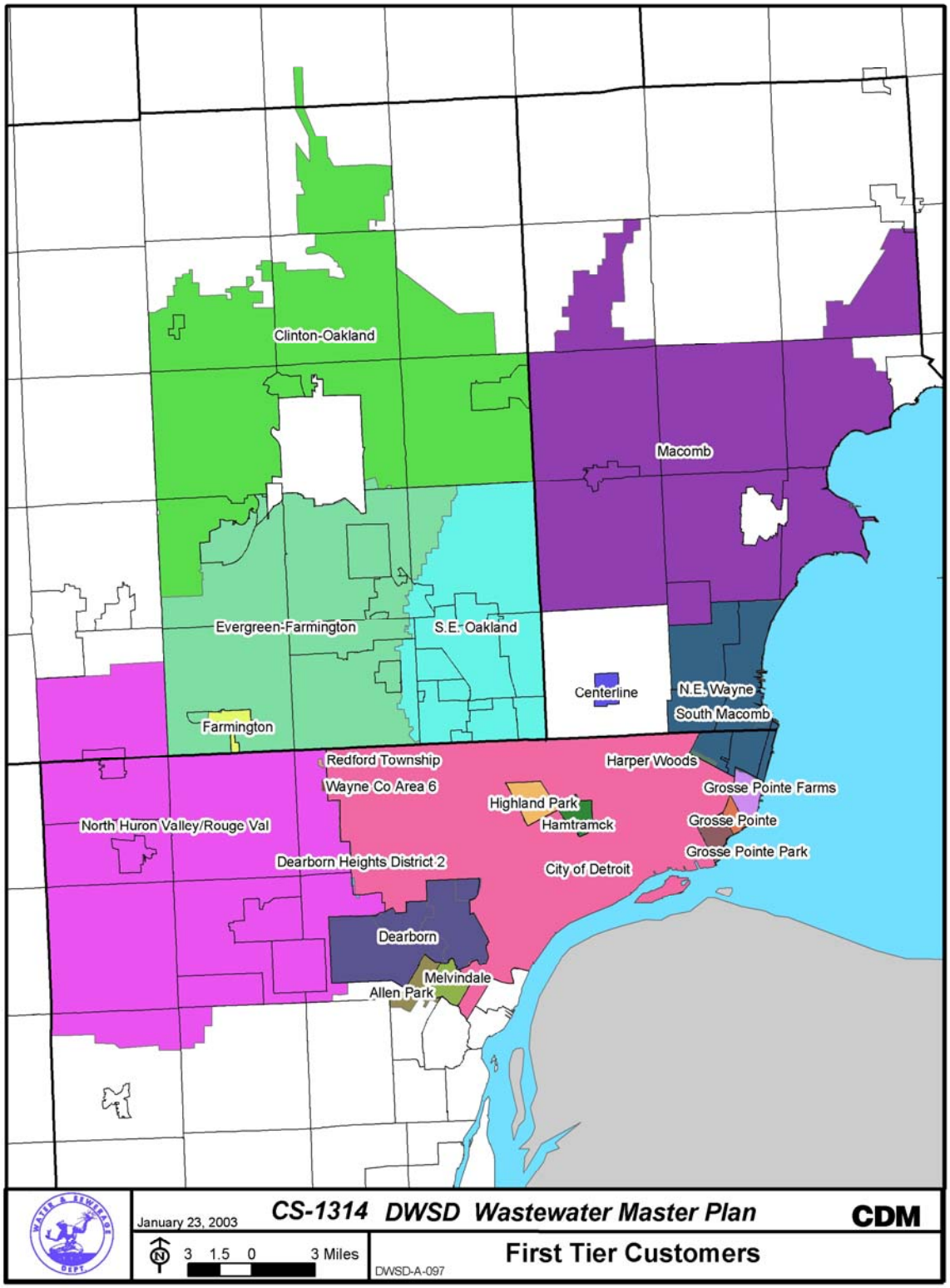


**Figure 3. DWSD First Tier Customers**

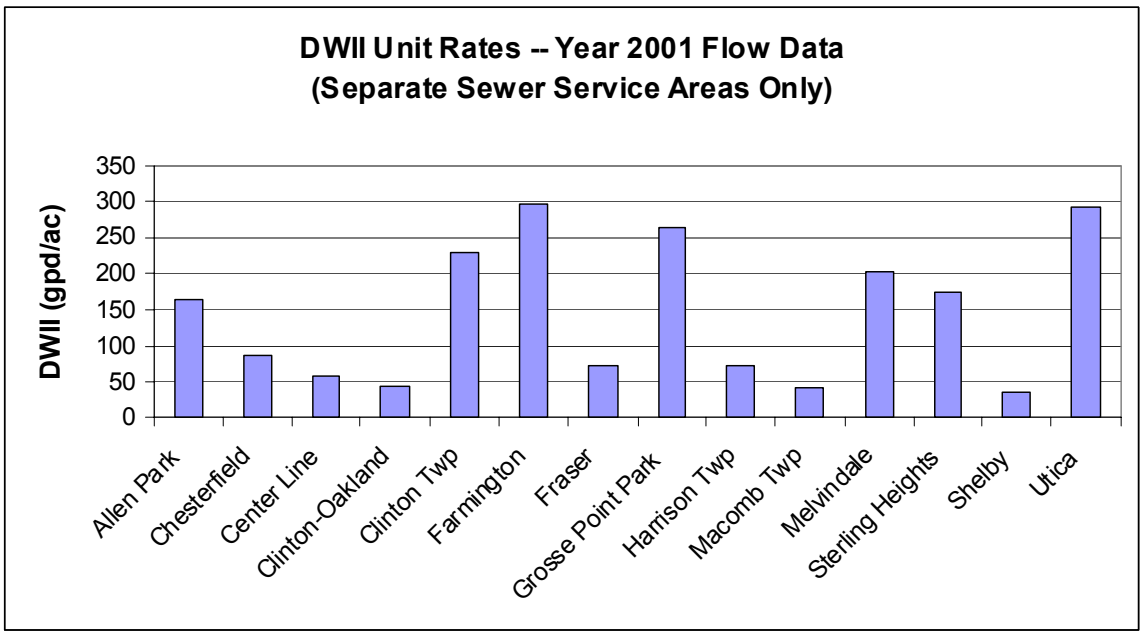


**Figure 4. DWII Unit Rates for Separate Sewer Service Systems**

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:

$$Qp = Qr + (Emp. - SIU\ Emp.) * 50\ gped * (1.5472E10\text{-}6) + SIU\ flows$$

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

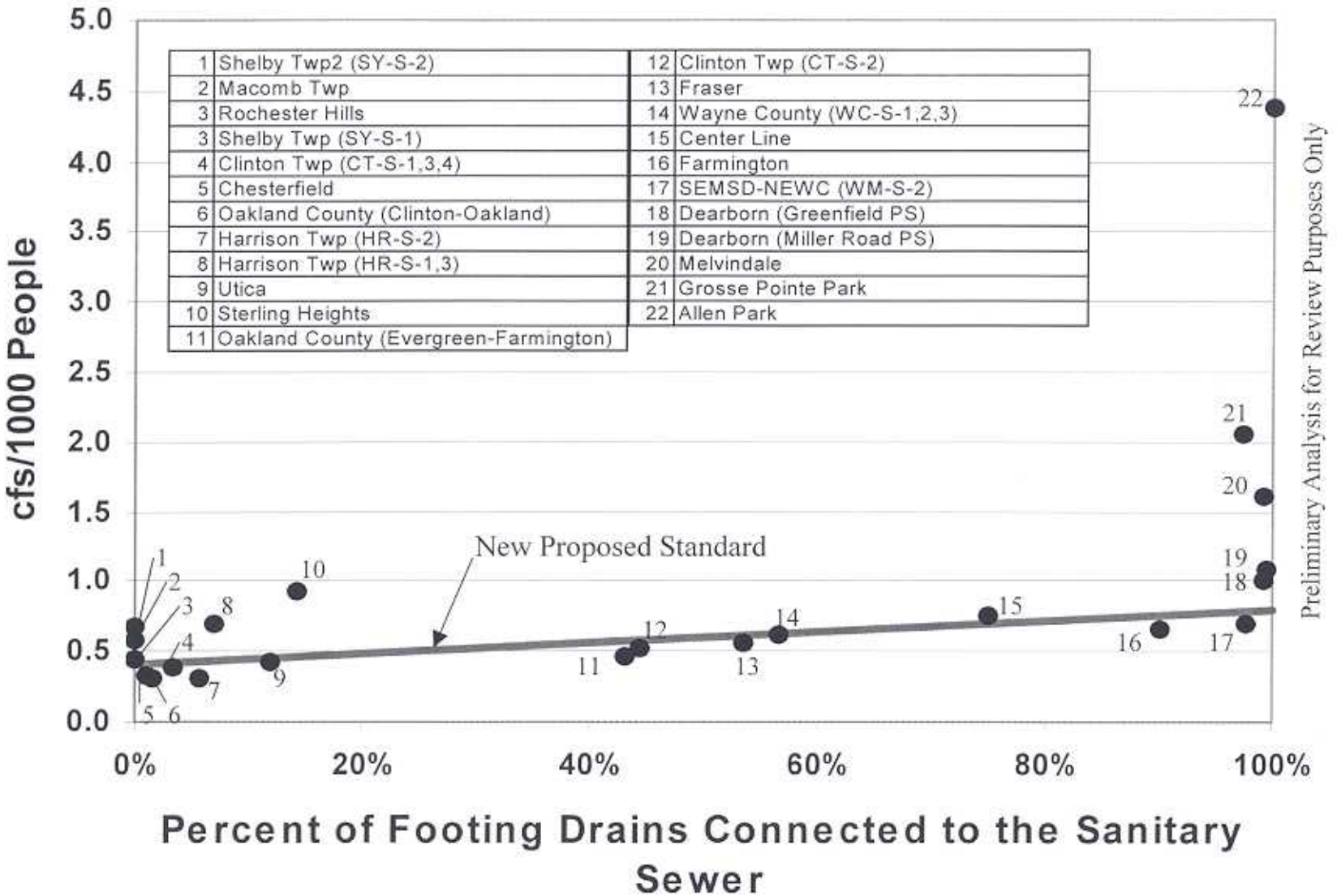

Table 3. Various Statistics of Flow Data from Major DWSD Collection System Flow Meters for Year 2001 (cfs)

| 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

C:\AY\WWMP\FlowMgt\FlowDB\[Flows-2001_phil's.xls]Table1

## 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) | 34.68 |
| 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+DT 12 | 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 | 2,788 | 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 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 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

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[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.

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