# CHAPTER 3. WASTEWATER GENERATION ANALYSIS

## 3.1 BACKGROUND

Wastewater generation within the City of Chula Vista is collected by City-owned facilities and conveyed to connections to METRO conveyance and treatment facilities for treatment and disposal. The City's current capacity at METRO is 20.864 mgd. Future City flow projections based on current growth projections indicate that this capacity may be exceeded within the next 10-15 years. This chapter presents future generation projections that can be used by the City to establish a basis for future METRO capacity acquisitions to allow for implementation of the City's General Plan goals.

The scope of the analysis includes quantifying wastewater flow rates for existing conditions and projected conditions through year 2050, summarize the growth rate estimates over a 38-year planning horizon, and determine additional METRO capacity requirements. Future growth for this master plan update has utilized the 2005 Adopted General Plan including General Plan Amendments in 2013, 2013 Otay Ranch General Development Plan Projections and the San Diego Association of Governments (SANDAG) population projections, developing a linear growth rate between existing flow and ultimate flow in 2050. Generally, the analysis did not attempt to verify underlying demographic data. Developers planning to modify an area different from the 2005 General Plan and associated amendments and these projections shall develop and independent wastewater impact analysis/report to determine whether or not the existing and future infrastructure will allow for those redevelopments.

## 3.2 BACKGROUND

The wastewater flow projections were made for the existing (2012), five-year (2017), ten-year (2022), fifteen-year (2027), twenty-year (2032), twenty-five-year (2037), thirty-year (2042), and thirty-eight year (2050) conditions. Existing flow was calculated from the city's historical water billing data and wastewater flow monitoring data gathered from the City. Yearly and planning flow projections were calculated based on the City's 2005 General Plan including General Plan Amendments in 2013, 2013 Otay Ranch General Development Plan Projections and the San Diego Association of Governments (SANDAG) population projections in conjunction with the wastewater unit duty factors (as described in Section 3.3.3), developed as part of this Master Plan.

## 3.3 WASTEWATER FLOW PROJECTIONS

### *3.3.1 RETURN-TO-SEWER RATIOS*

Existing wastewater flow projections were calculated using water billing data received from The City for the period 2009-2011. Existing wastewater consumption for each billing account was developed based upon the average usage over the previous 3 years. Water billing accounts were matched to assessor's parcel numbers (APNs) through geo-coding using GIS. The geo-coding process matched approximately 95 percent of the water accounts, which accounted for 98 percent of the total water consumption within the City. In addition to the billing records, the City provided wastewater flow monitoring data at recommended locations throughout the City. Using the flow monitoring data collected, a return-to-sewer ratio (RTS) was calculated on a per land use basis. Using the RTS, the overall wastewater flow was calculated then calibrated approximately 6.1 percent to match The City's average flow of 15.73 mgd for the existing condition. This process provided a good spatial representation of wastewater flow, while preserving the actual existing flow of 15.73 mgd.

### 3.3.2 *Existing Baseflow Development*

Average Dry Weather Flow (ADWF), or base flow, is domestic (or sanitary) wastewater flow from residential, commercial, and institutional (schools, churches, hospitals, etc.) sources, plus industrial wastewater. The wastewater flow is affected by population and land uses in an area. Wastewater flow varies throughout the day in response to personal habits and business operation. In this case, these flows were estimated by multiplying water demands by Return-To-Sewer (RTS) ratios based on land use. To calculate the City's 2012 ADWF, 2009-2011 water billing records were analyzed and a list of the Major Water Users, with

average daily water demands greater than 25,000 gallons per day (gpd), was compiled. As presented in Table 3-1, there were 82 Major Users accounting for 5.4 mgd, approximately 21 percent, of the City's total water demand. These Major Users are illustrated in Figure 3-1.

**Table 3-1: Major Water Users in the City of Chula Vista**

| Major User ID | Assessor's Parcel Number (APN) | Service Name | Service Address | 2009-2011 Average Daily Water Bill Demand (gpd) | Landuse |
|---|---|---|---|---|---|
| 1 | 585-140-2100* | OTAY WATER DISTRICT | PUBLIC AGENCY | 947,881 | Open Space/Recreation |
| 2 | 595-320-3000* | EASTLAKE COUNTRY CLUB PARTNERSHIP | 2375 CLUBHOUSE DR | 354,614 | Open Space/Recreation |
| 3 | 619-040-2400* | SAN DIEGO COUNTRY CLUB INC | 88 L ST | 221,855 | Open Space/Recreation |
| 4 | 617-011-0800 | SAN DIEGO UNIFIED PORT DISTRICT | PUBLIC AGENCY | 182,951 | Transit/Utilities |
| 5 | 643-040-0700 | UNITED STATES OLYMPIC COMMITTEE | C/O PATRICE MILKOVICH | 153,057 | Olympic Training Center |
| 6 | 643-033-0100 | CITY OF CHULA VISTA | PUBLIC AGENCY | 149,966 | Open Space/Recreation |
| 7 | 643-051-3800 | OTAY RANCH R 8 LLC | 270 NEWPORT CENTER DR #200 | 104,226 | Multi-Family |
| 8 | 571-330-2900 | ROHR INC | C/O DELOITTE \| TOUCHE LLP | 103,534 | Industrial |
| 9 | 643-061-0100 | GGP-OTAY RANCH L P | P O BOX 617905 | 93,046 | Commercial |
| 10 | 619-300-1000 | PARK PALOMAR PROPERTIES | 244 PALOMAR ST #A | 83,821 | Multi-Family |
| 11 | 641-010-2800 | SHARP CHULA VISTA MEDICAL CENTER | 8695 SPECTRUM CENTER CT | 82,618 | Government/Office/Public Inst |
| 12 | 642-020-2800 | SOUTHWESTERN COMMUNITY COLLEGE DISTRICT | PUBLIC AGENCY | 81,083 | Junior/Middle/Senior/Jr Col |
| 13 | 566-240-2700 | FRONT PORCH COMMUNITIES AND SERVICES | 303 N GLENOAKS BLVD #1000 | 79,757 | Multi-Family |
| 14 | 595-222-1800 | CAMELOT AT EASTLAKE SHORES ASSN | 2251 SAN DIEGO AVE #A250 | 74,765 | Open Space/Recreation |
| 15 | 641-010-0700 | STATE OF CALIFORNIA | PUBLIC AGENCY | 74,081 | Multi-Family |
| 16 | 642-030-1400 | UNITED STATES OF AMERICA | PUBLIC AGENCY | 73,602 | Multi-Family |
| 17 | 644-241-0300 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 67,008 | Junior/Middle/Senior/Jr Col |
| 18 | 643-610-1600 | WINDINGWALK MASTER ASSN | 12865 POINTE DEL MAR WAY #200 | 65,655 | Open Space/Recreation |
| 19 | 641-122-0700 | E Q R-MISSIONS AT SUNBOW L L C | P O BOX 87407 | 60,777 | Multi-Family |

| Major User ID | Assessor's Parcel Number (APN) | Service Name | Service Address | 2009-2011 Average Daily Water Bill Demand (gpd) | Landuse |
|---|---|---|---|---|---|
| 20 | 622-102-1800 | EASTGATE TECHNOLOGY PARTNERS L P | 1000 PIONEER WAY | 57,345 | Industrial |
| 21 | 643-052-1300 | ROMAN CATHOLIC BISHOP OF SAN DIEGO | P O BOX 85728 | 57,047 | Junior/Middle/Senior/Jr Col |
| 22 | 643-506-0400 | EASTLAKE III COMMUNITY ASSN | C/O LENNAR CORPORATE | 56,759 | Open Space/Recreation |
| 23 | 572-300-1100 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 53,554 | Junior/Middle/Senior/Jr Col |
| 24 | 643-380-1600 | WESTERN PACIFIC HOUSING-ANTIGUA L L C | 2280 WARDLOW CIR | 52,902 | Open Space/Recreation |
| 25 | 643-052-1700 | TREVIANA AT LOMAS VERDES L P | 4365 EXECUTIVE DR #600 | 52,873 | Open Space/Recreation |
| 26 | 573-100-3900 | COUNTY OF SAN DIEGO | PUBLIC AGENCY | 51,810 | Government/Office/Public Inst |
| 27 | 618-210-6100 | VILLA GRANADA | C/O ESSEL ENTERPRISES | 49,756 | Multi-Family |
| 28 | 618-290-4400 | THOMPSON KENNETH L&BONNIE | VISTA DEL CORONADO APTS | 48,173 | Multi-Family |
| 29 | 644-310-1400 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 47,612 | Junior/Middle/Senior/Jr Col |
| 30 | 644-171-2000 | BRANDYWINE CLASSICS OWNERS ASSOCIATION | C/O THE PAUL MILLER CO | 47,587 | Open Space/Recreation |
| 31 | 623-030-1200 | CASTLE PARK ENTERPRISES | 13919 STRUBELS LN | 46,946 | Multi-Family |
| 32 | 641-072-1600 | CITY OF CHULA VISTA | PUBLIC AGENCY | 46,621 | Open Space/Recreation |
| 33 | 642-080-0600 | E Q R-TERESINA LIMITED PARTNERSHIP | P O BOX 87407 | 46,356 | Multi-Family |
| 34 | 595-320-1700 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 46,205 | Junior/Middle/Senior/Jr Col |
| 35 | 592-192-2200 | BRE PROPERTIES INC | ATTN PROPERTY TAX DEPT | 44,645 | Multi-Family |
| 36 | 642-352-7100 | CHARTER POINT HOMEOWNERS ASSN | C/O PROPERTY MGMT ASSOC | 44,330 | Open Space/Recreation |

| Major User ID | Assessor's Parcel Number (APN) | Service Name | Service Address | 2009-2011 Average Daily Water Bill Demand (gpd) | Landuse |
|---|---|---|---|---|---|
| 37 | 618-200-0200 | BRENTWOOD MHP INVESTORS LLC <LF> FISH LEON H TR | C/O FOLLETT INVS PROPERTIES INC | 43,588 | Multi-Family |
| 38 | 595-850-0300 | ROLLING HILLS GARDEN APARTMENTS L L C | 2121 E PACIFIC COAST HWY #290 | 42,599 | Multi-Family |
| 39 | 568-370-4600 | SCRIPPS HEALTH | CORP REAL ESTATE DEPT - AN300 | 42,201 | Government/Office/Public Inst |
| 40 | 645-020-1700 | KNOTTS BERRY FARM | C/O PROPERTY TAX SERVICE | 41,121 | Open Space/Recreation |
| 41 | 642-080-0300 | EQR-TERESINA LP | P O BOX 87407 | 41,048 | Multi-Family |
| 42 | 595-031-2200 | SAN MIGUEL RANCH MASTER ASSN | C/O TRIMARK PACIFIC HOMES | 40,668 | Open Space/Recreation |
| 43 | 620-010-2400 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 39,870 | Junior/Middle/Senior/Jr Col |
| 44 | 595-221-0300 | VILLA MARTINIQUE OWNERS ASSN | C/O AMERICAN INC | 38,844 | Open Space/Recreation |
| 45 | 595-080-5000 | CHULA VISTA ELEMENTARY SCHOOL DISTRICT | PUBLIC AGENCY | 38,634 | Elementary School |
| 46 | 595-072-0200 | EASTLAKE VILLAGE MARKETPLACE L L C | EVM L L C | 38,576 | Commercial |
| 47 | 624-080-1400 | SHEPARD BILL N M D TRUST 01-14-02 | C/O PELL PROPERTY MGMT | 37,586 | Multi-Family |
| 48 | 640-090-2000 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 37,398 | Junior/Middle/Senior/Jr Col |
| 49 | 593-240-2200 | CITY OF CHULA VISTA | PUBLIC AGENCY | 37,301 | Open Space/Recreation |
| 50 | 618-210-5000 | ESSEL VILLA SEVILLE L P | C/O ESSEL ENTERPRISES | 37,070 | Multi-Family |
| 51 | 643-520-1500 | SONORA RIDGE HOMEOWNERS ASSN | C/O TRACY BRIGANTE | 35,820 | Open Space/Recreation |
| 52 | 574-110-0600 | SWEETWATER UNION HIGH SCHOOL DISTRICT | PUBLIC AGENCY | 35,715 | Junior/Middle/Senior/Jr Col |
| 53 | 645-021-4700 | ISTAR BLUES L L C <LF> A-WON PROPERTIES L L C | C/O EPROPERTYTAX | 35,274 | Open Space/Recreation |

| Major User ID | Assessor's Parcel Number (APN) | Service Name | Service Address | 2009-2011 Average Daily Water Bill Demand (gpd) | Landuse |
|---|---|---|---|---|---|
| 54 | 595-222-0200 | VILLAS AT EASTLAKE SHORES HOMEOWNERS ASSN | C/O MERIT PROPERTY MGMT INC | 34,737 | Open Space/Recreation |
| 55 | 563-330-3700 | KAMPGROUNDS ENTERPRISES INC | 111 N 2ND AVE | 34,707 | Open Space/Recreation |
| 56 | 595-800-1900 | EASTLAKE III COMMUNITY ASSN | 5993 AVENIDA ENCINAS #101 | 34,454 | Single Family |
| 57 | 642-560-1900 | SOUTH BAY COMMUNITY VILLAS L P | C/O SOUTH BAY COMMUNITY SERVICES | 34,330 | Multi-Family |
| 58 | 595-091-2500 | EASTLAKE III COMMUNITY ASSN | C/O THE EASTLAKE COMPANY | 34,285 | Open Space/Recreation |
| 59 | 642-380-1200 | SERENA CONDOMINIUM ASSOCIATION | C/O BARBARA BLASE | 33,944 | Open Space/Recreation |
| 60 | 624-053-2300 | SALAZAR MARIO H | 4087 OTAY VALLEY RD | 33,798 | Single Family |
| 61 | 595-071-1500 | V W E OWNER L L C | C/O SUDBERRY PROPERTIES INC | 32,541 | Commercial |
| 62 | 595-031-1500 | SAN MIGUEL RANCH MASTER ASSN | C/O TRIMARK PAC HOMES L P | 31,910 | Open Space/Recreation |
| 63 | 570-020-4100 | EUCALYPTUS GROVE HOLDINGS L L C | 595 SOUTH RIVERWOODS PKY #400 | 31,799 | Multi-Family |
| 64 | 592-192-2300 | BEACON COVE LTD | HANKEN CONO ASSAD CO | 31,719 | Multi-Family |
| 65 | 642-410-0900 | TIARA AT RANCHO DELREY CONDOMINIUM ASSN | C/O CALIFORNIA PACIFIC HOMES INC | 31,658 | Open Space/Recreation |
| 66 | 641-122-0100 | SEVILLA APARTMENTS L P | 1322 SCOTT ST #204 | 31,555 | Multi-Family |
| 67 | 619-250-2200 | PALOMAR VOA AFFORDABLE HOUSING L P | 1660 DUKE ST | 31,551 | Multi-Family |
| 68 | 624-367-1300 | RANCHO RIOS HOMEOWNERS ASSN | C/O MR JACK KUTA, PAUL MILLER CO | 31,491 | Open Space/Recreation |
| 69 | 642-560-1400 | B R E-F M C A L L C | 525 MARKET ST | 31,468 | Multi-Family |
| 70 | 593-240-2600 | CITY OF CHULA VISTA | PUBLIC AGENCY | 30,590 | Open Space/Recreation |
| 71 | 639-080-6100 | BRE PROPERTIES INC | ATTN PROPERTY TAX DEPT | 30,535 | Multi-Family |

| Major User ID | Assessor's Parcel Number (APN) | Service Name | Service Address | 2009-2011 Average Daily Water Bill Demand (gpd) | Landuse |
|---|---|---|---|---|---|
| 72 | 620-633-4400 | APOLLO II HOMEOWNERS ASSN | 272 CHURCH AVE #4 | 30,166 | Single Family |
| 73 | 642-071-2900 | B R E-F M C A L L C | 525 MARKET ST | 28,854 | Multi-Family |
| 74 | 570-020-4000 | EUCALYPTUS GROVE HOLDINGS L L C | 595 RIVERWOOD DR #400 | 28,796 | Multi-Family |
| 75 | 567-090-0500 | WHITNEY FAMILY TRUST 11-11-97 | 7301 RUE MICHAEL | 28,437 | Multi-Family |
| 76 | 593-240-2400 | CITY OF CHULA VISTA | PUBLIC AGENCY | 28,210 | Open Space/Recreation |
| 77 | 618-152-0800 | GREEN WAYNE R TRUST 11-28-86 | C/O ALLIANCE INVESTMENT | 27,987 | Multi-Family |
| 78 | 619-050-6200 | HCA VILLA SEAWIND APARTMENTS LTD | HANKEN CONO ASSAD CO | 27,788 | Multi-Family |
| 79 | 623-060-6400 | KREUTZKAMP REVOCABLE 2000 TRUST 08-17-00 | 2820 MAIN ST | 25,869 | Multi-Family |
| 80 | 595-031-2100 | SAN MIGUEL RANCH MASTER ASSN | C/O TRIMARK PACIFIC HOMES | 25,590 | Open Space/Recreation |
| 81 | 567-010-2900 | ROHR INC | P O BOX 460389 | 25,516 | Industrial |
| 82 | 567-032-4800 | MR CASA VICTORIA LLC | C/O WALZ PROPERTIES | 25,424 | Multi-Family |

*Golf Course - The majority of the water usage shown is attributed to irrigation use and as such has been assigned a RTS 0.05 for hydraulic modeling purposes.

N

0 4,850 9,700 Feet

**Legend**

- Collection System Pipelines
- Major Water Users
- City of Chula Vista Boundary
- City Parcels

Infrastructure ENGINEERING CORPORATION

City of Chula Vista
Wastewater Collection System Master Plan

**2009-2011 Major Water Users**
**FINAL**

May 2014

**Figure 3-1**

### 3.3.3 *LANDUSE AND WASTEWATER DUTY FACTORS*

The wastewater ADWF duty factors were calculated using return-to-sewer-ratios (RTS) as described above. Wastewater duty factors for residential were expressed in gallons per day per dwelling unit (GPD/DU) and/or gallons per capita per day (GPCD), while duty factors for the remaining zoning classifications were expressed in GPD/acre. In order to calculate the GPCD, San Diego Association of Governments (SANDAG) Region Wide Growth Forecast of 2010 (version 12) data reports a population per household (pop/HH) factor of 3.31, however in order maintain consistency with the number of dweling units (DU) also collected from SANDAG resulting in 230 gpd/DU, IEC used a factor of 3.65 in for calculating gpcd. The City provided IEC population data for schools which includes the total number of students as well as employees for the 2011-2012 school years. This data was then used to calculate the GPCD for both elementary and middle/junior/senior/Jr. College.

The single and multi-family wastewater duty factor resulted in 63 and 55 GPCD, accordingly. The typical duty factors for residential households with 3-4 persons ranges between 41-71 GPCD. The calculated wastewater duty factor for elementary schools was 12 GPCD and 13 GPDC for all other schools. Industry standards range between 10-20 GPCD. Table 3-2 summarizes the duty factors used for future flow projections.

Approximately 77% of the City's calculated BWF can be attributed to single family and multi-family land use types. The remaining 23% can be attributed to schools, commercial, industrial, government/office/public inst, open space and Olympic training center facilities.

**Table 3-2: Wastewater Duty Factors**

| Landuse | Recommended Wastewater Duty Factors based on 2009-2011 Water Demands | | | |
|---|---|---|---|---|
| | GPD/Capita | GPD/DU | gpd/acre | gpd/1000 sq-ft |
| Single Family | 63 | 230 | - | |
| Multi-Family | 55 | 182 | - | |
| Commercial | - | - | 1,401 | 80 |
| Industrial | - | - | 712 | 80 |
| Government/Office/Public Institution | - | - | 1,313 | 80 |
| Elementary School | 12 | - | 1181 | |
| Junior/Middle/High School | 13 | - | 1080 | |
| Olympic Training Center | - | - | 582 | |
| Open Space/Recreation | - | - | 410 | |

1. GPD/1000-sq-ft has been used for new developments with known building square footage.

### 3.3.4 *FUTURE AVERAGE DRY WEATHER WASTEWATER FLOWS (ADWF) PROJECTIONS*

In this analysis, once the ADWF was established for 2012 conditions, flow projections for 2017, 2022, 2027, 2032, 2037, 2042 and 2050 were calculated based on the 2005 Approved General Plan and approved Amendments landuse projections. Proposed new development projections were anticipated to begin starting in 2017. Table 3-3 outlines the General Plan Landuse Code Designations with associated Code Names and duty factor. Based on the General Plans Dwelling Units per acre, a range of high to low values is identified in the General Plan, however, for the master plan update; the middle value was used for residential parcels. Those values are included in Table 3-3.

**Table 3-3: Landuse Zoning Designations**

| Landuse Code Designation[1] | Landuse Code Name | Duty Factor[2] | Dwelling Units Per Acre[3] | Residential/Non-Residential Landuse Designations |
|---|---|---|---|---|
| CO | Commercial Office | 1401 | 0 | NR |
| CR | Commercial Retail | 1401 | 0 | NR |
| CV | Commercial Visitor | 1401 | 0 | NR |
| EUC | Eastern Urban Core | 182 | 13.8 | NR |
| FWC | Freeway Commercial | 0 | 0 | NR |
| FWY | Industrial | 0 | 0 | NR |
| I | Industrial Limited | 712 | 0 | NR |
| IL | Mixed-Use Commercial | 712 | 0 | NR |
| MUC | Mixed-Use Residential | 1401 | 0 | R |
| MUR | Open Space | 182 | 14.5 | NR |
| OS | Open Space Preserve | 0 | 0 | NR |
| OSP | Open Space Recreation | 0 | 0 | NR |
| PQ | Public_Quasi-Public | 1313 | 0 | NR |
| PRK | Park | 410 | 0 | NR |
| RH | Residential High | 182 | 22.5 | R |
| RL | Residential Low | 230 | 1.5 | R |
| RLM | Residential Low Medium | 230 | 4.5 | R |
| RM | Residential Medium | 182 | 8.5 | R |
| RMH | Residential Medium High | 182 | 14.5 | R |
| TC | Town Center | 182 | 0 | NR |
| TFA | Transit Focus Area | 0 | 14.5 | R |
| UCR | Urban Core Resort | 182 | 44 | R |
| WAT | Water | 0 | 0 | NR |

1. Code Designations gathered from 2005 General Plan
2. DU/Acre based on the "Medium" range of values per the 2005 General Plan

Table 3-4 shows the anticipated developments per the 2005 Approved General Plan including General Plan Amendments in 2013, 2013 Otay Ranch General Development Plan Projections and the San Diego Association of Governments (SANDAG) population Projections and projected maximum flows (future development beyond the developments identified in this master plan will be required to develop a wastewater impact report to evaluate the impact to the system), and Table 3-5 summarizes the total flow detailed out from Table 3-4 for each development. Table 3-6 identifies the City's total projected flows through 2050. Growth/flow projections used a linear growth projection between 2012 and 2050.

It should be noted that this master plan update included estimated flows from a portion of the Bayfront development in the calculation of the City's flow projections, treatment capacity needs and Sewerage Capacity Charge. No existing conveyance system upsize was included in the CIP as a result of the projected Bayfront flows. Partial Bayfront flows were used only to define ultimate treatment capacity needs.

**Table 3-4: Projected Wastewater Loads for Proposed Developments**

| Proposed Project No. | Proposed Project Description/Applicant | Residential | | | | Non-Residential | | | | | | | | | | | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Residential Zoning | Proposed Dwelling Units (du) | Duty Factor (gpd/unit)[1] | Projected Residential Wastewater Load (gpd) | Non-Residential Land Use/Zoning | Non-Residential Zoning | Non-Residential Units | Non-Residential Area (acres) | Non-Residential Area (sq-ft) | Duty Factor (gpd/EDU) | Duty Factor (gpd/acre) | Duty Factor (gpd/ 1000 sq-ft) | Projected Non-Residential Load (gpd) | Percent Non-Residential Loading[2] | Ultimate Buildout Load (gpd) | |
| A | Bayfront (Pacifica) | SF | 1,500 | 230 | 345,000 | Retail, Commercial | CR | | | 215,000 | | | 100 | 21,500 | | 983,650 | Adopted General Plan, per email received from City on 9/4/13 |
| | | | | | | Office | O | | | 420,000 | | | 100 | 42,000 | | | |
| | | | | | | CPF | CPF | | | 9,500 | | | 100 | 950 | | | |
| | | | | | | Mixed Use Commercial | CR | | | 100,000 | | | 100 | 10,000 | | | |
| | | | | | | Resort Hotel | RES | 3,100 | | | 182 | | | 564,200 | | | |
| B | Urbana | MF[3] | 266 | 182 | 48,412 | | | | | | | | | 6,536 | 13.5% | 54,948 | Adopted General Plan, per email received from City on 9/18/13. |
| C | The Colony | MF[3] | 162 | 182 | 29,484 | | | | | | | | | 3,980 | 13.5% | 33,464 | Adopted General Plan, per email received from City on 9/18/13. |
| D-P | Eastern Urban Center (Millenia) (Poggi Basin) | EDU | 580 | 230 | 133,400 | | | | | | | | | | | 133,400 | Adopted General Plan, per email received from City on 9/18/13. |
| D-S | Eastern Urban Center (Millenia) (Salt Creek Interceptor) | MF | 2,983 | 182 | 542,906 | Commercial | | | | 3,314,000 | | | 100 | 331,400 | | 896,854 | Adopted General Plan, per email received from City on 9/18/13. |
| | | | | | | Hotel | | | | 155,000 | | | 100 | 15,500 | | | |
| | | | | | | Fire Station | | | | 18,000 | | | 100 | 1,800 | | | |
| | | | | | | Parks | | | 13 | | | 410 | | 5,248 | | | |
| E-S | Otay Ranch Village 2 (Salt Creet Interceptor) | SF | 414 | 230 | 95,220 | Industrial | I | | 36 | | | 712 | | 25,917 | | 148,680 | Adopted General Plan, per email received from City on 9/19/13 |
| | | | | | | Parks | PRK | | 40 | | | 410 | | 16,441 | | | |
| | | MF | 61 | 182 | 11,102 | CPF | CPF | | 0 | | | 1,401 | | 0 | | | |
| E-P | Otay Ranch Village 2 (Poggi Canyon) | SF | 730 | 230 | 167,900 | Commercial | CR | | 12 | | | 1,401 | | 16,672 | | 535,696 | Adopted General Plan, per email received from City on 9/19/13 |
| | | | | | | Industrial | I | | 52 | | | 712 | | 36,668 | | | |
| | | MF | 1,517 | 182 | 276,094 | Parks | PRK | | 16 | | | 410 | | 6,724 | | | |
| | | | | | | Mixed Use | MU | | 9 | | | 1,401 | | 11,909 | | | |
| | | | | | | School[11] | PQ | | 10 | | | 1,181 | | 12,164 | | | |
| | | | | | | CPF | CPF | | 5 | | | 1,401 | | 7,565 | | | |
| F | | SF | 0 | 230 | 0 | Commercial | CR | | | | | | | 0 | | 139,958 | Adopted General Plan, per email |
| | | | | | | Industrial | I | | 177 | | | 712 | | 125,668 | | | |

| Proposed Project No. | Proposed Project Description/Applicant | Residential | | | | Non-Residential | | | | | | | | | | | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Residential Zoning | Proposed Dwelling Units (du) | Duty Factor (gpd/unit)[1] | Projected Residential Wastewater Load (gpd) | Non-Residential Land Use/Zoning | Non-Residential Zoning | Non-Residential Units | Non-Residential Area (acres) | Non-Residential Area (sq-ft) | Duty Factor (gpd/EDU) | Duty Factor (gpd/acre) | Duty Factor (gpd/ 1000 sq-ft) | Projected Non-Residential Load (gpd) | Percent Non-Residential Loading[2] | Ultimate Buildout Load (gpd) | |
| | Otay Village 3 North & Portion of 4 (Salt Creek Interceptor) | | | | | CFP | CPF | | 10 | | | 1,401 | | 14,290 | | | received from City on 9/18/13. |
| | | | | | | School[11] | PQ | | | | | | | 0 | | | |
| | | MF | 0 | 182 | 0 | Park | PRK | | | | | | | 0 | | | |
| G | Otay Ranch Village 6 - Marquis I & II - Amendment[3] | MF | 206 | 182 | 37,492 | | | | | | | | | | | 37,492 | Comments from City, 4/28/14 |
| H | Otay Ranch Village 11 | MF | 43 | 182 | 7,826 | Church | CPF | | 5.5 | | | 1,401 | | 7,706 | | 44,908 | Comments from City, 4/28/14 |
| | | | | | | High School | PQ | | 27.2 | | | 1,080 | | 29,376 | | | |
| I-E | Otay Ranch Village 8 East (Salt Creet Interceptor) | SF | 635 | 230 | 146,050 | Commercial | CR | | 8.9 | | | 1401 | | 12,469 | | 176,811 | Adopted General Plan, per email received from City on 9/18/13. |
| | | | | | | School[5] | PQ | | 10 | | | 1,181 | | 11,810 | | | |
| | | MF | 293 | 182 | 53,326 | Parks | PRK | | 6 | | | 410 | | 2,419 | | | |
| | | | | | | CPF | CPF | | 3 | | | 1,401 | | 4,063 | | | |
| I-W | Otay Ranch Village 8 West (Salt Creek Interceptor) | SF | 621 | 230 | 142,830 | Commercial | CR | | | 300,000 | | | 100 | 30,000 | | 489,751 | Adopted General Plan, per email received from City on 9/18/13. |
| | | | | | | Parks | PRK | | 28 | | | 410 | | 11,398 | | | |
| | | MF | 1,429 | 182 | 260,078 | School[5] | PQ | | 32 | | | 1,181 | | 37,320 | | | |
| | | | | | | CPF | CPF | | 6 | | | 1,401 | | 8,126 | | | |
| J | Otay Ranch Village 9 (Salt Creek Interceptor) | SF | 266 | 230 | 61,180 | Commercial | CR | | | 1,500,000 | | | 100 | 150,000 | | 932,432 | Adopted General Plan, per email received from City on 9/18/13. |
| | | | | | | School[5] | PQ | | 20 | | | 1,181 | | 23,384 | | | |
| | | MF | 3,734 | 182 | 679,588 | CPF | CPF | | 5 | | | 1,401 | | 7,005 | | | |
| | | | | | | Parks | PRK | | 28 | | | 410 | | 11,275 | | | |
| K | Otay Ranch Village 10 (Salt Creek Interceptor) | SF | 0 | 230 | 0 | School[5] | PQ | | 0 | | | 1,181 | | 0 | | 60,520 | Adopted General Plan, per email received from City on 9/18/13. |
| | | | | | | Industrial | I | | 85 | | | 712 | | 60,520 | | | |
| | | MF | 0 | 182 | 0 | Parks | PRK | | 0 | | | 410 | | 0 | | | |
| L | Freeway Commercial[12] | MF | 0 | 182 | 0 | Commercial | CR | 0 | 35 | | | 1,401 | | 48,335 | | 48,335 | Adopted General Plan, per email received from City |
| | | | | | | Hotel | RES | 0 | | | 182 | | | 0 | | | |

| Proposed Project No. | Proposed Project Description/Applicant | Residential | | | | Non-Residential | | | | | | | | | | | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Residential Zoning | Proposed Dwelling Units (du) | Duty Factor (gpd/unit)[1] | Projected Residential Wastewater Load (gpd) | Non-Residential Land Use/Zoning | Non-Residential Zoning | Non-Residential Units | Non-Residential Area (acres) | Non-Residential Area (sq-ft) | Duty Factor (gpd/EDU) | Duty Factor (gpd/acre) | Duty Factor (gpd/ 1000 sq-ft) | Projected Non-Residential Load (gpd) | Percent Non-Residential Loading[2] | Ultimate Buildout Load (gpd) | |
| | | | | | | Park | PRK | | 0 | | | 410 | | 0 | | | on 9/18/13. Comments from City, 4/28/14. |
| | | | | | | Existing Commercial | CR | | 0 | | | 1,401 | | 0 | | | |
| M | Eastlake Summit[3] | MF | 57 | 182 | 10,374 | | | | | | | | | | | 10,374 | Comments from City, 4/28/14 |
| N | Eastlake Olympic Pointe | MF | 427 | 182 | 77,714 | | | | | | | | | | | 77,714 | Lake Pointe Off-Site Sewer Capacity Analysis Study. Table 2 & 6. Atkins, January 2012. |
| O | Eastlake Lake Pointe | MF | 288 | 182 | 52,416 | Commercial | CR | | 0.23 | | | 1,401 | | 322 | | 52,738 | Lake Pointe Off-Site Sewer Capacity Analysis Study. Table 2 & 6. Atkins, January 2012. |
| P | San Miguel Ranch | MF | 138 | 182 | 25,116 | | | | | | | | | | | 25,116 | Comments from City, 4/28/14 |
| Q | Rolling Hills Ranch | SF | 17 | 230 | 3,910 | | | | | | | | | | | 3,910 | 2005 Approved General Plan |
| R | Palomar Gateway District - Proposed | RES | 1,700 | 182 | 309,400 | Retail/Office | CR | | 8 | | | 1,401 | | 11,250 | | 320,650 | Palomar Gateway District Specific Plan Sewer Study. Table 1 & 4. Atkins, November 2012. |
| T | University | | 0 | | 0 | School[5] | PQ | | 473 | | | 1,181 | | 558,613 | | 558,613 | Adopted General Plan, per email received from City on 9/18/13. |
| U | Planning Area 20 | | 0 | | 0 | Parks | PRK | | 188 | | | 410 | | 77,080 | | 98,095 | Comments from City, 4/28/14 |
| | | | | | | Commercial | CV | | 15 | | | 1401 | | 21,015 | | | |
| V | Otay Ranch Village 4[6] | SF | 453 | 230 | 104,190 | Parks | PRK | | 63 | | | 410 | | 25,748 | | 132,880 | Adopted General Plan, per email received from City on 9/18/13. |
| | | | | | | CPF | CPF | | 2 | | | 1401 | | 2,942 | | | |
| W | Otay Ranch Urban Core | SF | 10800 | 230 | 2,484,000 | Retail | CR | | | 4,000,000 | | | 100 | 400,000 | | 3,384,000 | Adopted General Plan, Chula Vista |

| Proposed Project No. | Proposed Project Description/Applicant | Residential | | | | Non-Residential | | | | | | | | | | | Reference |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Residential Zoning | Proposed Dwelling Units (du) | Duty Factor (gpd/unit)[1] | Projected Residential Wastewater Load (gpd) | Non-Residential Land Use/Zoning | Non-Residential Zoning | Non-Residential Units | Non-Residential Area (acres) | Non-Residential Area (sq-ft) | Duty Factor (gpd/EDU) | Duty Factor (gpd/acre) | Duty Factor (gpd/ 1000 sq-ft) | Projected Non-Residential Load (gpd) | Percent Non-Residential Loading[2] | Ultimate Buildout Load (gpd) | |
| | | | | | | Commercial | CV | | | 1,300,000 | | | 100 | 130,000 | | | Urban Core Traffic Impact Analysis, Table 4-1, October 2005 |
| | | | | | | Office | O | | | 3,700,000 | | | 100 | 370,000 | | | |
| X | Eastlake Woods (The Gates) | SF | 27 | | | | | | | | | | | | | 24,495 | Comments from City, 4/28/14 |
| | | | | | | | | | | | | | | | | | |
| ***Total*** | | | ***29,347*** | | | | | | | | | | | | | ***9,405,483*** | |

1. Duty Factors from TM 1, City of Chula Vista Wasterwater Master Plan Update, IEC, Draft, 2/27/13.
2. Non-Residential persentage 13.5% per the Customer Data Analysis and Billing Audit.
3. Landuse/growth projections based on 2005 Approved General Plan for parcels within the projected developments area.
4. Village 13 is not included within these projections due to the project location outside of City boundaries. Should the project move forward in the future and the City aquire those parcels, a wastewater impact study will need to be developed at that time.
5. Assumed elementry school, Duty factor of 1181 gpd/acre is based on 12 gpd/student.
6. Village Four Community Park may develop independent from the balance of Village Four and the park is included as part of the SPA Plan for the adjacent Village Two and Three areas.

**Table 3-5: Projected Approved Future Developments**

| Proposed Project ID | Proposed Project Description/Applicant | 2050 Projected Wastewater Flow (gpd) |
|---|---|---|
| A | 983,650 | 983,650 |
| B | 54,948 | 54,948 |
| C | 33,464 | 33,464 |
| D-P | 133,400 | 133,400 |
| D-S | 896,854 | 896,854 |
| E-S | 148,680 | 148,680 |
| E-P | 535,696 | 535,696 |
| F | 139,958 | 139,958 |
| G | 37,492 | 37,492 |
| H | 44,908 | 44,908 |
| I-E | 176,811 | 176,811 |
| I-W | 489,751 | 489,751 |
| J | 932,432 | 932,432 |
| K | 60,520 | 60,520 |
| L | 48,335 | 169,101 |
| M | 10,374 | 16,317 |
| N | 77,714 | 77,714 |
| O | 52,738 | 52,738 |
| P | 25,116 | 25,116 |
| Q | 3,910 | 3,910 |
| R | 320,650 | 320,650 |
| T | 558,613 | 558,613 |
| U | 98,095 | 38,540 |
| V | 132,880 | 132,880 |
| W | 3,384,000 | 3,384,000 |
| X | 24,495 | 24,495 |
| ***Total*** | | ***9,405,483*** |

**Table 3-6: Recommended Wastewater Flow Projections**

| Year | Total Projected Flow (mgd) | SANDAG Population* |
|---|---|---|
| 2012 | 15.73 | 249,382 |
| 2017 | 17.59 | 255,382 |
| 2022 | 19.46 | 271,913 |
| 2027 | 21.32 | 282,785 |
| 2032 | 23.18 | 293,610 |
| 2037 | 25.05 | 306,922 |
| 2042 | 26.91 | 318,270 |
| 2050 | 29.89 | 330,049 |

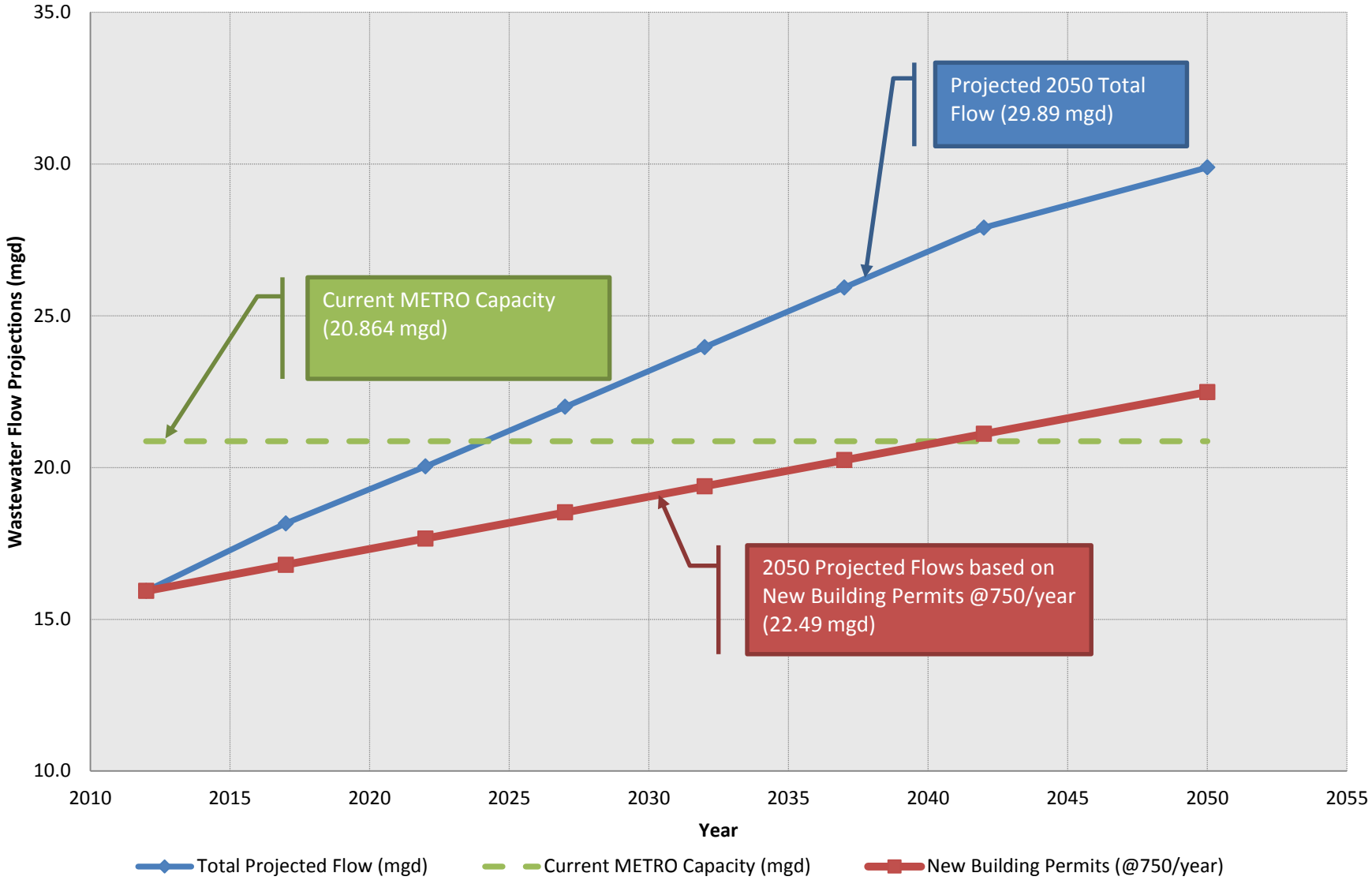
* SANDAG Populations were not used as part of the flow calculations but have been provided for informational purposes only.

The ultimate flow in 2050 has been projected to increase approximately 47% from existing flows up to 29.89 mgd. This flow is approximately 9 mgd more than the existing capacity at METRO, and it is anticipated that total flows will reach the 20.864 mgd capacity in approximately year 2024. Future developments account for approximately 76% of the increased flows, with the resulting 24% being disbursed throughout other areas of the City. For a visual comparison, the City requested including a graphical representation of the average new building permits on an annual basis and projecting it through 2050. Per the City's request, using an average of 750 new building permits per year based on the 2010-2013 City's Permit Plus database, the growth is much slower, resulting in approximately 22.49 mgd in 2050.

Figure 3-2 shows a graphical representation of the total flow increase based on the AGP growth projections and compares them to the new building permit growth projections. Figure 3-3 shows a map of proposed future developments.

Table 3-7 summarizes the outfalls included in the model with associated City Metering Locations and the total average daily flow associated with each, verifying that the total flow being loaded into the model are exiting the system via the outfalls as well. The total 15.56 mgd outfall is nearly 98% of existing flows loaded into the model verifying the model is running accurately. The location of all the metering locations throughout the City are shown in Figure 3-3.

**Figure 3-2: Projected Wastewater Flows**



N

0 4,950 9,900 Feet

CV-12
CV-10
CV-11
CV-9
CV-8
CV-5
CV-6&7
CV-3
CV-2
CV-14
CV-1
CV-4

San Miguel Ranch
Rolling Hills Ranch
Eastlake Woods
Eastlake Summit
Eastlake Lake Pointe
Eastlake Olympic Pointe
Urban Core
Colony
Urbana
Bayfront
Palomar Gateway
Otay Ranch Village 6-Marquis I and II
Freeway Commercial
Village 11
Eastern Urban Center
University
Village 2_Poggi
Village 2_SCI
Village 9
Village 10
Village 3 4 North
Village 4
Village 8 East
Village 8 West
Planning Area 20

SAN MIGUEL
SR-125 SB
SR-125 NB
NEW PROCTOR VALLEY
PROCTOR VALLEY
WILLOW
BONITA
CORRAL CANYON
EASTLAKE
OTAY LAKES
EASTLAKE PKWY
HERITAGE
SR-54 EB
SR-54 EB RAMP
20TH
SR-54 WB
E ST
GUNPOWDER POINT
MARINA
BROADWAY
BAY
I-5 NB
PALOMAR
ORANGE
MAIN
BEYER
OTAY VALLEY
I-805 SB
I-805 NB
BRANDYWINE
TELEGRAPH CANYON
PASEO RANCHERO
MEDICAL CENTER DR
OLYMPIC PARKWAY
LA MEDIA
SR-125 SB
BIRCH
URBAN CENTER EAST

Infrastructure ENGINEERING CORPORATION

City of Chula Vista
Wastewater Collection System Master Plan

**Projected Future Developments and Outfall Metering Locations FINAL**

May 2014

**Figure 3-3**

**Table 3-7: ADWF Outfall Flow Summary**

| Outfall Modeling ID | Maximum Outfall Flow (gpm) | Maximum Outfall Flow (MGD) | City Outfall Metering IDs |
|---|---|---|---|
| 8830 | 755 | 1.09 | CV-1 |
| OUTFALL_9168 | 3337 | 4.81 | CV-2 |
| OUTFALL_3172 | 1115 | 1.61 | CV-3 |
| IEC_OUTFALL_02 | 10 | 0.01 | CV-4 |
| OUTFALL_931 | 47 | 0.07 | CV-5 |
| OUTFALL_923 | 813 | 1.17 | CV-6 & 7 |
| OUTFALL_466 | 20 | 0.03 | CV-8 |
| OUTFALL_848 | 228 | 0.33 | CV-9 |
| OUTFALL_64 | 414 | 0.60 | CV-10 |
| 140 | 241 | 0.35 | CV-11 |
| 14583 | 269 | 0.39 | CV-12 |
| OUTFALL_9152 | 3410 | 4.91 | CV-14 |
| 15296 | 33 | 0.05 | - |
| 353 | 55 | 0.08 | - |
| IEC_NEWOF_07 | 6 | 0.01 | - |
| IEC_OUTFALL_05 | 7 | 0.01 | - |
| OUTFALL_290 | 51 | 0.07 | - |
| ***TOTAL*** | ***10811*** | ***15.57*** | |

### *3.3.5 PEAK DRY WEATHER WASTEWATER FLOW (PDWF)*

To calculate PDWF, ADWF was used and multiplied by a peaking factor. The 2012 Peak Dry Factor was established based on the data gathered during the *2012 Sewer Flow Monitoring* performed by the City. To create the PDWF scenario, which models the peak flow experienced in the collection system under dry conditions, the BWF component is peaked to account for the variation in sewer generation that occurs over the course of a typical day. This peaking is accomplished by applying diurnal curves to the BWF. Because the sewer generation patterns vary for residential and non-residential sources, two separate diurnal curves were used.

Typical residential and non-residential diurnal curves were extracted from flow monitoring data collected from the City. The normalized diurnal curves for residential and non-residential sewer flows can be seen in Figure 3-4 and Figure 3-5, respectively. Base infiltration, groundwater pumping, and outside sewer flows were not modified to create PDWF values.

**Figure 3-4: Normalized Diurnal Curve (Residential)**

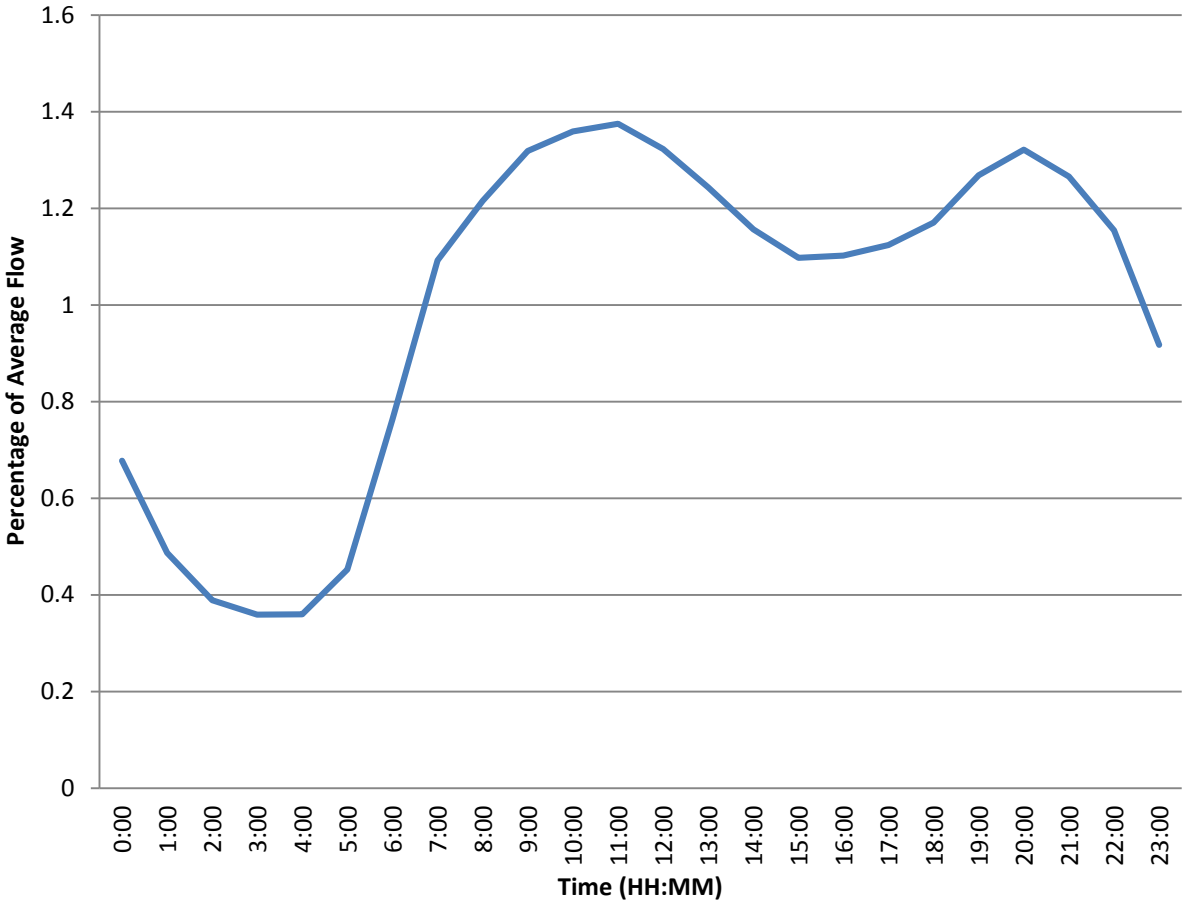
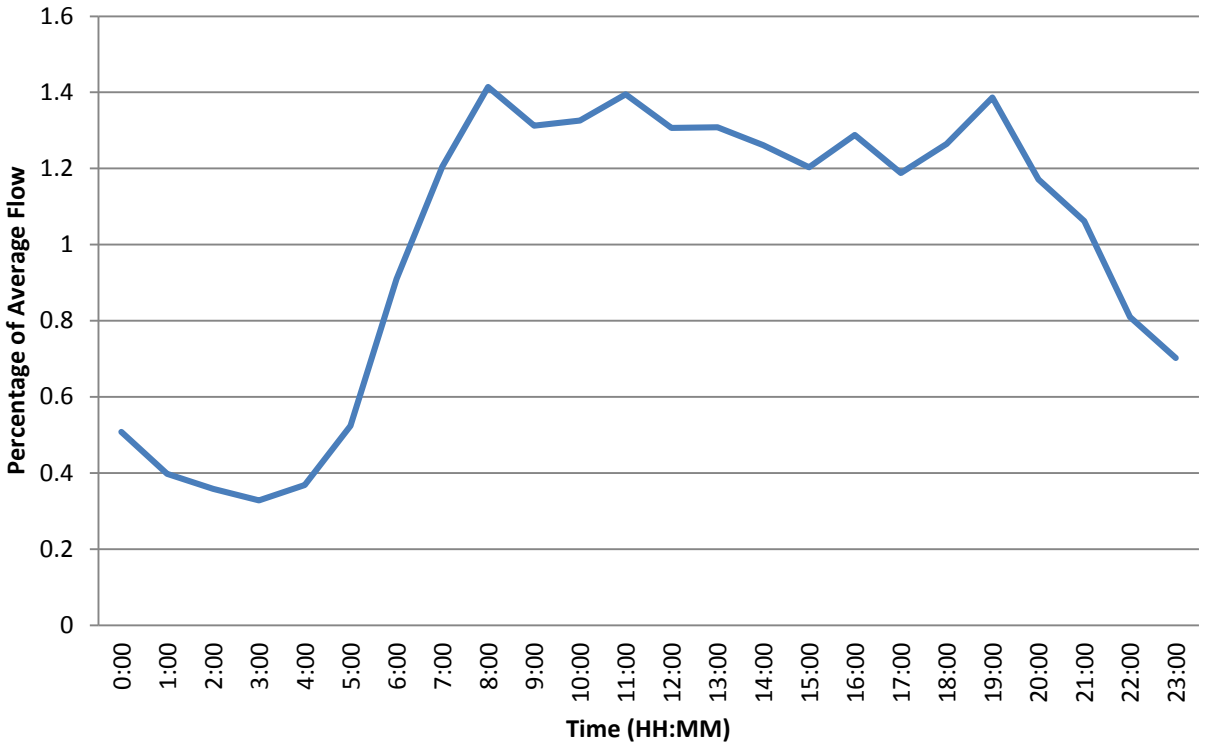


**Figure 3-5: Normalized Diurnal Curve (Non-Residential)**




### *3.3.6 Peak Wet Weather Wastewater Flow (PWWF)*

Peak Wet Weather Wastewater Flow (PWWF) is estimated as Peak Dry Weather Flow (PDWF) plus Rainfall Dependent Infiltration/Inflow (RDI/I) and BWI, combined as Inflow/Infiltration (I/I) for this master plan due to the data available. RDI/I is storm water that enters the wastewater collection system in direct response to the intensity and duration of individual rainfall events. RDI/I may recede gradually after a storm; however, any residual flow is considered to be a general increase in GWI.

To create the PWWF scenarios, the model was loaded using PDWF values, and Rainfall Dependent Inflow and Infiltration (RDI/I), combined as I/I was added to the PDWF. Peak values were then evaluated based on consistency throughout the year from data gathered from the City's main outfalls, removing any inconsistent peaks, resulting in an average peaking factor for I/I of 1.85. The total volume of I/I was then averaged out across the city and multiplied accordingly to each pipeline based on its length-diameter. The respective I/I value was then added to the calculated BWF per time period for PWWFs.