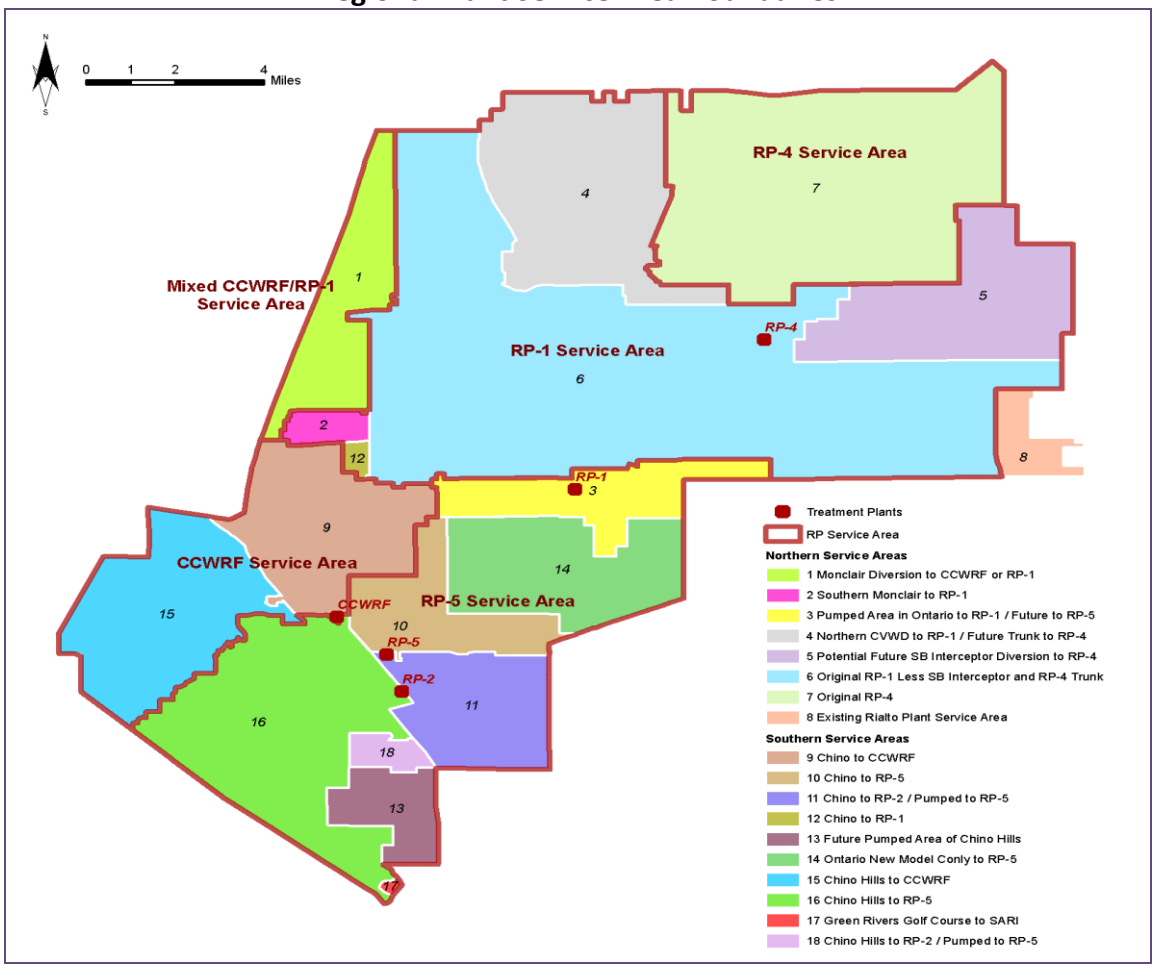
CHAPTER 5
WASTEWATER FLOWS

5.1 REGIONAL FACILITIES

Regional Water Recycling Plants

Figure 5-1 illustrates the service area boundaries for IEUA's four water recycling plants. The four Regional facilities are: Regional Plant No. 1 (RP-1), Regional Plant No. 4 (RP-4), Regional Plant No. 5 (RP-5), and Carbon Canyon Wastewater Reclamation Facility (CCWRF). The biosolids produced at RP-4 and RP-1 are thickened, digested, and dewatered at solids handling facilities located at RP-1. Similarly, the CCWRF and RP-5 biosolids are treated at Regional Plant No. 2 (RP-2). The stabilized and dewatered solids are transported to the Inland Empire Regional Composting Facility for processing into soil amendment.

Figure 5-1
Regional Plant Service Area Boundaries



RP-5 began treating and discharging wastewater in March 2004. At that time, the RP-2 wastewater influent was diverted to RP-5 for treatment. Since portions of RP-2 are located in the 100-year flood plain, liquid wastewater processing at RP-2 was discontinued and the plant is being used only for processing solids from RP-5 and CCWRF. Biosolids processing at RP-2 will continue until the plant reaches the end of its useful life or until the RP-2 land can no longer be leased from the U.S. Army Corps of Engineers. Some land at RP-5 has been reserved for future solids processing facilities.

Regional Interceptor System

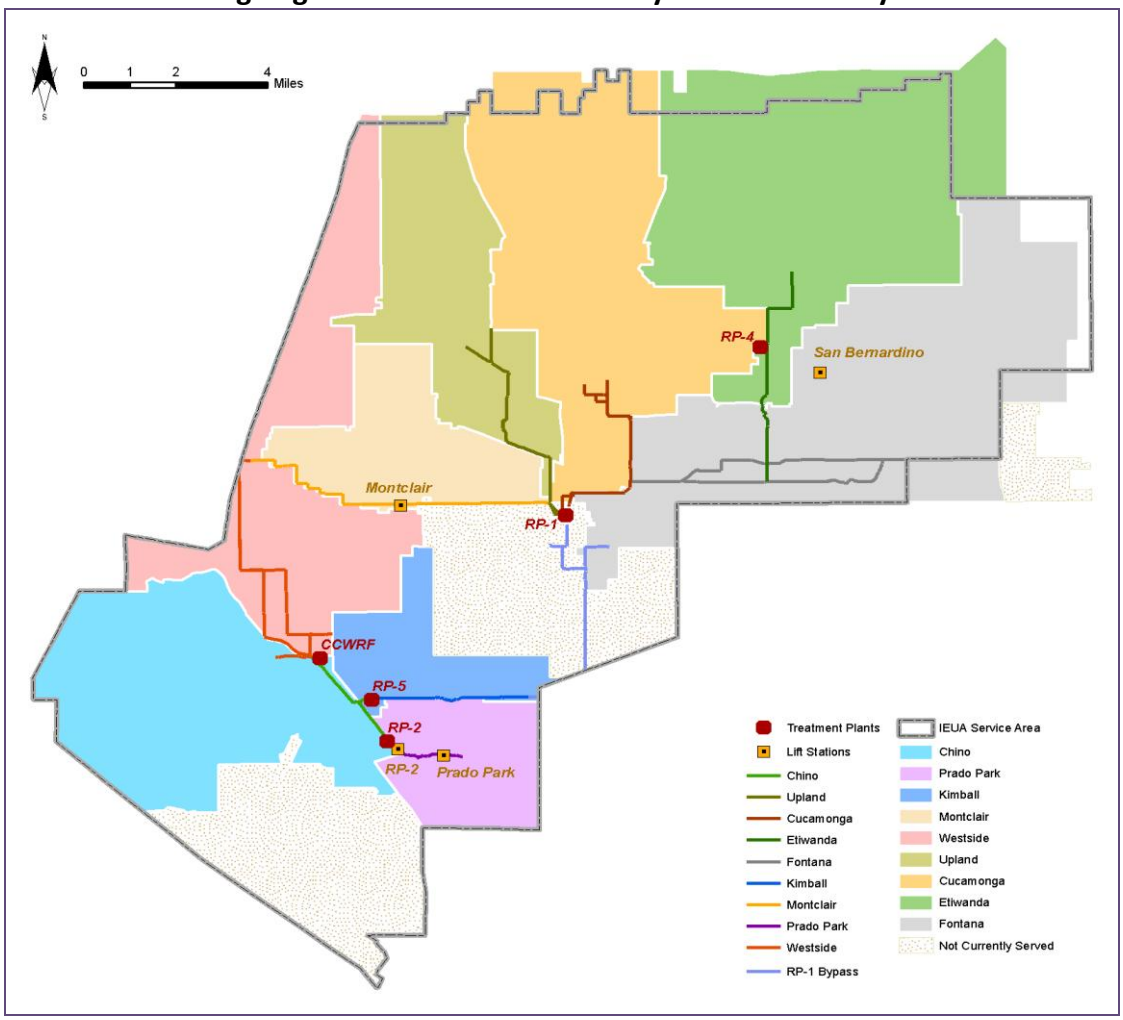
IEUA has a network of regional interceptor sewers that can be used to bypass flow from one treatment plant to another to balance and optimize the use of treatment capacity. Currently, the regional interceptors can bypass flow from RP-4 to RP-1 and from CCWRF to RP-5. In addition, primary effluent can be bypassed from the RP-1 equalization basins to RP-5. Figure 5-2 illustrates the existing regional trunk wastewater system and tributary areas. The main routes for bypassing/diverting flow are:

- Operators can bypass up to 6 million gallons per day (MGD) from RP-4 to RP-1 through the Etiwanda Interceptor.
- Operators can bypass flow from CCWRF to RP-5 through the Chino Interceptor--typically 1 to 2 MGD.
- A portion of the flow from the Cities of Upland and Montclair (about 4 MGD) can be diverted either to CCWRF, through the Westside Interceptor, or to RP-1, via the Montclair Lift Station and Montclair Interceptor. Typically, most of the flow is routed to CCWRF to avoid pumping costs.
- Primary effluent and sludge can be diverted from the RP-1 equalization basins into the Eastside Interceptor and then it flows by gravity to RP-5. Up to 9 MGD could potentially be bypassed; however, operational experience has shown that 1 to 2 MGD is currently the optimum in terms of wastewater treatment plant performance.

As shown on Figure 5-2, IEUA has four wastewater lift stations:

- The Montclair Lift Station pumps wastewater from portions of Montclair, Upland, and Chino to RP-1.
- The Prado Park Lift Station pumps wastewater from the Prado Regional Park in the City of Chino to RP-5.
- The RP-2 Lift Station, which pumps flow from the southeastern portions of the cities of Chino and Chino Hills to RP-5.
- The San Bernardino Avenue Pump Station, which pumps a portion of the flow from the City of Fontana to RP-4.

Figure 5-2
Existing Regional Trunk Wastewater System & Tributary Areas



Program Master Planning and Integrated Water Resources Management

IEUA's Wastewater Facilities Master Plan (WFMP) was adopted in August 2002 with the approval of the Regional Technical and Policy Committees. The WFMP, together with the Recycled Water Feasibility Study (2002) and the Organics Management Strategy Business Plan (2002), formed a "Program Master Plan" and were the subject of a Programmatic Environmental Impact Report (PEIR) certified on June 28, 2002. This TYCIP is consistent with the IEUA's approved WFMP and PEIR.

The PEIR integrated all of the Agency's related planning activities into one comprehensive document in order to address the environmental concerns of the overall effects of the projects contemplated by the Agency. This comprehensive planning process is illustrated in Figure 5-3.

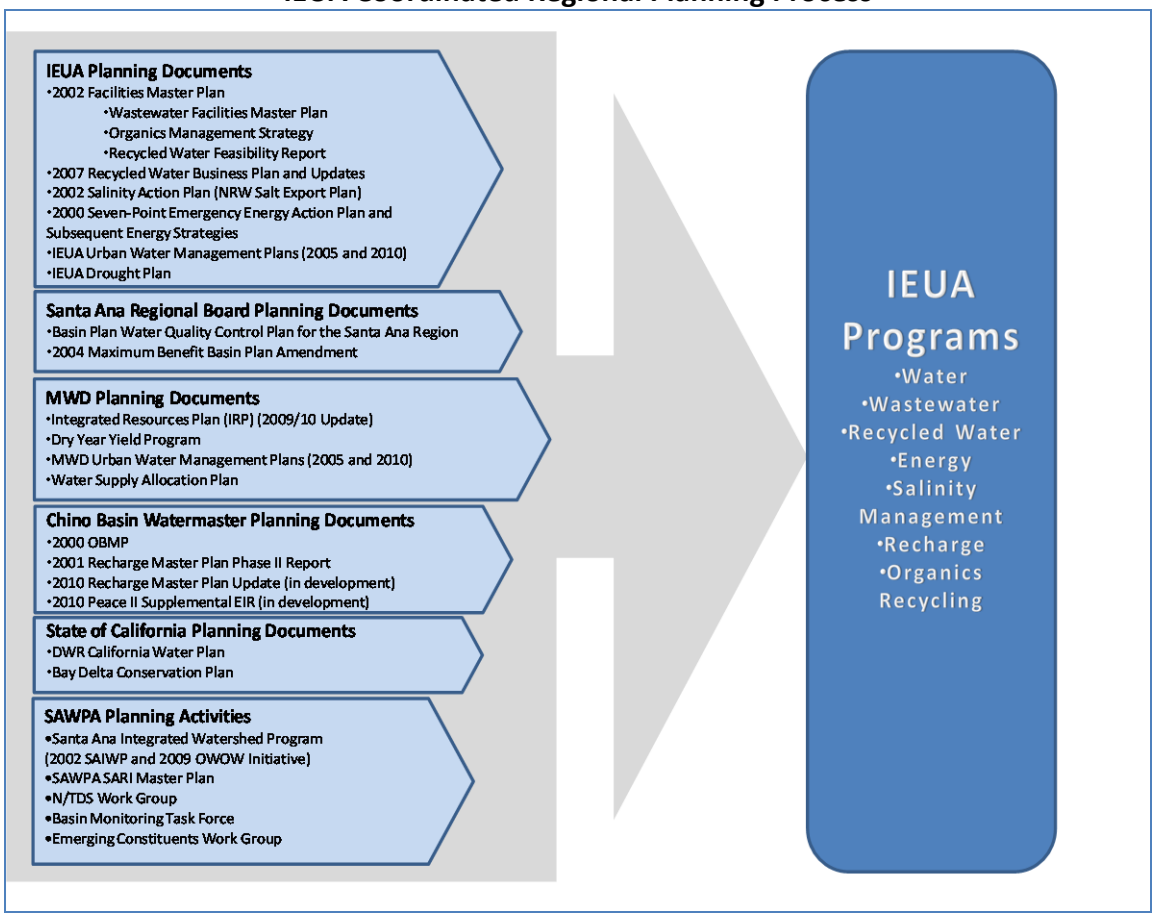
Since 2002, the need to integrate all of the Agency's master planning activities into Chino Basin's overall water supply management strategy has become even more

apparent. In 2008 and 2009, there has been a profound shift in California Water Supply Planning in response to three consecutive years of drought and regulatory restrictions on pumping imported water from the Bay-Delta. In addition, rising energy costs, economic recession, climate change, greenhouse gas emission reduction legislation, and drought allocation plans have led to decreased imported water reliability and a call from the Governor to reduce per capita water demand by 20% to 30%. This has led to increased involvement of IEUA with the development of regional planning documents (CBWM, SAWPA, MWD, and Regional Board) and State of California Planning Documents (DWR, CalEPA, etc.)

Wastewater Facilities Master Plan

Some of the objectives of the 2002 WFMP were to: (1) identify facilities that need to be replaced or expanded in the near- and long-term to meet projected growth and wastewater flow needs; (2) develop a cost-effective, phased implementation plan; (3) determine space and location needs for additional or expanded treatment facilities; (4) develop strategies for flow diversion between service areas to optimize existing treatment capacity utilization; and (5) maximize water recycling, energy efficiency, and organics recycling.

Figure 5-3
IEUA Coordinated Regional Planning Process



The WFMP included plans for expansion of wastewater facilities to meet the needs of growth within the service area through 2050. Specifically, it included improvements and expansion of wastewater facilities at RP-4; construction of a new 16.3-MGD permitted capacity wastewater facility at RP-5; conversion of RP-2 to a solids handling facility only (elimination of wastewater treatment at RP-4); and numerous upgrades and odor control facilities at RP-1 and Carbon Canyon RWRF. These plans have all been implemented. In addition, a new, state-of-the art composting facility was put into service near RP-4 that handles biosolids and green waste; a demonstration renewable energy facility was constructed at RP-5; a new, LEED-Platinum administration building and wetlands educational park were constructed near RP-5; the recycled water system was expanded to include additional recycled water pump stations, pipelines, and reservoirs in the northeast and central areas; and organics management facilities were constructed for handling biosolids, manure, and food waste in the southern area.

IEUA Recycled Water Feasibility Study

IEUA prepared a Recycled Water Feasibility Study, adopted by the Board of Directors in August 2002, which delineated the Agency's recycled water program through the year 2020. In 2004, IEUA initiated development of the Regional Recycled Water Program Implementation Plan, which updated information from the 2002 study. In 2005, the IEUA Recycled Water Program Implementation Plan identified additional future recycled water demand, primarily in the developing areas of the cities of Chino and Ontario. IEUA recognizes that water recycling is a critical component of an effective water resources management strategy; over the years, recycled water will become a larger portion of the overall water resources supply mix for the Chino Basin. Water recycling will help "drought proof" the Basin, help achieve the objectives of the OBMP, and provide a lower cost water supply to all the residents within IEUA's service area.

The 2002 Feasibility Study recommended and the 2005 Recycled Water Program Implementation Plan confirmed that interconnection of all four of the IEUA's regional treatment plants in a looped distribution system would maximize beneficial use of recycled water, increase system reliability and flexibility, and provide other operational and cost reducing benefits. The looped system will also allow more customers to be served and provide the flexibility to release surplus recycled water to spreading basins throughout the Basin for recharge.

IEUA's adopted Recycled Water Feasibility Study (August 2002), indicated that by the year 2020 the projected use of recycled water would exceed 70,000 acre-feet per year (AFY), with over 1,700 customers projected to be connected to the regional recycled water distribution system. Subsequent implementation of the 2005 Recycled Water Program Implementation Plan and the 2005 IEUA Urban Water Management Plan showed that a total of over 93,000 AFY of recycled water could be delivered to over 1,900 potential customers. IEUA will recharge up to 33,000 AFY of recycled water (blended with storm water and imported water to meet the overproduction replenishment needs) into the Chino Groundwater Basin and facilitate direct deliveries

of over 60,000 AFY of recycled water to local customers. IEUA's goal is to use as much recycled water for local beneficial uses as is economically practical and replenish the Chino Groundwater Basin. In June 2007, IEUA received a new permit for recycled water recharge adding several more basins that can be utilized for recharge with recycled water. These added basins will increase both the volume and distribution of recycled water availability in the Chino Basin.

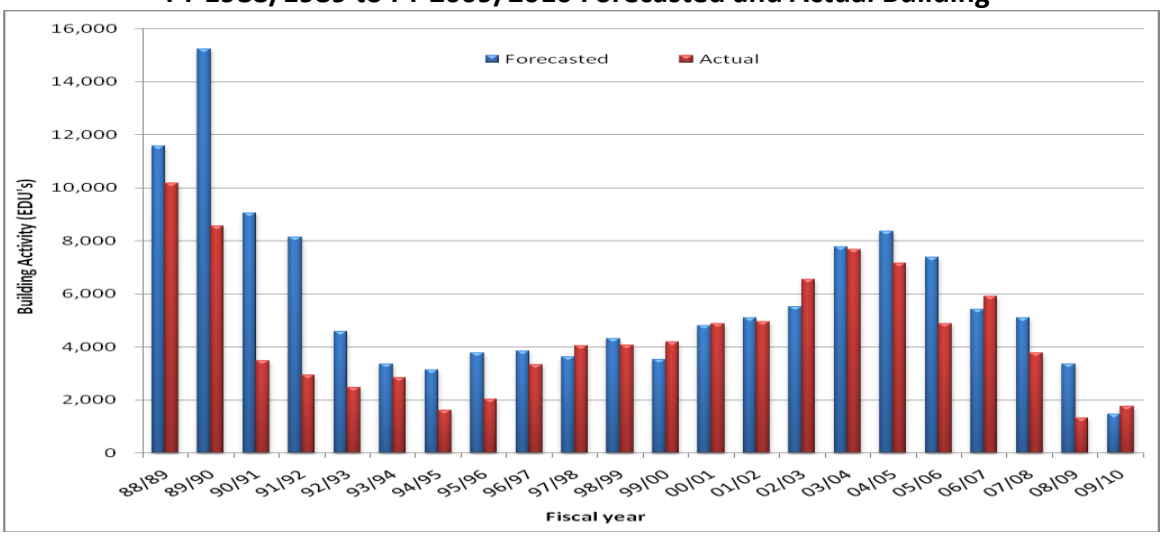
Recycled Water 3-Year Business Plan

In FY 2007/08, in response to potential water supply shortages and reductions in MWD imported water supplies, IEUA accelerated implementation of the recycled water program deliveries by committing to a Recycled Water Business Plan. The Recycled Water Business Plan (initially adopted in December 2007) is intended to be a "short-term" action-oriented document that will be updated annually to adjust the goals, timelines and projects that will expand the use of recycled water. The Recycled Water Business Plan, as updated in 2008, has a goal of increasing the total recycled water connected demand to 50,000 AFY by FY 2011/12. The program is to be funded by a combination of state and federal grants, State Revolving Fund Financing (SRF) and MWD rebates. In addition, the recycled water supply is not impacted by drought and will mitigate the impacts of regional or statewide water supply limitations.

5.2 HISTORICAL WASTEWATER FLOWS

Forecasting growth within IEUA's service area has not been easy in the last few years. With the significant drop in housing prices, limited credit availability and rise of interest rates from their recent historic lows, the real estate market has softened dramatically throughout the southland. As shown in Figure 5-4, FY 2008/09 revised forecasts were significantly higher than actual building activities, underscoring the challenge in predicting economic conditions and the local market response.

Figure 5-4
FY 1988/1989 to FY 2009/2010 Forecasted and Actual Building

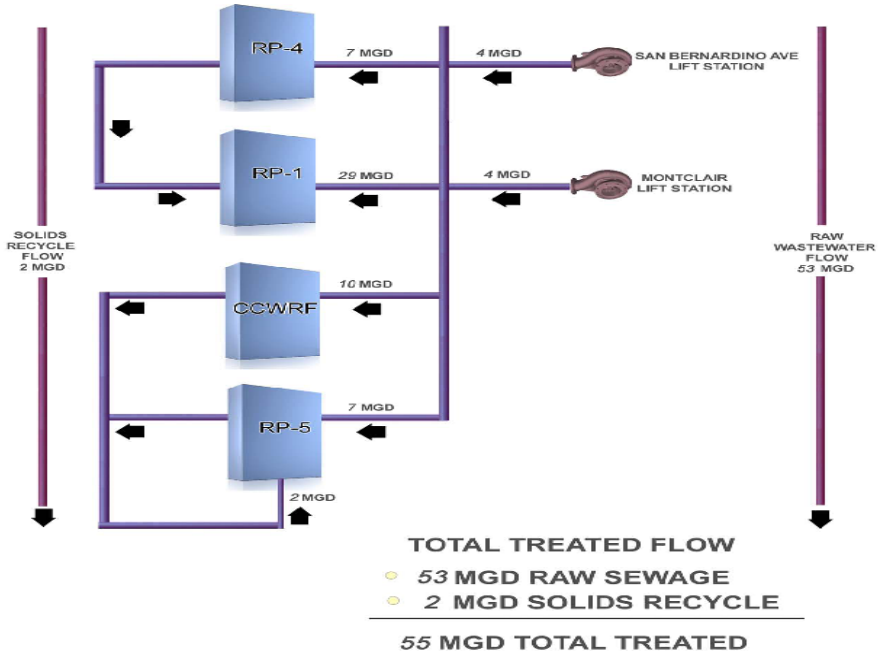


5.3 CURRENT WASTEWATER FLOWS

In recent years, as the need for recycled water increased, there were extensive efforts by the Operations Division, Planning & Water Resources Division, and Engineering & Construction Management Division to monitor wastewater flows at the regional plants and within the collection system. At each treatment plant, detailed accounts of flows and recycle streams entering and leaving the facilities were logged. Flow meters were recalibrated and influent and effluent readings compared to ensure quality data. Flow balances were performed for each facility and for the Agency as a whole, to ensure that service area flow quantities and recycle flow quantities could be distinguished. The information was used to prepare an Agency-wide System Flow Balance. This helped to clarify the Agency's options for optimizing flow distribution between facilities. It also verified the current baseline for future flow projections. Several diversion scenarios between the Regional Plants (RPs) were analyzed and stress tests at some of the Regional Plants were conducted to determine the bottlenecks within the plant.

Figure 5-5 shows the current flows being treated at each of the Agency's regional water recycling facilities. In June 2009, the San Bernardino Avenue Lift Station came on line, which increased the amount of flow treated at RP-4 by approximately 4 MGD and correspondingly decreased the amount treated at the other three regional recycling facilities. The use of the lift station allows more flow to be supplied directly to recycled water users in the Northeast recycled water network.

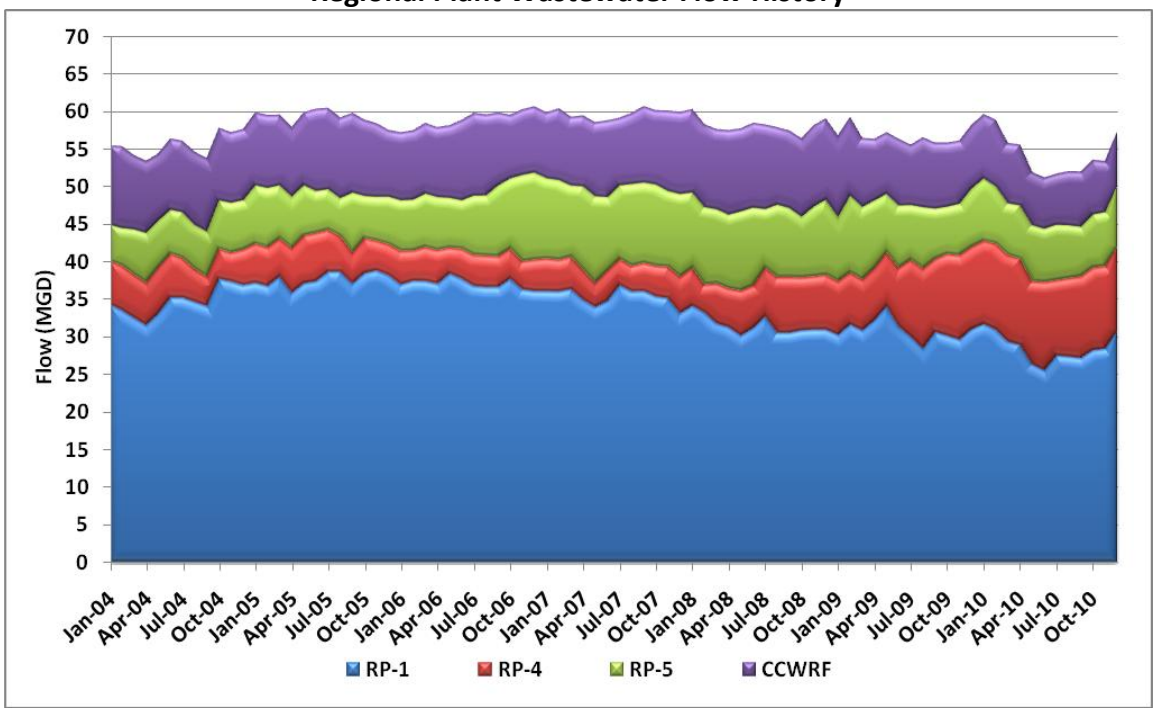
Figure 5-5
Current Wastewater Flows



IEUA's historical wastewater flow trend is shown below in Figure 5-6. This figure depicts the raw sewage from each regional water recycling plant's tributary area and the total for all facilities combined.

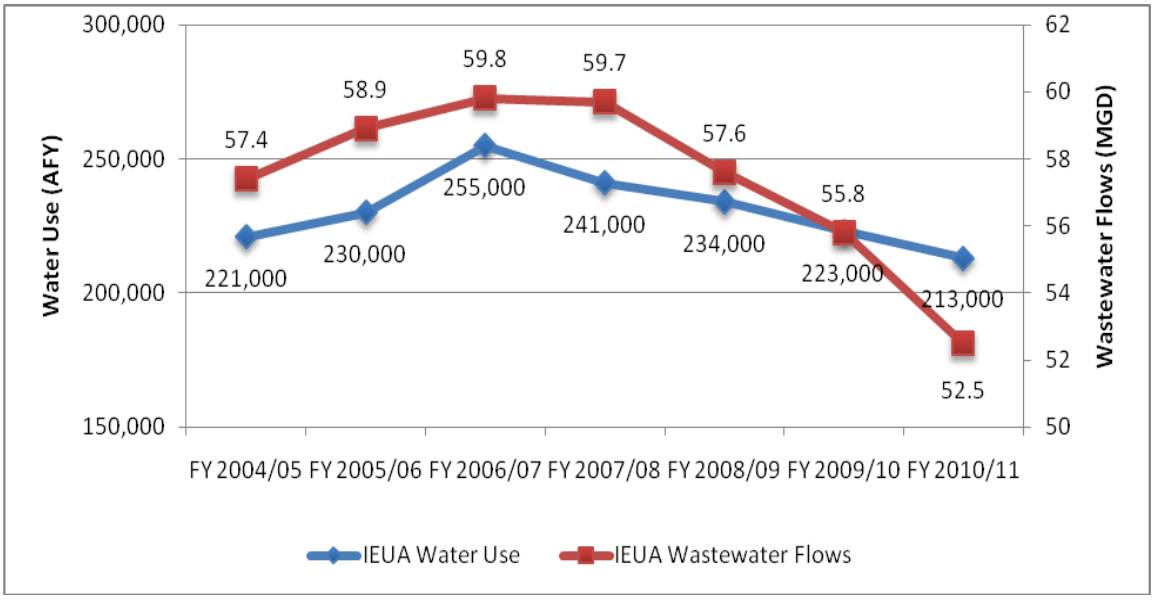
Despite the impact the current economy has had on growth in recent years, the IEUA service area has continued to see development continue. However, the average daily flow rates of raw sewage into the Regional Water Recycling Plants have decreased by approximately 10% over the past several years. Los Angeles County and Orange County sanitation agencies have also experienced a leveling off or declining of wastewater flows over the past few years. This trend may reflect the decrease in economic growth and the increase in area foreclosures to some extent. However, it is expected to continue for the next few years, even after the economy rebounds, as conservation continues.

Figure 5-6
Regional Plant Wastewater Flow History



For a third year in a row, water use by the Inland Empire Utilities Agency (IEUA) member agencies and wastewater generation has significantly declined (Figure 5-7). IEUA's member agencies overall water use has decreased approximately 32,000 acre-feet since FY 2006/07 and wastewater generation decreased by 4 mgd. In FY 2010/11, water use is estimated to decrease by another 5% and wastewater by another 3 mgd. This can be largely attributed to IEUA and its member agencies' public education, water use efficiency programs, ordinance enforcement and the economic downturn.

Figure 5-7
Recent Water Use and Wastewater Flow Trends



The backbone of the regional system has been designed using the raw sewage flow rate specified in the Regional Sewerage Service Contract—Exhibit J—which is 270 gallons per day per equivalent dwelling unit (gpd/EDU). IEUA still plans its regional sewer system around Exhibit J. However, the current average flow rate for new developments is estimated to be 200 gpd/EDU. Newly constructed and re-modeled homes are assumed to generate less wastewater on average due to the installation of water- efficient appliances. It is expected that the overall average Agency service area flow per EDU will continue to decline, given the rising price of water, decreases in water supply availability and greater need for water conservation.

5.4 FUTURE WASTEWATER SUPPLIES

A survey of the Contracting Agencies is conducted in September of each year to determine the rate of projected growth for the next ten years, in terms of Equivalent Dwelling Units (EDUs). The results of the 2010 survey are summarized in Table 5-1.

Table 5-1
Ten-Year Growth Forecast By Contracting Agencies

Fiscal Year	City of Chino (EDUs)	City of Chino Hills (EDUs)	CVWD (EDUs)	City of Fontana (EDUs)	City of Montclair (EDUs)	City of Ontario (EDUs)	City of Upland (EDUs)	Total (EDUs)
11/12	54	162	152	416	165	484	152	**1,585**
12/13	54	724	171	455	202	1,017	210	**2,833**
13/14	63	773	121	532	212	1,850	253	**3,804**
14/15	61	774	171	607	42	2,438	267	**4,360**
15/16	54	361	121	684	42	1,700	365	**3,327**
16/17	54	311	121	758	42	1,600	447	**3,333**
17/18	54	209	121	835	42	1,450	449	**3,160**
18/19	54	179	221	910	42	1,450	459	**3,315**
19/20	54	43	121	910	42	1,150	489	**2,809**
20/21	54	43	121	910	42	1,150	489	**2,809**
Totals	**556**	**3,579**	**1,441**	**7,017**	**873**	**14,289**	**3,580**	**31,335**

Over the next ten years, building activity is projected to total 31,355 EDUs. This is lower than last year's TYCD projection of 37,287 EDUs and significantly lower than projections from two years ago that were over 60,000 EDUs. The reduced projections are primarily a result of the current economic downturn which has slowed development. The City of Ontario is anticipating growth from the New Model Colony to begin increasing in FY 2012/13, although, with the housing market in flux, it is difficult to predict exactly when the increase in building activity will occur. Total building activity is projected by the member agencies to peak in FY 2014/15 at 4,360 EDUs**.**

As shown in Figure 5-8, the building activity forecasts for FY 2009/10 and beyond have dropped for three consecutive years. The total projected building activity over the next ten years has fallen from 69,651 EDUs in FY 2008/2009 to 60,428 EDUs in FY 2009/2010 to 37,287 EDUs in FY2010/11 and to 31,335 EDUs in the present fiscal year.

Figure 5-8
Historical Building Activity and Successive Year Growth Forecasts

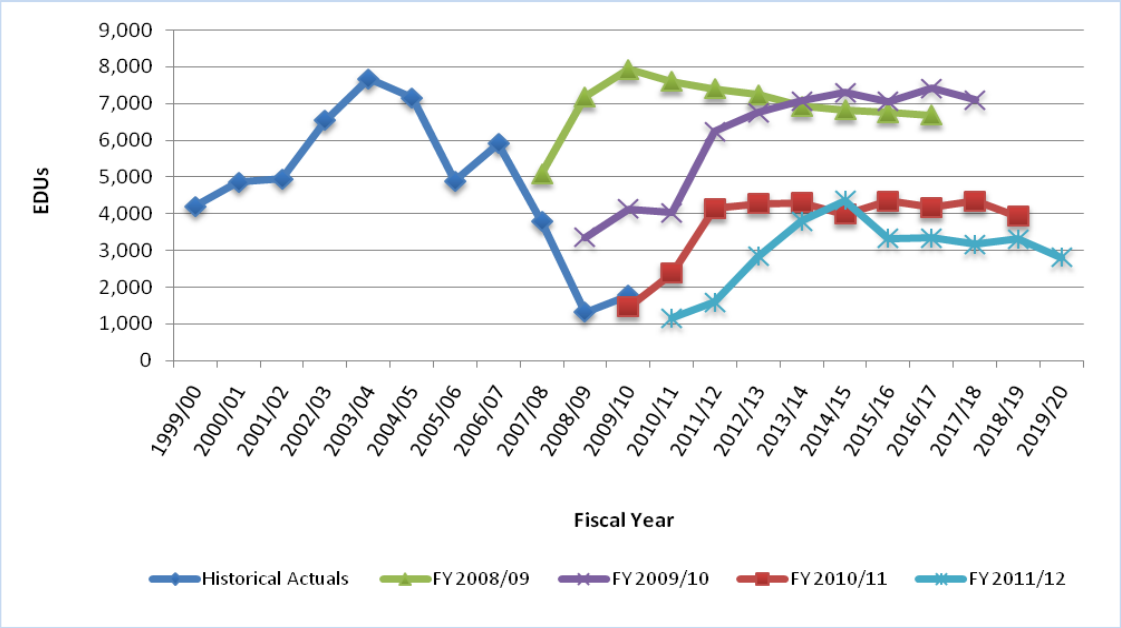


Table 5-2 presents the TYCD forecast by land use. Over the next ten years, building activity is projected to be approximately 70% residential and 30% commercial/industrial by EDUs. This is a slight shift from 75% residential & 25% commercial/industrial, which has been seen in recent previous TYCD forecasts.

Table 5-2
FY 2011/2012 Ten-Year Capacity Demand Forecast by Land Use

Fiscal Year	Residential (EDUs)	Commercial / Industrial (EDUs)	Total (EDUs)
11/12	999	588	**1,585**
12/13	1,784	1,050	**2,834**
13/14	2,628	1,175	**3,803**
14/15	2,974	1,386	**4,360**
15/16	2,381	944	**3,325**
16/17	2,370	964	**3,334**
17/18	2,342	817	**3,159**
18/19	2,470	845	**3,315**
19/20	2,094	715	**2,809**
20/21	2,094	715	**2,809**
Totals	**22,136**	**9,199**	**31,335**

Table 5-3 presents the TYCD Forecast by wastewater treatment plant. For the purposes of this report, the current service areas of each Regional Plant were used to allocate

projected sewage flows to each plant. With the completion of RP-4 expansion (7 – 14 MGD) and the completion of the San Bernardino Interceptor and Pump Station, staff continues to work on how to optimize the Agency's flows in order to maximize recycled water sales while minimizing overall pumping and treatment costs, in particular for the RP-4 and RP-1 service areas. This will also help relieve some of the potential capacity issues at CCWRF, RP-5 and RP-2 where much of the Agency's growth is forecasted to occur. The impact of these changes will be evaluated as part of the preparation of the TYCIP.

Table 5-3
2011/2012 Ten-Year Capacity Demand Forecast by Regional Recycled Water Plant

	RP-1		RP-4		CCWRF		RP-5		Total	
Fiscal Year	**EDUs**	**MGD**	**EDUs**	**MGD**	**EDUs**	**MGD**	**EDUs**	**MGD**	**EDUs**	**MGD**
11/12	505	0.14	374	0.10	261	0.07	445	0.12	1,585	0.43
12/13	612	0.17	419	0.11	354	0.10	1,448	0.39	2,833	0.76
13/14	710	0.19	421	0.11	438	0.12	2,235	0.60	3,804	1.03
14/15	795	0.21	521	0.14	430	0.12	2,614	0.71	4,360	1.18
15/16	914	0.25	523	0.14	319	0.09	1,571	0.42	3,327	0.90
16/17	938	0.25	573	0.15	305	0.08	1,517	0.41	3,333	0.90
17/18	921	0.25	625	0.17	268	0.07	1,346	0.36	3,160	0.85
18/19	1,057	0.29	675	0.18	209	0.06	1,374	0.37	3,315	0.90
19/20	987	0.27	675	0.18	158	0.04	989	0.27	2,809	0.76
20/21	987	0.27	675	0.18	158	0.04	989	0.27	2,809	0.76
Totals	**8,426**	**2.29**	**5,481**	**1.46**	**2,900**	**0.79**	**14,528**	**3.92**	**31,335**	**8.47**

Consistent with the regional contract assumption that the average flow is 270 GPD/EDU, the TYCD forecast predicts an additional flow associated with new development of about 8 MGD for the entire service area. Due to the New Model Colony development, the RP-5 service area is projected to experience the largest increase in sewage production at about 3.98 MGD. This is consistent with last year's projections. The RP-1 and RP-4 service areas are projected to have increased flows of about 2.4 MGD and 1.6 MGD, respectively. The Carbon Canyon Wastewater Reclamation Facility (CCWRF) service area is projected experience a lower increase in sewage production of approximately than 0.8 MGD.

Flow monitoring conducted by IEUA and the contracting agencies, in recent years, suggests that future growth flows per EDU may be lower than the regional contract level of 270 MGD/EDU (most likely due to water conserving devices being installed in new homes). Monitoring of new development in Chino (The Preserve) indicates that a flow factor of 180-220 GPD/EDU may be a more appropriate value to use for new residential development. In addition, monitoring data is showing that the strength of the waste is increasing over time.

Alternative flow forecast scenarios have been developed to evaluate the range of potential future flows. As shown in Table 5-4, if all projected growth occurs at an average rate of 270 GPD/EDU, then the additional flow would be 8.0 MGD by 2019/2020. If all projected growth occurred at an average rate of 200 GPD/EDU, then the additional flow would be 5.9 MGD by 2019/2020. Given that current wastewater flows (52.5 MGD) and the TYCD forecast, the range of total projected flows in ten years is approximately 59 MGD to 61 MGD.

Table 5-4
Alternative Flow Scenarios – Net Increase between 2014/2015 and 2020/2021

Flow Alternatives	Additional Flow 2014/2015	Additional Flow 2020/2021	Total Flow 2020/2021	% Capacity Used*
Forecast EDU's @ 270 GPD	3.7 mgd	8.8 mgd	61.8 mgd	72%
Forecast EDU's @ 250 GPD	3.4 mgd	8.1 mgd	61.1 mgd	71%
Forecast EDU's @ 200 GPD	2.8 mgd	6.5 mgd	59.5 mgd	69%

*Assumes a region-wide capacity of 85.7 mgd.

Ten-Year Wastewater Flow Forecast

For purposes of forecasting future wastewater flows and determining capacity needs, these ten-year flow forecasts uses a revised estimate of EDU growth that reflects the current conditions and assumptions that were the basis of the Agency's long-range budget.

These projections are based on the Agency's budgetary estimates of EDU growth. Figure 5-9 below shows a comparison of projected wastewater flows using the original Contracting Agency estimates and the revised budgetary estimates. Using the Contracting Agency estimates, the total wastewater flows would increase by 6-8 MGD over the 10 years. Using the adopted budget estimates, the total flows will increase by 3-4 MGD.

Figure 5-9
10-Year Flow Forecast (200gpd/EDU)

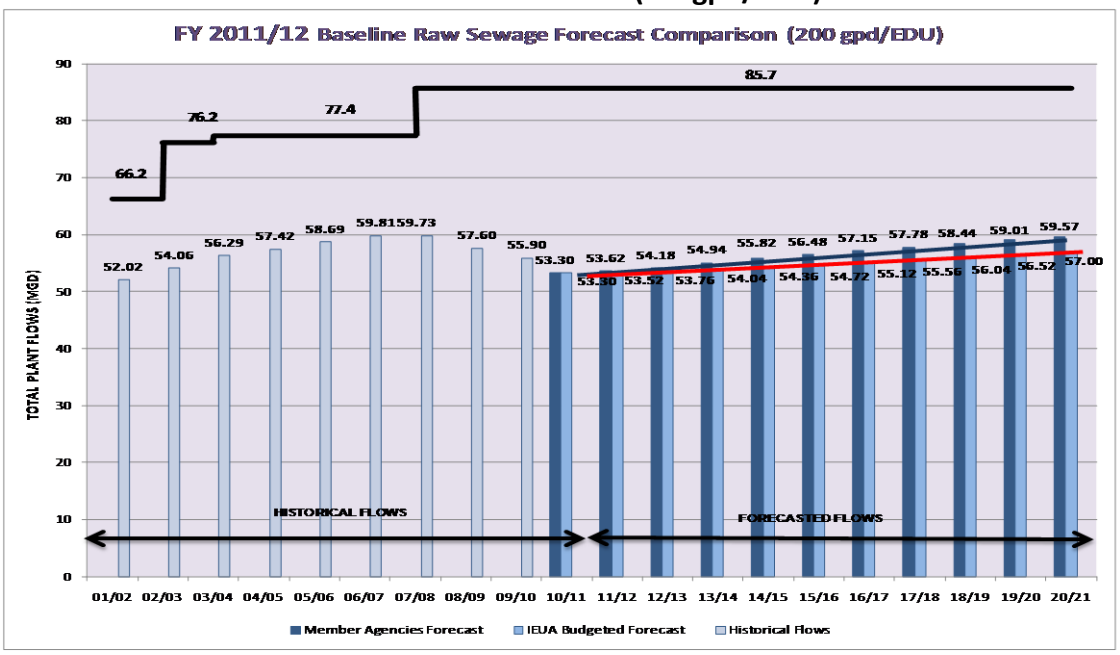
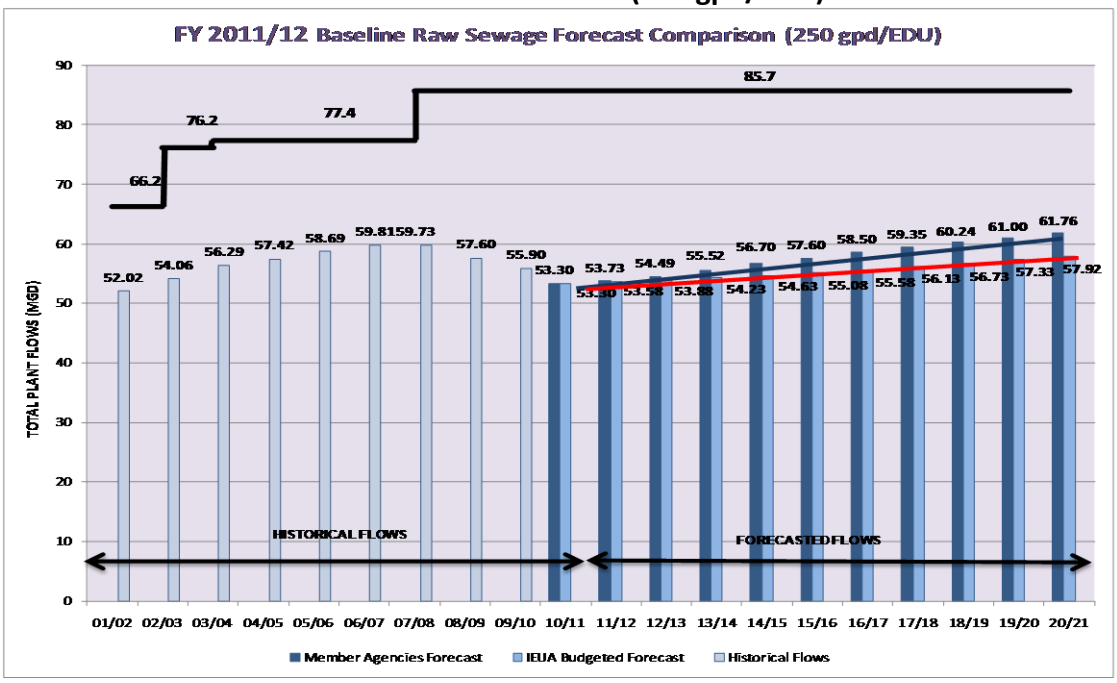


Figure 5-10 provides the same comparison using a flow factor of 250 gpd/EDU. The upper horizontal solid line is the combined capacity of the Agency's water recycling facilities. Regardless of which flow factor and which growth forecast is used, the treatment capacity is adequate for the projected flows.

Figure 5-10
10-Year Flow Forecast (250 gpd/EDU)



Capacity Utilization Forecast

Table 5-5 presents the Ten-Year Capacity Demand Forecast by wastewater treatment plant. The current service areas of each Regional Plant were used to allocate projected sewage flows to each plant. For each service area, Table 2-2 compares the anticipated average regional plant influent flows now (FY 2010/11) and in FY 2019/20. It shows the baseline raw sewage flows from the service areas as well as the "adjusted" flows. The adjusted flows are the expected actual treated flows including bypasses, diversions, and the solids handling liquid recycle stream that is pumped from RP-2 to RP-5. Currently, the total baseline raw sewage flow is 53.3 MGD and the adjusted total influent flow is 54.9 MGD. The difference (1.6 MGD) is due to recycling solids-handling side streams between RP-2 and RP-5.

Table 5-5
Regional System Flow and Capacity Utilization Summary (MGD)

	FY2010/11 Estimate				FY2020/21 Projection			
Water Recycling Facility	**Raw Service Area Flow**	**Plant Influent Flow**	**Plant Rated Capacity**	**Percent Capacity Utilization**	**Raw Service Area Flow**	**Plant Influent Flow**	**Plant Rated Capacity**	**Percent Capacity Utilization**
RP-1	28.65	28.38	44.0	65%	29.68	29.40	44.0	67%
RP-4	6.95	10.72	14.0	77%	7.62	11.39	14.0	81%
CCWRF	10.96	7.01	11.4	62%	11.30	7.35	11.4	65%
RP-5	6.74	8.78	16.3**	54%	8.40	10.45	16.3	64%
IEUA Total	53.29	54.90	85.7	64%	56.99	58.60	85.7	68%

*Note: Projections are based on the budgeted EDU growth scenario and 200 gpd/EDU.
**Note: RP-5's current discharge permit establishes the plant's rated capacity, including recycle flows, at 16.3 MGD.

<u>Table 5-5 Assumptions Looking Forward:</u>

- Assumes 200 gpd/EDU and uses the Agency's budgetary estimate of projected EDU growth
- Former Ontario Lift Station flow (2.5 MGD) is considered part of RP-5 raw service area flow
- San Bernardino Lift Station routing 4 – 5 MGD (tributary to RP-1) to RP-4
- 3.2 MGD of Montclair Interceptor flows are routed to RP-1, 1.0 MGD are routed to CCWRF
- 1.6 MGD of solids handling side-stream flow is recycled from RP-2 to be treated at RP-5

As shown in Table 5-5, the forecasted total system flow for FY 2020/21 is 58.6 MGD, including the recycle stream from RP-2 to RP-5. The overall treatment plant capacity utilization is expected to be 68% at the end of the ten year planning period. Agency-wide capacity utilization will be balanced and optimized between facilities to achieve the lowest operational cost while satisfying recycled water demands and water quality requirements. This will be accomplished using the bypass and diversion capabilities. As reflected in Table 5-5, it is likely that capacity utilization at RP-4 and CCWRF will be selectively higher than at the other water recycling facilities, with the operational goal being to supply recycled water to the users with the least amount of pumping energy.

Fifty-Year Flow Projection

As indicated in Figure 5-11 ("Regional System 50-Year Flow Projections"), wastewater flows have been projected to reach somewhere between a low of 79 MGD to a high of 90 MGD by the year 2050. These projections were developed considering current, historical and future growth information. The "low" scenario reflects a wastewater flow increase of about 0.63 MGD per year and the "high" scenario reflects 0.9 MGD per year. The current trend falls between the two curves.

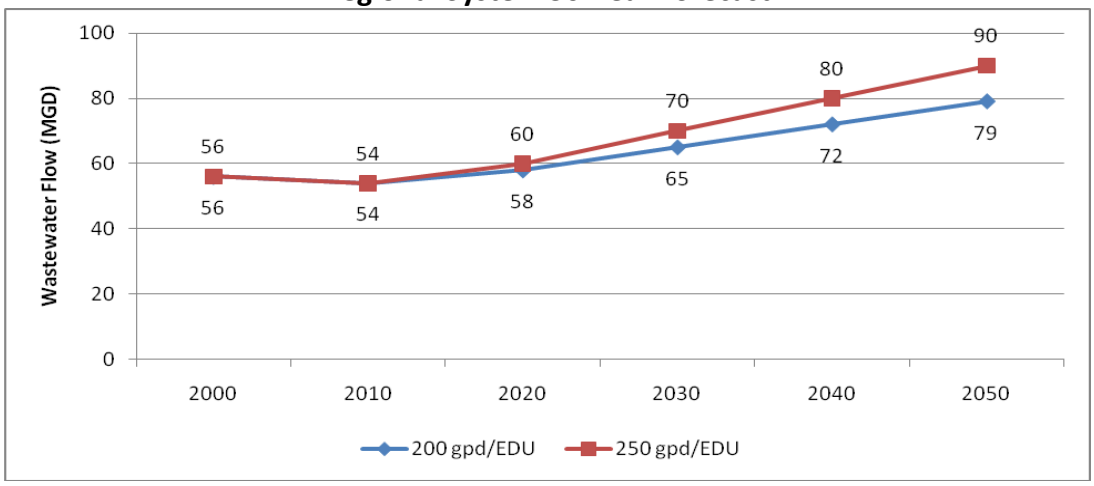



Figure 5-11
Regional System 50-Year Forecast