SAN JOSÉ/SANTA CLARA TREATMENT PLANT ADVISORY COMMITTEE

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PIERLUIGI OLIVERIO, MEMBER
DAVID SYKES, MEMBER
JAMIE MATTHEWS, MEMBER
PAT KOLSTAD, MEMBER
JOSE ESTEVES, MEMBER
STEVEN LEONARDIS, MEMBER
JOHN GATTO, MEMBER

AGENDA/TPAC

4:30 p.m. **February 12, 2015** **Room 1734**

1. ROLL CALL

2. APPROVAL OF MINUTES

A. December 11, 2014

3. UNFINISHED BUSINESS/REQUEST FOR DEFERRALS

4. DIRECTOR'S REPORT (verbal)

A. Directors Verbal Report

- Monthly Progress Report

5. AGREEMENTS/ACTION ITEMS

A. Sanitary Sewer Flow Study Update

Staff Recommendation:

1. Accept the updated staff report regarding the attached Sanitary Sewer Flow; and
2. Approve the proposed changes and policy recommendations for future updates to the revenue program for the San José – Santa Clara Regional Wastewater Facility.

The proposed Update is scheduled for Council consideration on March 3, 2015.

B. First Amendment to the Consultant Agreement with Brown and Caldwell for Engineering services for the digester and thickener Facilities Upgrade Project

Staff Recommendation:

a. Approve the First Amendment to the Consultant Agreement with Brown and Caldwell for engineering services for the Digester and Thickener Facilities Upgrade project at the San José – Santa Clara Regional Wastewater Facility, modifying the scope of services and increasing the

amount of compensation by $1,999,884, for a total agreement amount not to exceed $14, 017,410; and extending the term of agreement from December 31, 2019 to June 30, 2020.

b. Adopt the following 2014-2015 Appropriation Ordinance Amendments in the San Jose – Santa Clara Treatment Plant Capital Fund:
   (1) Decrease the Energy Generation Improvements appropriation to the Environmental Services Department in the amount of $955,000;
   (2) Decrease the Digested Sludge Dewatering in the amount of $545,000; and
   (3) Increase the Digester and Thickener Facilities Upgrade appropriation to the Environmental Services Department in the amount of $1,500,000.

The proposed Amendment is scheduled for Council consideration on February 24, 2015.

6. OTHER BUSINESS/CORRESPONDENCE

A. **Election of the Chair**

7. STATUS OF ITEMS PREVIOUSLY RECOMMENDED FOR APPROVAL BY TPAC

A. Memorandum of Understanding between the City of San José and McCarthy to Amend CC&Rs for the McCarthy Property Adjacent to the San José – Santa Clara Regional Wastewater Facility

Staff Recommendation: Approval of a Memorandum of Understanding between the City of San Jose and Joseph A. McCarthy and Muriel M. Harris as successor Trustees of the RLM Trust and MGM Trust ("McCarthys") to negotiate an amendment to two Declaration of Covenants, Conditions, Restrictions & Agreements ("CC&Rs") by and among McCarthys, City of San Jose, and Browning-Ferris Industries of California, Inc. and International Disposal Corp. of California, Inc., dated April 17, 1998 and recorded on April 28, 1998 and July 28, 2000, respectively, to provide McCarthys a process for early termination of the CC&Rs following completion of specific conditions.

The proposed Memorandum of Understanding to Amend the CC&Rs was heard by Council on December 16, 2014 and the following was adopted:

(1) Execute a Memorandum of Understanding between the City of San José and McCarthy Ranch Limited Partnership, successor in interest to Joseph A. McCarthy and Muriel M. Harris as successor Trustees of the RLM Trust and MGM Trust ("McCarthy's), to negotiate an amendment to two Declaration of Covenants, Conditions & Restrictions Agreements ("CC&Rs") by an among McCarthys, City of San José, and

Browning-Ferris Industries of California, Inc. and International Disposal Corp. of California, Inc., dated April 17, 1998 and recorded on April 28, 1998 and July 28, 2000, respectively, to provide McCarthys a process for early termination of the CC&Rs following completion of specific conditions; and

(2) Modify the Memorandum of Understanding to specify that the payment from McCarthys to the City for release of the CC&R be based on the fair market value of the property originally purchased by the City from McCarthys or $6,500,000, whichever is higher, and to include in proposed odor implementation plan that the odor fenceline be established at the Regional Wastewater Facility property line; and

(3) Negotiate and Execute amendment(s) to the CC&Rs with the consent of all parties and their successors or assigns to the CC&Rs to establish a process for early termination contingent on the conditions set forth in the Memorandum of Understanding, as modified.

8. REPORTS

A. Open Purchase Orders Greater Than $100,000 (including Service Orders)

The attached monthly Procurement and Contract Activity Report summarizes the purchase and contracting of goods with an estimated value between $100,000 and $1.08 million and of services between $100,000 and $270,000.

9. MISCELLANEOUS

A. The next TPAC meeting is March 12, 2015, at 4:30 p.m. City Hall, Room 1734.

10. OPEN FORUM

11. ADJOURNMENT

NOTE: If you have any changes or questions, please contact Adriana Márquez, Environmental Services, (408) 975-2547.

To request an accommodation or alternative format for City-sponsored meetings, events or printed materials, please contact Adriana Márquez (408) 975-2547 or (408) 294-9337 (TTY) as soon as possible, but at least three business days before the meeting/event.

Availability of Public Records. All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, that are distributed to a majority of the legislative body will be available for public inspection

MINUTES OF THE
SAN JOSE/SANTA CLARA
TREATMENT PLANT ADVISORY COMMITTEE
City Hall, City Manager's Office, 17th Floor, Room 1734
Thursday, December 11, 2014 at 4:30 p.m.

1. ROLL CALL

Minutes of the Treatment Plant Advisory Committee convened this date at 4:30 p.m. Roll call was taken, with the following members in attendance:

Committee members: Committee Chair Chuck Reed, Committee Members: Jose Esteves, Jamie Matthews, Pat Kolstad, Teri Killgore(alternate), Steven Leonardis

Absent: Committee Members: Alex Gurza, Madison Nguyen, Kansen Chu, John Gatto

2. APPROVAL OF MINUTES

A. November 13, 2014
Item 2.A was approved.
Ayes – 6 (Reed, Esteves, Matthews, Kolstad, Killgore, Leonardis)
Nays – 0
Absent – 4

B. November 20, 2014
Item 2.B was approved.
Ayes – 6 (Reed, Esteves, Matthews, Kolstad, Killgore, Leonardis)
Nays – 0
Absent - 4

David Wall spoke on this item

3. UNFINISHED BUSINESS/REQUEST FOR DEFERRALS

4. DIRECTORS REPORT

A. Directors Verbal Report:
- Monthly Progress Report

5. AGREEMENTS/ACTION ITEMS

A. Memorandum of Understanding between the City of San José and McCarthy to Amend CC&Rs for the McCarthy Property Adjacent to the San José – Santa Clara Regional Wastewater Facility

Staff Recommendation: Approval of a Memorandum of Understanding between the City of San Jose and Joseph A. McCarthy and Muriel M. Harris as successor Trustees of the RLM Trust and MGM Trust ("McCarthys") to negotiate an

amendment to two Declaration of Covenants, Conditions, Restrictions & Agreements ("CC&Rs") by and among McCarthy's, City of San Jose, and Browning-Ferris Industries of California, Inc. and International Disposal Corp. of California, Inc., dated April 17, 1998 and recorded on April 28, 1998 and July 28, 2000, respectively, to provide McCarthy's a process for early termination of the CC&Rs following completion of specific conditions.

The proposed Memo of Understanding to Amend the CC&Rs is scheduled for Council consideration on December 16, 2014.

Motion by Committee Member Esteves, second by Committee Member Leonardis to approve item 5.A. Committee Member Matthews opposed item 5.B.

Ayes – 5 (Reed, Esteves, Kolstad, Killgore, Leonardis)
Nays – 1 (Matthews)
Absent - 4

David Wall spoke against item 5.A.

6. OTHER BUSINESS/CORRESPONDENCE

7. STATUS OF ITEMS PREVIOUSLY RECOMMENDED FOR APPROVAL BY TPAC

Sanitary Sewer Flow Study Update

Staff Recommendation:

1. Accept the staff report regarding the attached Sanitary Sewer Flow Study and cross reference to the full Council on December 2, 2014; and
2. Recommend to the full Council approval of the proposed changes and policy recommendations for future updates to the revenue program for the San José-Santa Clara Regional Wastewater Facility. Use West Valley Sanitation District flow date to estimate flow rates for County Sanitation District 2-3, Cupertino Sanitary District and Burbank unless specific flow data is recorded from those agencies by November 30, 2014.

The proposed update on the Sanitary Sewer Flow Study is scheduled for Council consideration on January 27, 2015.

David Wall spoke against this item.

B. Odor Control Strategy for Regional Wastewater Facility

Staff Recommendation: Approve the proposed odor control strategy at the San José-Santa Clara Regional Wastewater Facility .

TPAC Recommendation: Approve the proposed odor control strategy at the San José-Santa Clara Regional Wastewater Facility and review the cost of setting the southern fenceline at Highway 237.

The proposed odor control strategy at the San José-Santa Clara Regional Wastewater Facility, along with the additional TPAC recommendations, was approved by Council on December 2, 2014.

C. Biosolids Transition Strategy Update

Staff Recommendation: Accept this staff report that provides an update on the Biosolids Transition Strategy for the San José-Santa Clara Regional Wastewater Facility.

The proposed update on the Biosolids Transition Strategy was approved by Council on December 2, 2014.

D. Agreement with Vitol, Inc. for the Purchase of California Carbon Allowances

Staff Recommendation: Ratify City Council adoption of a resolution to authorize the City Manager to execute an agreement between the City of San José and Vitol, Inc. for the purchase of California Carbon Allowances for the San José - Santa Clara Regional Wastewater Facility as part of the California Cap-and-Trade Program for an amount not to exceed $306,605.25.

The proposed agreement with Vitol was heard and approved by Council on October 28, 2014.

E. Biosolids Transition Strategy

Staff Recommendation: Approve the Biosolids Transition Strategy for the San José-Santa Clara Regional Wastewater Facility.

TPAC Recommendation:
1. Proceed with the TPAD upgrade;
2. Defer thermal and greenhouse drying facilities; and
3. Bring other recommendations back along with a revised timeline in fall 2015 after the odor strategy is completed and costs are calculated.

The proposed Biosolids Transition Strategy was heard by Council on December 2, 2014 and the following action was taken:

1. **Proceed with TPAD;**
2. **Defer the thermal drying and greenhouse drying facilities; and**
3. **Bring back all other recommendations in spring 2015, once additional odor modeling and odor control cost information on the biosolids transition is available.**

Items 7.A,B,C,D, and E were approved to note and file.

8. REPORTS

A. Open Purchase Orders Greater Than $100,000 (including Service Orders)

The attached monthly Procurement and Contract Activity Report summarizes the purchase and contracting of goods with an estimated value between $100,000 and $1.08 million and of services between $100,000 and $270,000.

Item 8.A was approved to note and file.

9. MISCELLANEOUS

A. The next TPAC meeting is January 8, 2014, at 4:30 p.m. City Hall, Room 1734.

10. PUBLIC COMMENT

David Wall spoke about various items.

11. ADJOURNMENT

A. The Treatment Plant Advisory Committee adjourned at 4:51 p.m.

Chair
Treatment Plant Advisory Committee

San José-Santa Clara Regional Wastewater Facility

Capital Improvement Program
Monthly Status Report for December 2014

February 5, 2015

This report provides a summary of the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (Wastewater Facility or RWF) for the period of December 2014.

Report Contents

Project Delivery Model 2
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Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram 13
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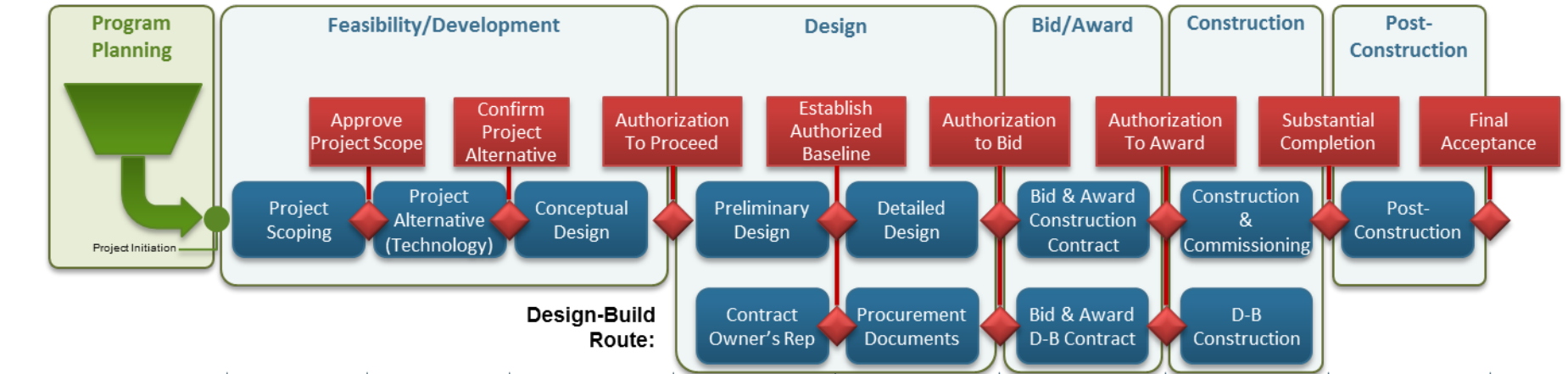
Project Delivery Model



Active Projects

Design-Bid-Build

Feasibility/Development			Design			Bid/Award	Construction	Post-Construction
Adv. Facility Control and Meter Repl. ***Construction-Enabling Improvements*** Outfall Bridge and Levee Improvements	Facility Wide Water Systems ***Headworks Critical Improvements*** Headworks Improvement New Headworks ***Nitrification Clarifiers Rehab.***	Plant Instrument Air System Upgrade	Digester & Thickener Facilities Upgrade Iron Salt Feed Station				A5-A6 Nitrif. Mag. Meter & Valve Repl. BNR2 Clarifiers Guardrail Repl. DCS Upgrade/Repl. Digester Gas Storage Repl. Filtration Bldg.B2 & B3 Pipe & Valve Repl. Fire Main Repl. – Ph. III Handrail Repl. – Phase V Training Trailer Repl.	DCS Fiber Optics Exp. ***RWF Street Treatment – Phase III***

Design-Build

Biosolids Transition Projects	Digested Sludge Dewatering					Cogeneration Facility	Digester Gas Compressor Upgrade Emergency Diesel Generators	

Key
Stage Gates
Stages

Note: Projects shown in bold and italics have moved phase in the reporting period

Program Summary

December 2014

In 2008 the Wastewater Facility undertook a Plant Master Plan (PMP) effort which ultimately resulted in its adoption in November 2013. The Project Validation process held between October 2013 and January 2014 reviewed the projects identified in the Plant Master Plan in order to develop a five-year and ten-year CIP. This monthly report provides a summary of the progress and accomplishments of the CIP for the month of December 2014 within Fiscal Year 2014-2015.

In the month of December, the program team finished out 2014 strongly. We continued to move studies and projects through stage gates of the Project Delivery Model (PDM) process (see figure, inside of front cover). In particular, we saw the Nitrification Clarifier Rehabilitation project and Traffic Circulation and Impacts Study move forward through the "Approve Project Scope" stage gate. We continued work on estimating our staffing needs for FY 15-16, focusing on finalizing the required City staffing levels. We moved forward with the design consultant procurement for the Headworks Improvements and New Headworks projects. We began preparing procurement documents for the Facility-wide Water Systems Improvements project.

A number of studies proceeded, including significant efforts on the Odor and Corrosion Control Study and Architectural Guidelines Study. We finalized our Project Delivery Method memo, which we will use to recommend a delivery method (design-bid-build vs. design-build) for individual projects. We continued to develop our approach for program funding, including the use of the Clean Water State Revolving Fund (SRF).

Our environmental team continued to prepare for increased levels of construction, including coordination of our mitigation monitoring and reporting program (MMRP), a requirement of the Plant Master Plan Environmental Impact Report. We continued to evaluate our overall CIP schedule, with a workshop held on December 3rd to analyze key steps (and associated schedule impacts) during the feasibility/development phase of project delivery (e.g., pilot testing, condition assessments). Updated schedules are being used as input to our 5 year CIP budget. Staff responded to questions from potential proposers regarding the Request for Qualifications to prequalify design-builders for the Cogeneration Facility.

We worked intensely with RWF O&M staff to draft a Facility Operations Plan (FOP). The FOP outlines how unit processes are operated within the RWF during normal and peak flow and loading conditions. It also contains a one year look-ahead, identifying how construction of capital and maintenance projects may impact operations.

At the December 2nd City Council meeting, we presented an update on the Biosolids Transition Strategy and Odor and Corrosion Control Study. Council approved implementing temperature-phased anaerobic digestion (TPAD) as part of the Digester and Thickener Facilities Upgrade project and deferring the Thermal Drying Facility and Greenhouse Demonstration projects. Council also concurred with TPAC recommendation to postpone the Digester Sludge Dewatering project until fall 2015 when the Odor and Corrosion Study has been completed. However, Council asked the staff to return with the recommendations earlier in spring 2015 when odor and cost information specific to the Biosolids transition would be available.

Look Ahead

In January, we will continue to move forward on numerous efforts related to design consultant procurement, including the Headworks Improvements and New Headworks projects. The Cogeneration Facility design-build procurement will also continue. Building on previous efforts, we will develop a "stage page" interface for our consultant procurement efforts. The stage page provides staff more intuitive access to our various PDM requirements and references. Stage gate meetings will be held for the Filter Rehabilitation and Iron Salt Feed Station projects.

Our resourcing work will continue, with a shift to analyzing overall staffing needs in FY 15-16 (City and consultant staff). We will finalize our interim guidance on plant automation and communicate that to all staff. This interim guidance will help align existing projects with the direction being developed in the on-going Automation Master Plan.

Our biosolids team will work on a revised Biosolids Transition Strategy, based on the input received from TPAC and City Council in December.

Program Highlight – Program Execution Plan

The Program Execution Plan (PEP) is the master guidebook that describes the processes and requirements for implementing the CIP. The PEP serves as the User Manual for all staff, including City, Consultant and Contractor staff working on the program team. It resides on the CIP Portal, the collaborative, web-based work environment that is used by the CIP team (see Figure 1).

Successful delivery of the CIP requires three key components--an organization with the right people in the right positions; defined, successful and repeatable processes that promote successful project implementation; and application of systems that support project implementation and provide for measurement of performance. The PEP is organized into six sections to align to these three components:

- Section 1 – About the Program: Summary information regarding the program, including overall mission, vision and goals, project lists, program schedule, budget and annual work plan information.
- Section 2 – People: Defines the program's organization structure, delineated roles and responsibilities, authority matrix and contact list.
- Section 3 – Plans and Procedures: Provides the plans and procedures for managing program-level activities.
- Section 4 – Project Delivery Procedures: Provides the plans and procedures for managing project-level activities.
- Section 5 – Systems: Summarizes systems and tools required on all CIP projects.
- Section 6 – Program Strategies: Program-wide strategy documents to guide the direction of the program and the decisions made during project execution.

The processes and systems outlined within the PEP are intended to provide for consistency in program activities and functions. While these processes and systems will retain some rigidity to provide for this consistency, the PEP will remain a "living" document, allowing for changes and enhancements as the program evolves.

Figure 1—Program Execution Plan page on the CIP Portal

Program Performance Summary

Seven KPIs have been established to measure the overall success of the CIP. Each KPI represents a metric which will be monitored on a regular frequency. Through the life of the CIP, KPIs will be selected and measured which best reflect the current maturity of the program. The target for the seventh KPI "Staffing Level" KPI will be established as part of the analysis of future staffing needs.

Program Key Performance Indicators – Fiscal Year 2014-2015

KPI Description	Target	Actual	Status	Trend	Measurement
Schedule	85%	100% (2/2)[1]			Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. ***Target: 85% of projects delivered within 2 months of approved baseline schedule or better.***
Budget	90%	0% (0/1)			Percentage of CIP projects that are completed within the approved baseline budget. ***Target: 90% of projects delivered are within 101% of the baseline budget.***
Expenditure[2/3]	≥$95.8M	$97.6M			Total CIP actual + forecast committed cost for the fiscal year compared to CIP fiscal year budget. ***Target: Forecast committed cost meets or exceeds 60% of budget for Fiscal Year 14/15 (60% of $159.7M= $95.8M)***
Procurement	100%	100% (7/7)			Number of actual + forecast consultant and contractor procurements compared to planned for the fiscal year. ***Target: Forecast /actual procurements for fiscal year meet or exceed planned.***
Safety	0	0			Number of OSHA reportable incidents associated with CIP construction for the fiscal year. ***Target: zero incidents.***
Environment/Permits	0	0			Number of permit violations caused by CIP construction for the fiscal year. ***Target: zero violations.***
Staffing Level[4]	TBD	TBD	TBD	TBD	Percentage of authorized staffing level ***Target: to be determined***

KEY:

Cost:	 **Meets or exceeds KPI target**	 **Does not meet KPI target**

Notes

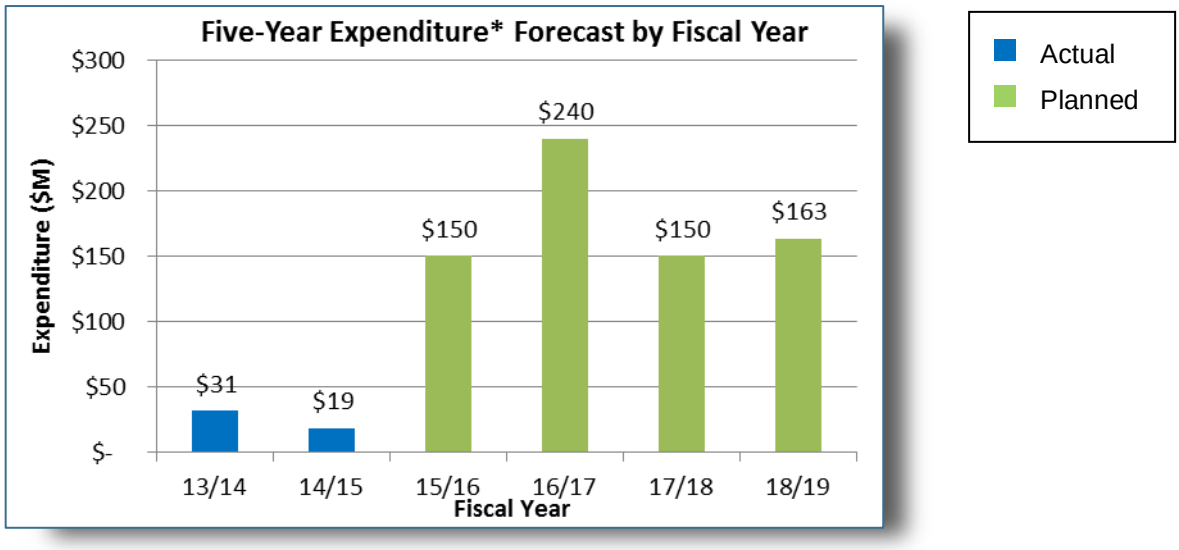
1. For the Schedule KPI, the number of delivered projects increased from 1 to 2. This count includes RWF Street Treatment – Phase III, which reached Beneficial Use on November 10, 2014.
2. FY14-15 budget excludes reserves, ending fund balance, South Bay Water Recycling, Public Art and Urgent and Unscheduled Rehabilitation items
3. The Expenditure KPI Target Forecast percentage has been adjusted to reflect the decision to report against the total program budget including contingency (previously the total budget did not include contingency allowance).
4. Staffing level KPI measured quarterly; all other KPIs measured monthly.

Program Cost Performance

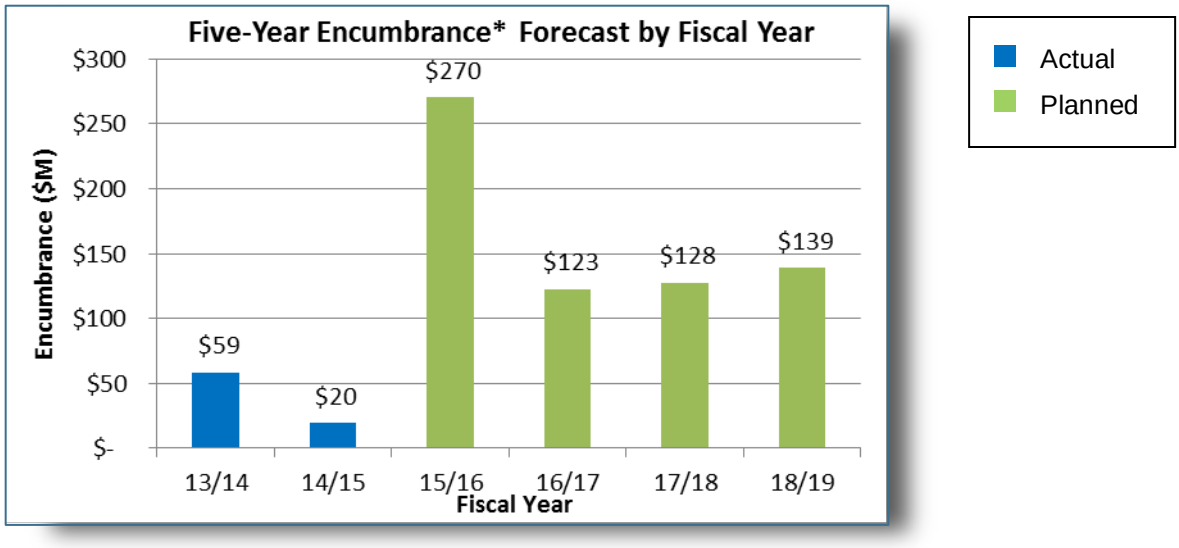
This section provides a summary of CIP cost performance for all construction projects and non-construction activities for FY14-15 and the Five-Year CIP.

Adopted 2015-2019 CIP Expenditure and Encumbrances

To accommodate the proposed increase in expenditures and encumbrances over the next five years, the City is developing a long-term financial strategy to fund the needed, major capital improvements while minimizing the impact to ratepayers.



*Expenditure defined as: Actual cost expended associated with services and construction of physical asset which may include encumbered amounts from previous years



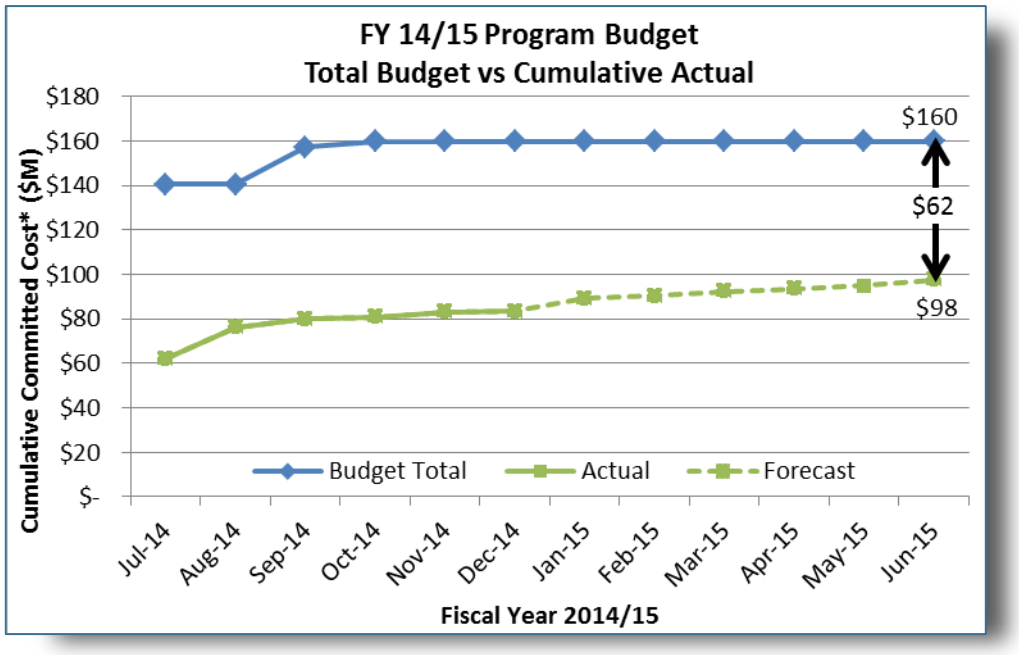
*Encumbrance defined as: Financial commitments, such as purchase orders or contracts, which are chargeable to an appropriation and for which a portion of the appropriation is reserved

Fiscal Year 2014-2015 Program Budget Performance

The fiscal year program budget is $160 million. The budget amount of $160 million represents the 2014-2015 budget of $107 million plus carryover of $53 million. The budget amount excludes reserves, ending fund balance, South Bay Water Recycling, Public Art and Urgent and Unscheduled Rehabilitation items. The budget now includes contingency allowance, which had been excluded from the amount shown in the August report.

The projected year-end variance of approximately $62 million is primarily due to the following activities that are now expected to occur in FY15-16:

- Award of the Cogeneration Facility design-build contract
- Award of construction contracts for the Iron Salt Feed Station, Plant Instrument Air System Upgrade, and Switchgear S40/G3 Relay Upgrade projects
- Award of design contracts for critical rehabilitation work in the Headworks Improvements and Nitrification Clarifier Rehabilitation projects



*Committed costs are expenditures and encumbrance balances, including carryover (encumbrance balances from the previous fiscal year).

Project Performance

There are currently 12 active projects in the construction or post-construction phase with a further 13 projects in feasibility/development, design or bid and award phases (see PDM graphic at the front of this report). All active projects are listed in the tables below. Projects in the construction phase have cost and schedule baselines established and are monitored using the City's Capital Project Management System (CPMS). These projects have green/red icons included in the table below to indicate whether they are on budget and schedule using the CPMS data as a source.

Project Performance – Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date[1]	Cost Performance [2]	Schedule Performance [2]
Distributed Control System (DCS) Fiber Optics Network Expansion	Post-Construction	May 2014		
RWF Street Rehabilitation - Phase III	Post-Construction	Nov 2014		
A5-A6 Nitrification Mag. Meter & Valve Replacement	Construction	Mar 2015		
Filtration Building B2 & B3 Pipe & Valve Replacement	Construction	Mar 2015		
BNR-2 Clarifier Guardrail Replacement	Construction	Apr 2015		
Fire Main Replacement - Phase III	Construction	Apr 2015		
Handrail Replacement - Phase V	Construction	May 2015		
Training Trailer Replacement	Construction	May 2015		
Digester Gas Storage Replacement	Construction	Jun 2015		
DCS Upgrade/Replacement	Construction	Jun 2016		
Digester Gas Compressor Upgrade	Construction	Jul 2016		
Emergency Diesel Generators	Construction	Aug 2016		

KEY:

Cost:	**On Budget**	**>1% Over Budget**
Schedule:	**On Schedule**	**>2 months delay**

Notes

1. Beneficial Use is defined as when the work is sufficiently complete, in accordance with the contract documents, so that the City can occupy or use the work. Beneficial use dates are being reviewed as part of project schedule reviews.
2. An explanation of cost and schedule variances on specific projects identified in this table is provided on page 10.

Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date[1]
Cogeneration Facility	Procurement	Sep 2018
Iron Salt Feed Station	Design	Apr 2017
Digester & Thickener Facilities Upgrade	Design	Sep 2018
Construction-Enabling Improvements	Feasibility/Development	Aug 2016
Headworks Critical Improvements	Feasibility/Development	Feb 2017
Plant Instrument Air System Upgrade	Feasibility/Development	Feb 2017
Adv. Facility Control & Meter Repl. Ph. 2	Feasibility/Development	Jun 2019
Digested Sludge Dewatering Facility	Feasibility/Development	Jun 2020
Headworks Improvements	Feasibility/Development	Jun 2020
Outfall Bridge and Levee Improvements	Feasibility/Development	Jul 2020
Facility-wide Water Systems Improvements	Feasibility/Development	Jul 2021
Nitrification Clarifiers Rehabilitation	Feasibility/Development	Feb 2022
New Headworks	Feasibility/Development	Mar 2022

Notes

1. Beneficial Use is defined as when the work is sufficiently complete, in accordance with the contract documents, so that the City can occupy or use the work. Beneficial use dates are being reviewed as part of project schedule reviews.

Significant Accomplishments

Cogeneration Facility

The Request for Prequalification of Design-builders was issued in November. A Pre-Bid conference was held on December 2, and attracted more than 40 interested parties. Submissions are due February 3, 2015.

Digester and Thickener Facilities Upgrade

The project team conducted design review workshops in November and December. The 30% design review comments and recommendations on the draft Preliminary Design Report were submitted to Brown and Caldwell. Additional workshops will be conducted in January to further define supporting facilities (e.g. biogas piping, screening facility layout, and waste gas burner upgrades). In addition, the project team received approval to proceed with TPAD at December 2nd Council meeting, as noted in the Program Summary section.

Digester Gas Compressor Upgrade

Anderson Pacific Engineering Construction has completed the installation of the 42 drilled piers for the new compressor building. The City has completed the review of the gas compressor package submittal. In January 2015, the contractor will begin the construction of the base foundation for the new gas compressor building.

Studies

Several key programmatic study workshops and meetings were conducted with Facility and CIP staff this month on the Aeration and Biosolids Assessment, Odor and Corrosion Control Assessment, Automation Master Plan, Yard Piping Condition Assessment, Heating and Cooling System Evaluation, Architectural Guidelines, and Facility Wide Process Risk Assessment. A number of Draft and Final Technical Memoranda were issued on these studies this month.

A major wastewater sampling exercise was successfully carried out at the Facility over a two week period in December as part of the Aeration and Biosolids Assessment. The results from the sampling will be used to accurately characterize the wastewater characteristics and facility operation to allow a full process model of the treatment plant to be built and calibrated.

Recommendations on the Biosolids Transition Strategy were made to City Council on December 2, 2014.

Traffic Circulation and Impacts passed through CIP Scoping Stage Gate 1 and award is anticipated next month. Flood Protection Study continued through contractual negotiations and is anticipated to pass through Stage Gate 1 and commence within the next two months.

Explanation of Project Performance Issues

A5-A6 Nitrification Mag. Meter & Valve Replacement

In September 2014, during startup, the project discovered that the actuators that had been specified and installed were incompatible with the available power supply. Engineering staff determined it would be more costly to modify the system than to order and install compatible actuators. In addition, O&M staff requested that the actuators match those used in the other clarifiers. The contractor has submitted a proposal for the requested equipment. Beneficial use is expected by the end of March 2015.

Handrail Replacement - Phase V

For safety reasons, handrail replacement to date has been accomplished with empty aeration basins. November through April is designated as the rainy season during which O&M staff need to have aeration basins available in the event of heavy rains. As a result, handrail replacement work around the aeration basins has been suspended until the end of April 2015. The contractor is expected to resume the work when additional basins can be made available. Beneficial Use is expected by late May, 2015.

Project Profile

Headworks

The headworks process is the first treatment process raw sewage encounters at a wastewater facility. The purpose of the headworks is to remove large objects (screenings), heavy inorganic material (grit), and to pump or direct the sewage so it can flow through subsequent processes. Since it is at the beginning of the treatment process and its effectiveness can have an impact to downstream treatment processes, it is one of the most critical processes at a wastewater facility.

The RWF currently has two functioning headworks, Headworks 1 and Headworks 2. Headwork 1 was built in several phases in the 1960's and 1970's. Headworks 2 was completed in 2008 and was originally intended to handle wet weather (storm) flows into the RWF. Headworks 2 is now also being used to supplement Headworks 1 during wet weather periods or when needed during dry weather periods to allow maintenance crews to perform maintenance on Headworks 1. However, Headworks 2 is still in need of additional improvements to enable it to be relied upon for duty operation. Together, the current headworks system is designed to handle up to 400 million gallons per day of sewage.

Headworks 1 is nearing the end of its useful life and the RWF will replace Headworks 1 with a new headworks (Headworks 3), as recommended by the Plant Master Plan and further evaluated in the 2014 Headworks Expansion Feasibility and Operational Review Report. Additionally, the project will "de-clutter" portions of the complicated pipe network at the front end of the RWF, provide comprehensive flow management planning to accommodate future increases in sewage and stormwater flows and include odor control technologies as needed. Currently, there are three headworks projects budgeted and scheduled for design and construction to accomplish the needed headworks improvements. These projects include:

1. Headworks Critical Tasks – This project includes installation of critical improvements to Headworks 2 and the Emergency Basin Overflow Structure (EBOS) to resolve immediate safety and operational reliability issues. This project is scheduled to be complete in February 2017.
2. Headworks Improvements – This project includes construction of; 1) non-critical reliability improvements to enable Headworks 2 to be reliably used as a duty headworks, 2) re-route flows that directly feed into Headworks 1 to other receiving locations to enable Headworks 1 to be completely dewatered for any repairs and eventual decommissioning of Headworks 1 and 3) perform improvements needed to Headworks 1 to keep is functioning adequately until the new headworks is effectively operating. The Headworks Improvements project is scheduled to be completed in June of 2020.
3. New Headworks – This project includes developing new and evaluating the existing Headworks 3 layout alternatives (currently four alternatives), assisting the City with selection of an alternative and performing design and assistance to the City during construction of the chosen alternative. The project also includes the preparation of a Flow Management Plan for the entire RWF. Headworks 3 is scheduled to be commissioned in March of 2022.

The project team is working to procure a planning and design consultant for the project. The design consultant award is anticipated in September 2015. Project Budget: $120,900,000.

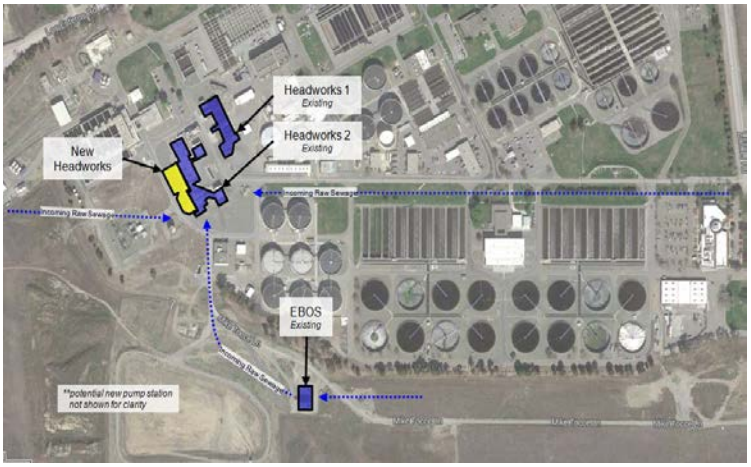


Figure 2— Headworks Location Plan

Figure 3 – Existing Headworks 2 Facility

Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

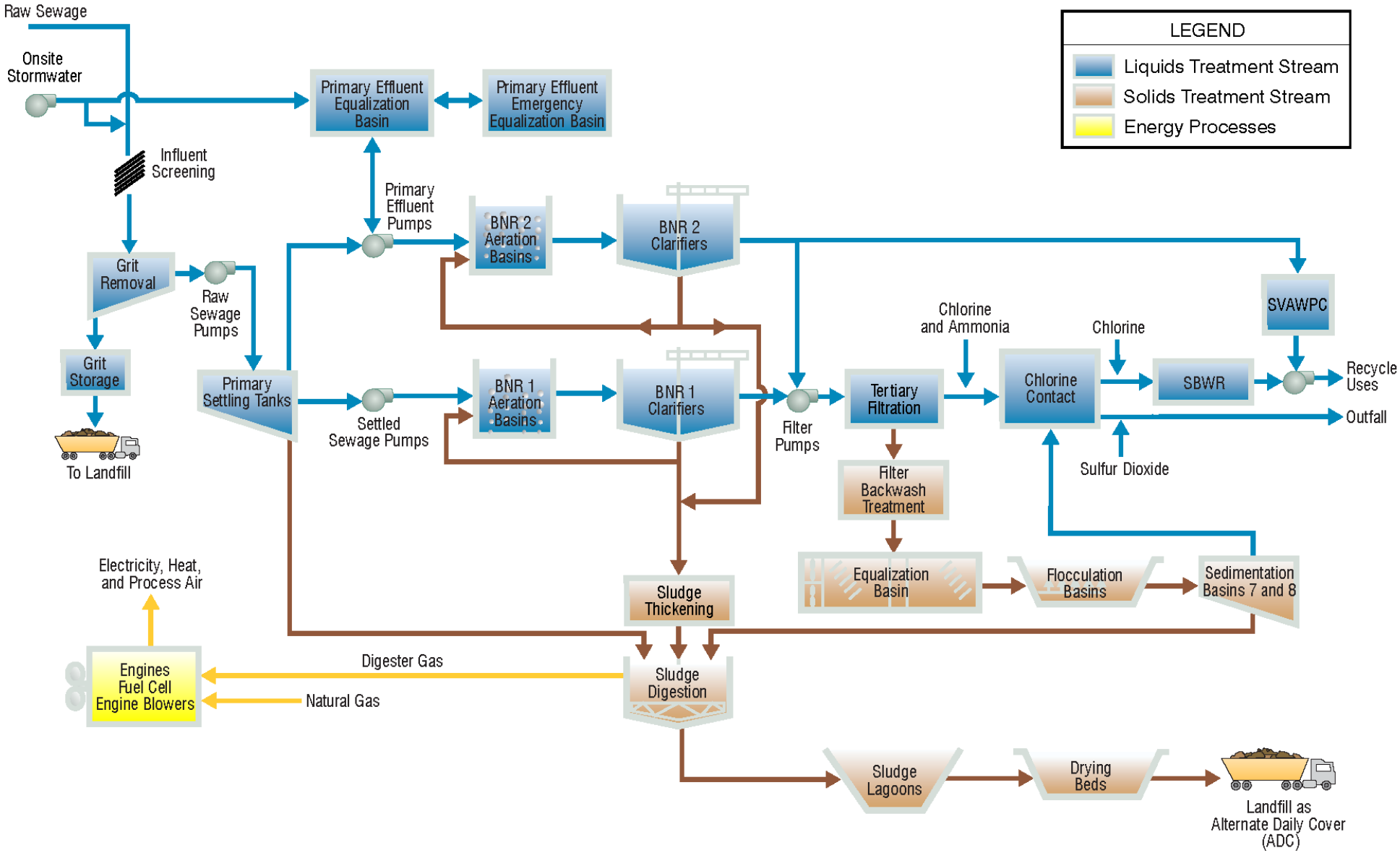


Figure 4—Current Treatment Process Flow Diagram

Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

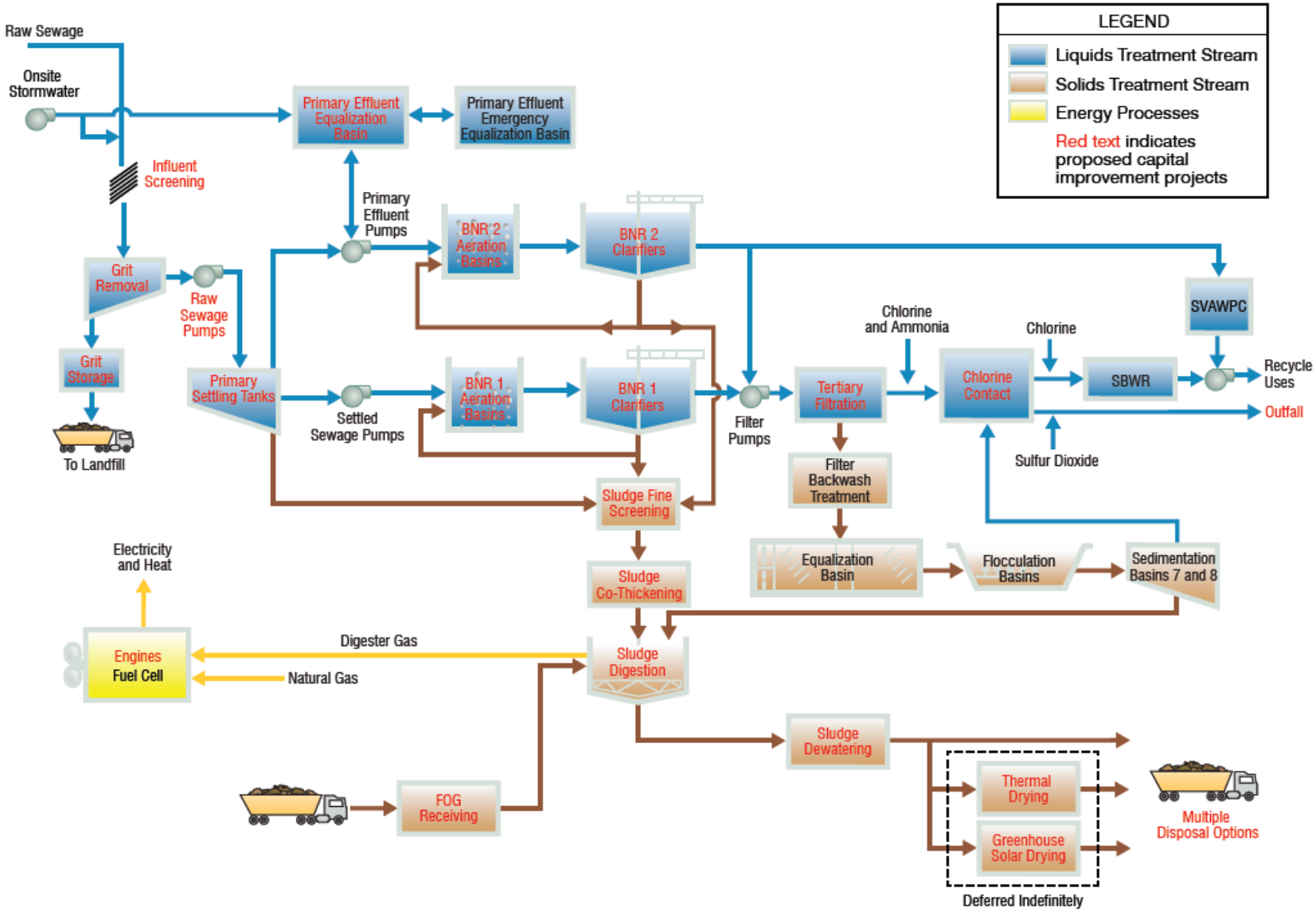


Figure 5—Proposed Treatment Process Flow Diagram

Active Construction Projects – Aerial Plan

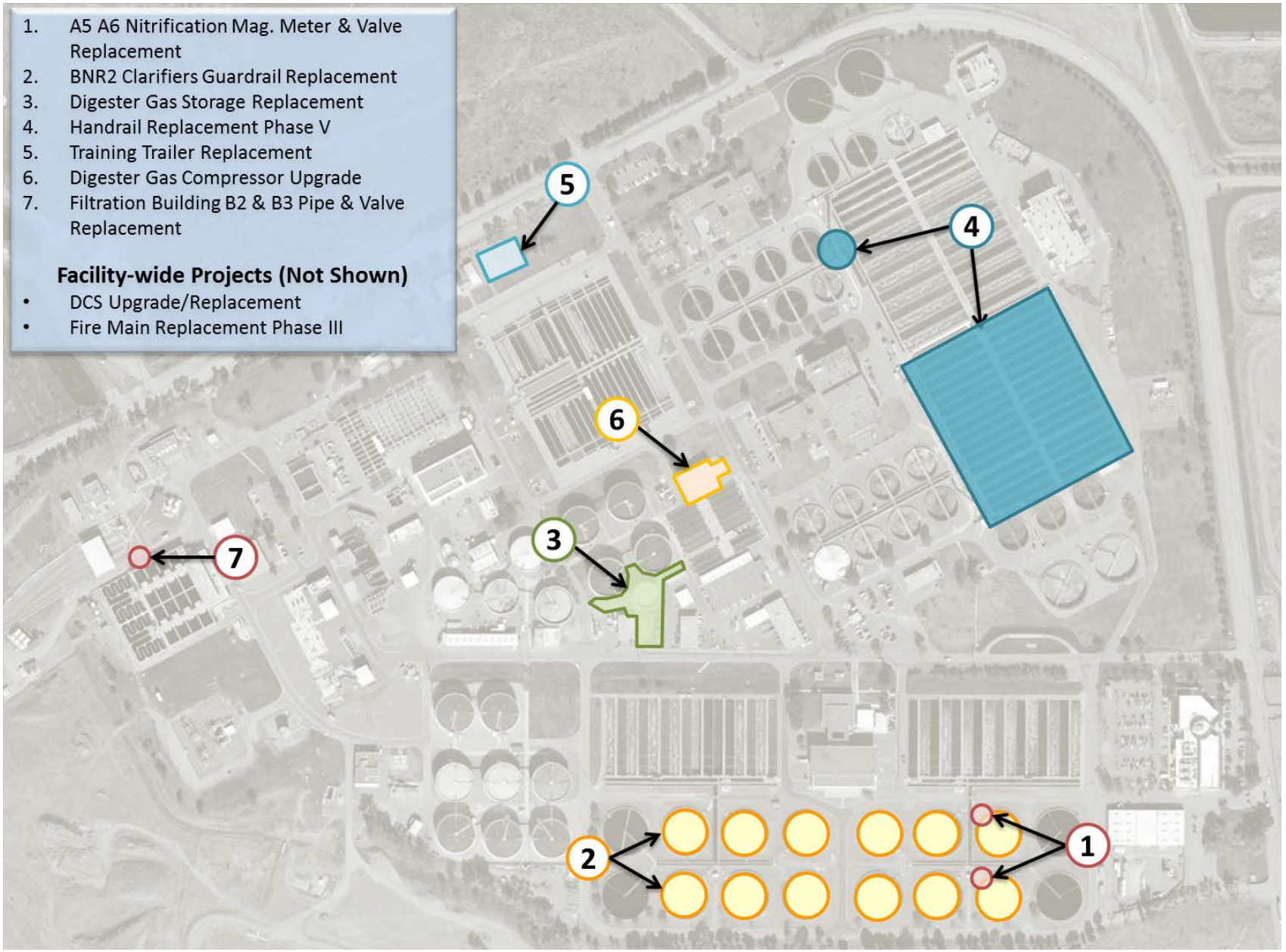


Figure 6—Active Construction Projects

COUNCIL AGENDA: 3/3/15
ITEM:

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Kerrie Romanow

SUBJECT: **SANITARY SEWER FLOW STUDY UPDATE**

DATE: February 9, 2015

Approved D. DSyL Date 2/10/15

REPLACEMENT

REASON FOR REPLACEMENT

The Sanitary Sewer Flow Study Update memo and consultant "City of San Jose Phase 2 Flow and Load Study Technical Memorandum No. 2" report were presented to the Transportation and Environment Committee (T&E) on November 3, 2014, and to the Treatment Plant Advisory Committee (TPAC) on November 13, 2014. At the November 13, 2014 meeting, TPAC directed staff to obtain and review water consumption data for County Sanitation District Nos. 2-3 (CSD 2-3), Cupertino Sanitary District (CuSD), and Burbank Sanitary District (Burbank), and to update the sanitary sewer flow estimates for each of these agencies. In addition, this replacement memo clarifies information in Table 5: FY 14-15 Treatment Plant O&M Cost Sharing Impact using Updated Flows and Household Sizes. This replacement memo and updated Sanitary Sewer Flow Study report includes that updated information.

RECOMMENDATION

1. Accept the updated staff report regarding the attached Sanitary Sewer Flow; and
2. Approve the proposed changes and policy recommendations for future updates to the revenue program for the San José-Santa Clara Regional Wastewater Facility.

OUTCOME

Approval of the staff recommendations would update the assumptions regarding wastewater flow and household sizes for the cities of San José and Santa Clara and the Tributary Agencies; and establish a process for regular updates to assumptions for allocating wastewater treatment costs between the various agencies.

EXECUTIVE SUMMARY

In August 2012, the Auditor issued a report entitled "Environmental Services: A Department at a Critical Juncture," and recommended (1) updating the assumptions for residential sanitary sewer rates, and (2) establishing a policy for periodic updates to these assumptions. The City retained Carollo Engineers (consultant) to conduct a sewer flow study. The flow study involved a detailed flow analysis for residential customers, a strength analysis for residential and non-residential customers, and a mass balance comparing estimated sewage discharges with influent to the San José-Santa Clara Regional Wastewater Facility[1] (Wastewater Facility).

Residential flow assumptions for all agencies, with the exception of West Valley Sanitation District (WVSD), have not been updated since 1975. Based on the findings of this study and prior studies, the current San José-Santa Clara Regional Wastewater Facility Revenue Program (revenue program) residential flow assumptions should be updated. Staff recommends updating these assumptions using a unique flow assumption (gallons per person per day) and household density (number of persons per household) for each agency and customer classification. This approach provides the best representation of sewer flows, and leads to a more accurate allocation of cost between agencies. It also uses a methodology that is simple to update based on future census data and water consumption records.

To create a unique set of flow assumptions for each agency, the consultant evaluated almost 666,000 water consumption records of residential customers to estimate sewer flows. The Technical Advisory Committee (TAC), which is comprised of staff from San José, Santa Clara, and the Tributary Agencies, discussed the approach at a workshop on October 1, 2014, the Phase 2 Sanitary Sewer Flow Study report was reviewed by T&E on November 3, 2014 and by TPAC on November 13, 2014. The flow assumptions for each jurisdiction were based on winter water consumption data for 2010, 2011 and 2012.

The consultant performed a mass balance, which compares the measured flow Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), and Ammonia (NH_3) entering the Wastewater Facility to the calculated values that result from the current rate calculation process, as well as the calculated values from the proposed alternatives. The consultant found that the actual strength parameters from the influent were not consistent with the assumptions under the current Wastewater Facility revenue program. Staff recommends that San José, Santa Clara and the Tributary Agencies conduct a wastewater strength-sampling program. Until a study has been completed to determine actual residential wastewater strengths, staff recommends using the current concentrations, which are consistent with standard industry parameters and the State Water Resources Control Board Revenue Program Guidelines.

Unlike the residential flow, the non-residential water consumption data is reviewed on an annual basis in order to update individual non-residential customer flow, and strength amounts are

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[1] *The legal, official name of the facility remains San Jose/Santa Clara Water Pollution Control Plant, but beginning in early 2013, the facility was approved to use a new common name, the San José-Santa Clara Regional Wastewater Facility.*

updated pursuant to the Revenue Program Guidelines approved commercial user strength characteristics. Updating non-residential flow and strength parameters would require a more detailed flow study and extensive sampling of wastewater flows for each user type, therefore, Staff does not recommend any changes to the non-residential categories, flow or strength parameters at this time.

It is recommended that the revenue program assumptions be updated every ten years to ensure accuracy and equity. This may include a combination of updating the household densities used to estimate residential sewer flows based on the latest census information and review of water consumption data. It may also include updating residential and non-residential wastewater strength parameters based on more current loadings data.

BACKGROUND

In August 2012, the City Auditor released audit Report 12-06, Environmental Services: A Department at a Critical Juncture. The audit scope included a review of the Sanitary Sewer Use Charge (SSUC) and the allocation of costs to customers. The Auditor recommended updating assumptions driving sanitary sewer rates for residential customers, and establishing a policy to periodically evaluate assumptions that influence rates, including household size, daily per capita sewage flow, and housing stock composition. The Administration agreed with the recommendation.

The Environmental Services Department (ESD) completed a preliminary flow study for the Wastewater Facility for San José residential customers in February 2013. Due to the short time frame of the study and the lack of easily accessible data on water use trends for the entire service area, the findings were based on a limited dataset. In a March 2013 Information Memo to Council, ESD described plans to prepare and release an RFQ for a consultant to expand the study to include the entire Wastewater Facility service area, water consumption data for multiple years, and commercial sector data.

The City did not receive any proposals in response to an RFQ for a consultant released in July 2013. The RFQ was revised based on feedback from potential proposers, and the City received multiple proposals in response to a revised RFQ released in October 2013.

The City retained Carollo Engineers Inc. in March 2014 to perform a sanitary sewer flow and load (strength parameters) study for the entire service area of the Wastewater Facility. The Wastewater Facility capital and operating and maintenance costs are allocated to the Tributary Agencies based on their sanitary sewer flow and strength parameters (BOD), (TSS), (NH_3). The balance of the cost is shared by San José and Santa Clara based on each jurisdiction's share of the total assessed value for property in the two cities.

The first phase of the study was completed in May 2014. During this phase, the consultant compiled data pertinent to the sanitary sewer flow analysis work, reviewed the current revenue

program and customer classifications, reviewed wastewater strength parameters used in the current revenue program, identified reporting variations, and developed an approach to complete their analysis of sanitary sewer flow and strength data. Staff provided the T&E Committee a status report in June and to Council on August 5, 2014.

Staff also provided TAC, a draft report on the preliminary findings and recommendations on July 16, 2014. TAC agreed with the recommendation to proceed updating the residential flow and household values based on a consistent approach, and to proceed with second phase. The second phase of the study, conducted a detailed flow analysis for residential customers, a detailed flow and strength parameter analysis for residential and non-residential customers, and conducted a mass balance. This level of analysis was completed for the cities of San Jose, Santa Clara, and Milpitas, and for WVSD residential customers. Water consumption data was not available from Burbank, CSD Nos. 2-3, or CuSD when Phase II of the study was completed in October 2014, Phase II of the study was presented to TPAC on November 13, 2014, at which time, TPAC requested that Burbank, CSD Nos. 2-3 and CuSD provide their customer water consumption data to the consultant for analysis. The Phase III report and following analysis incorporates the analysis of the WVSD non-residential customer data, as well an analysis of the water consumption data from Burbank, CSD Nos. 2-3, and CuSD customers.

ANALYSIS

The revenue program is a cost recovery program which is subject to the State Water Resources Control Board (SWRCB) Revenue Program Guidelines. The sanitary sewer ratepayers supporting the Wastewater Facility are comprised of residential and nonresidential customers. Consequently, a change in the residential percentage of cost would necessarily impact the non-residential share of the cost. Staff determined through the flow study that the average household sizes (number of people per household) and residential flow per person have changed, resulting not only in a shift to each agencies' share of the Wastewater Facility operating and maintenance costs, but also a shift between residential and non-residential users. Since each agency establishes their own methodology for sewer rates, the impact of changes to the residential assumptions will vary between the agencies.

Flow Study Methodology and Analysis

The consultant engaged in four major sub-tasks: a detailed flow analysis for residential customers; a strength analysis for residential and non-residential customers; a mass balance comparing estimated sewage discharges with influent to the Wastewater Facility; and recommendations to update the wastewater flow and strength parameters used in the current revenue program.

Sewer rates are developed in conformance with the SWRCB "Revenue Program Guidelines for Wastewater Agencies," March 1998 edition (most recent edition), and in accordance with Proposition 218. The guidelines require that rates must recover costs of operations and maintenance (including replacement) from users of the system in proportion to the volume and

strength of sewage discharged. To assure that system users are charged equitably for service, the system's annual revenue requirements are allocated separately for both capital and operations and maintenance to the parameters of flow, BOD, TSS, and NH3. State guidelines allow residential users to be divided into single family, multiple family, and mobile home subgroups to allow for more refined cost allocations. Each classification has its own estimated flows and loadings for single family, multiple family, and mobile homes. All other users are classified as non-residential, and include Commercial, Institutional and Monitored Industries subgroups.

Residential Density

The revenue program has been using 1975 average countywide densities (number of people per household) of 3.37 people per household for single-family homes, 2.05 people per multi-family home, and 1.90 people per mobile home. Since 2006 and based upon a wastewater flow study conducted in 2005, WVSD uses average household sizes of 2.63, 2.46, and 2.41 respectively.

The current study uses updated population estimates for a five-year period from the 2012 American Community Survey (ACS) to update the average household size. Census Tract data from the 2012 ACS was used to estimate the densities for the various agencies.

On a countywide basis, household sizes for both multi-family and mobile home have increased substantially since 1975. The 2012 ACS data also shows a 32% variance across the agencies for average single-family household size, a 60% variance for multi-family household size, and a 67% variance for mobile home household size. Table 1 illustrates the residential densities (household sizes) used in the current revenue program (County 1975 and WVSD 2005) and the updated County and agency-specific densities (2012 ACS).

Table 1: Residential Household Sizes (Number of persons per unit, or "Density")

Housing Type	County (1975)	WVSD (2005)	County (2012)	Milpitas (2012)	San José (2012)	Santa Clara (2012)	Burbank (2012)	CSD 2-3 (2012)	CuSD (2012)	WVSD (2012)
Single Family	3.37	2.63	3.15	3.54	3.34	2.96	2.76	3.63	2.94	2.74
Multi Family	2.05	2.46	2.37	2.73	2.53	2.26	2.64	3.29	2.47	2.06
Mobile Home	1.90	2.41	2.71	2.24	2.97	2.28	-	2.73	-	1.78

Residential Flows

San José, Santa Clara, and the Tributary Agencies currently calculate the "flow component" of the revenue program based on an estimated flat rate flow or gallons per day per household (GPD/household). The methodology used for the flow assumption is (1) the gallons per capita per day (GPCD) flow rate, multiplied by the (2) the number of persons per household. All of the agencies, with the exception of WVSD, use 219 GPD for single family, 123 GPD for multi-family and 124 GPD for mobile homes. Since 2006 and based on a 2005 study, WVSD uses 184 GPD for single-family, 160 GPD for multi-family, and 157 GPD for mobile homes.

The Phase 2 and 3 studies updated residential flow assumptions by reviewing residential water consumption data during the winter months of January, February, and March. The assumption is that water consumption during the winter months would be primarily indoor consumption and best approximates residential sewer discharges. Three years of winter water consumption data (2010-2012) from Milpitas, San José, Santa Clara, Burbank, CSD 2-3, CuSD, and WVSD was analyzed to determine the flow rate per household.

In order to eliminate outliers in the water consumption data, the consultant considered two approaches: (1) a flow cap of 400 gallons per day/household for single-family dwellings and 300 gallons per day/household for multiple-family and mobile home dwellings; and (2) a dynamic Interquartile Range (IQR) cap. The 400GPD/household and 300GPD/household is approximately twice the median single-family, and multiple-family/mobile home flow rates of the surveyed agencies and attempts to eliminate anomalous account recordings; however, it does not recognize accounts that consume over those caps. A single cap of 400 GPD for single-family and 300 GPD for multiple-family and mobile home, were selected because using the caps has the advantage of consistency and does not favor one agency over another. Using the 400 GPD/household for single-family and 300 GPD/household for multiple-family and mobile flow caps also better reconcile with the influent flow at the Wastewater Facility. While statistically valid, the IQR method creates a different cap across agencies and customer classes and could be considered biased. For example, an agency with a significant amount of outdoor irrigators would have a higher average sewer discharge. The IQR method also results in higher average flows than we see at the Wastewater Facility. For these reasons, the consultant recommends the 400 GPD for single-family and 300 GPD for multiple-family and mobile home caps to be a reasonable method for eliminating unreasonably high data points that would otherwise skew the results.

Table 2 illustrates the updated gallons per person per day (GPCD) using county average household density, as well as illustrating updated residential flow per person using the 400 GPD/household cap for single-family and the 300 GPD/household cap for multiple-family and mobile homes, and agency-specific household density. Please see the "Flow Cap" section of the attached Technical Memorandum No. 3 for additional information.

Table 2: Residential flow per person (GPCD)

Housing Type	County (1975)	WVSD (2005)	County (2012)	Milpitas (2012)	San José (2012)	Santa Clara (2012)	Burbank (2012)	CSD 2-3 (2012)	CuSD (2012)	WVSD (2012)
Single Family	65	70	59	51	60	61	55	53	66	68
Multi Family	60	65	58	51	53	66	47	49	60	70
Mobile Home	65	65	51	63	51	-	-	-	-	65

The consultant evaluated various approaches to establishing assumptions to update the Revenue Program including: (1) the current methodology of using the average countywide densities and flows for all households (except WVSD); (2) using the countywide density and each agency's individual flow; and (3) using the countywide flow and each agency's individual density.

At an October 1, 2014 TAC workshop, staff from San José, Santa Clara, and the Tributary agencies discussed methodology options and agreed that using agency specific flow and densities would best allow for a more equitable cost allocation due to the variance in flow and household size between the various jurisdictions. Please see the "Updating Residential Flow Assumptions" section of the attached Technical Memorandum No. 3 for additional information.

Table 3 illustrates the updated gallons per household per day (GPD/household) for San José, Santa Clara, and the Tributary Agencies using county average household density, as well as illustrating updated residential flow per person using agency-specific household density. Table 4 illustrates the percentage change for household types.

Table 3: Proposed Residential flow per household (GPD/household = Density x GPCD)

Housing Type	County (1975)	WVSD (2005)	County (2012)	Milpitas (2012)	San José (2012)	Santa Clara (2012)	Burbank (2012)	CSD 2-3 (2012)	CuSD (2012)	WVSD (2012)
Single Family	219	184	186	181	200	181	152	192	194	186
Multi Family	123	160	137	139	134	149	124	161	148	144
Mobile Home	124	157	138	141	151	-	-	-	-	116

Density values (average household size) from Table 1; GPCD values from Table 2

Table 4: Change in Residential flow per household (percent change from current assumption)

Housing Type	County (1975)	WVSD (2005)	County (2012)	Milpitas (2012)	San José (2012)	Santa Clara (2012)	Bur-bank (2012)	CSD 2-3 (2012)	CuSD (2012)	WVSD (2012)
Single Family	219	184	-15.1%	-17.4%	-8.7%	-17.4%	-30.6%	-12.3%	-11.4%	1.1%
Multi Family	123	160	11.4%	13.0%	8.9%	21.1%	0.8%	30.9%	20.3%	-10.0%
Mobile Home	124	157	11.3%	13.7%	21.8%	-	-	-	-	-26.1%

Residential Customer Classifications

San José, Santa Clara, and the Tributary Agencies use single-family, multi-family, and mobile home classifications to distribute O&M costs in the revenue program. The consultant reviewed available data and municipal code definitions to determine how the different agencies classify

each of the residential customers into one of these three groups. While the analysis revealed some differences in classifying residential properties, the overall discrepancies are relatively minor. Please see the "Residential Customer Classifications" section of the attached Technical Memorandum No. 2 for additional information.

Residential Strength Parameters
All of the agencies have used the same strength parameters for BOD (250 mg/L), TSS (250 mg/L), and NH3 (35 mg/L) since 1975. While WVSD updated its flows for single-family and multi-family residences after a 2005 wastewater flow study, it did not change its strength parameters.

Neither the literature nor available data from other wastewater agencies supported changing the strength parameters currently used, which are in the typical range and have been approved by the SWRCB. After consultation with TAC, the consultant recommended leaving the current strengths unchanged until a more thorough study could be performed to include analysis of residential sewage samples from all of the agencies.

Non Residential Flow and Strength Parameters
All accounts including commercial, industrial, and institutional users are grouped under the general heading of non-residential. The calculation of charges for most non-residential users is based on their water consumption and the strength parameters for the category to which they are assigned based on SWRCB Revenue Program Guidelines. Since sewage discharge is generally not measured directly, water consumption provides a proxy for sewer use. In some agencies, such as San José, water consumption for winter months is used to exclude irrigation flows and other outside uses that are higher during dry months. A return to sewer percentage is applied over a variety of commercial types. In other agencies, the water consumption for all 12 months is used, with a return to sewer percentage applied to adjust total consumption to exclude outdoor uses. Some businesses have much lower return factors that reflect on-site water consumption or evaporation, such as facilities with cooling towers.

For non-residential water consumption, a comparison was made between estimated sewer flows based on:

(1) Annual water consumption using return to sewer percentages, which varied widely across agencies; and
(2) Annualized winter water consumption without the application of the return to sewer percentages. Winter water consumption was defined as water consumed during January, February and March.

The results show that in terms of non-residential water consumption, using annual water consumption data to estimate sewer discharges produces a higher water consumption estimate when compared to using annualized winter consumption data. The difference was found to be about 20%-30% between the two non-residential sewer flow methodologies used by the Wastewater Facility Agencies. There is no industry standard for estimating sewage flows across

broad ranges of commercial and industrial classifications, and both approaches to estimate non-residential flow are reasonable and used by the wastewater industry. Without substantial flow monitoring data, it is not possible to definitively determine which approach is more accurate. However, estimating non-residential wastewater flows based on both winter water consumption and annual water consumption with a return to sewer factor are both widely accepted methods. In reviewing with TAC the analysis of using winter versus annual water data to estimate non-residential flow, there was a consensus that the existing data did not justify having all agencies use the same methodology, which could result in cost allocations that impacted individual agencies or users in ways that could not clearly be shown to be more fair than the current system. For additional information, please see the "Winter Versus Annual Non-Residential Flow Assumptions" section of the attached Technical Memorandum No. 2.

In each of the agencies, most of the non-residential users are combined into categories that are expected to have roughly similar strength parameters; however, the agencies do not use the same combinations. San José uses 59 non-residential categories, while the other agencies use significantly fewer non-residential categories.

Individual non-residential accounts that discharge more than 25,000 gallons per day are treated differently, with their rates being based on direct monitoring of their sewage flow and strength parameters. There are only about 61 monitored industries in the entire service area (30 in Santa Clara, 18 in San José, and 13 in Milpitas).

The consultant reviewed the current user categories for non-residential accounts in all of the agencies, and tested some alternative methods to group them more uniformly into fewer categories. All of the current charges are based on strength parameters that have been approved by the SWRCB for many years and accepted by local agencies and users. After discussion with TAC, the consultant recommended that the current methods be continued unless a more detailed study with extensive sampling and analysis of wastewater flows from each user type in each agency could be performed.

Non Residential Customer Classifications

Across agencies, there is often significant variability in the assumed wastewater loading coming from a single class of non-residential customers as each agency employs its own set of loading assumptions for BOD, TSS, and NH3. In many cases, the loading assumptions are similar or identical for the same Standard Industry Classification (SIC) Codes. However, some loading assumptions are very different for the same SIC code for different agencies. These differences can lead to a disparity between how different customers, with similar load values, in the same SIC code, are charged by different agencies.

The consultant evaluated the potential benefit of classifying non-residential customers into groups based on common strength ratios. The consultant recommended sorting and grouping all non-residential users with similar impacts on the wastewater system within the same group. This methodology would reduce the number of non-residential customer categories. This approach was discussed at the October 1, 2014 Special TAC meeting and it was determined that it would

initially involve significant administrative effort to implement this change, and that making this change absent updated non-residential strength information would not result in improved non-residential flow and strength estimates. For additional information, please see the "Non-Residential Classifications" section of the attached Technical Memorandum No. 2.

Mass Balance

A mass balance looks at the measured flow and loadings of the Wastewater Facility's influent, which is frequently sampled and analyzed. The consultant performed an analysis that allows for the assumptions made in the revenue program to be tested without doing new field work. By comparing the total measured flow, in millions of gallons per day, and the measured loadings, in pounds per day, with the calculated values based on the flow and strength parameters used in the Revenue Program, the consultant tested the reasonableness of current customer data assumptions for flow, BOD, TSS, and NH3. The study found that flow values for the current revenue program roughly approximates the amount of flow that enters the plant, but understates the amount of BOD, TSS and NH3 entering the Wastewater Facility. Because the mass balance resulted in inconsistent loadings at the Wastewater Facility relative to the revenue program, it may be necessary to conduct a wastewater strength-sampling program. It is unknown whether the cause of the discrepancy is due to the residential or non-residential loading assumptions. A residential strength-sampling program should be commissioned first to see if the residential parameters are correct.

Impact of Recommended Changes

Allocation of costs by agency: Using the FY 2014-2015 revenue program as the baseline, it was determined that the impacts of the recommended changes to the allocation of costs across San José, Santa Clara, and the Tributary Agencies varies by agency. The updated flows and household sizes may result in substantial changes between customer classes. Table 5 illustrates the potential change in cost allocation shifts between agencies using updated flow and household size. This table is provided to illustrate the potential impact of updating residential flow and household sizes.

Table 5: FY 14-15 Treatment Plant O&M Cost Sharing Impact Using Updated Flows and Household Sizes

FY 14-15 budgeted shares 3/11/14 reports to Tributary Agencies			POTENTIAL IMPACT OF NEW RESIDENTIAL FLOW ESTIMATES				
AGENCY	Percentage	O&M Budget Shares	Revised Percentage	Difference	% Change	O&M Redistributed	$ Increase (Decrease)
SJ	65.493	$60,121,800	65.299	(0.1940)	(0.296)	$59,944,500	($177,300)
SC	13.898	$12,758,500	13.857	(0.0410	(0.295)	$12,720,800	($37,700)
WVSD	8.264	$7,586,800	8.803	0.5390	6.522	$8,081,500	$494,700
CuSD	5.144	$4,722,500	5.165	0.0210	0.408	$4,741,700	$19,200
Milpitas	5.966	$5,476,500	5.717	(0.2490)	(4.174)	$5,247,900	($228,600)
CSD2-3	.956	$878,000	0.929	(0.0270)	(2.824)	$852,500	($25,500)
Burbank	.279	$255,900	0.230	(0.0490)	(17.563)	$211,100	($44,800)
Total	100%	$91,800,000	100%	0%		$91,800,000	$0

Because the revenue program is a cost recovery program, any change for one customer group or within the same customer group could impact the other customer groups. For example, as total flows to residential customers are changed based on updates provided by this study, there could be a shift of costs among the non-residential customers, assuming their flows are consistent year-over-year, and the budget that is allocated to all customers in the service area for the Wastewater Facility remains at the same level year-over-year. While the changes between broad user groups are small, the potential for greater changes between specific customer types is possible. The final cost allocation is dependent upon each user's total flow and strength parameters.

As stated above, updated flow assumptions for the residential sector could result in significant changes to the allocations for different customer classes. In addition, the rebuild of the Wastewater Facility may also require rate increases. A ten-year funding and rate study is currently underway. Recommended changes as a result of the Flow Study, as well as findings from the ten-year funding and rate study, will be used to develop the revenue program cost allocation for FY 2015-2016.

Revenue Program Update
To ensure accuracy and equity, staff is recommending that the revenue program assumptions be updated every 10 years. This may include a combination of updating the household densities used to estimate residential sewer flows based on the latest census information and review of water consumption data. It may also include updating residential and non-residential wastewater strength parameters based on more current loadings data.

EVALUATION AND FOLLOW-UP

In February-March 2015, as part of the annual revenue program process, San José will work with Santa Clara and all Tributary Agencies to allocate costs based on the updated flow and household size numbers. Each agency will then use their updated costs allocations, and other agency-specific factors, to set their rates. For San José, staff will bring forward any rate recommendations which may result from the flow study update as well as other CIP and O&M costs, to Council as part of the 2015-2016 budget process.

POLICY ALTERNATIVES

Alternative 1: Make no changes to the current residential household size or residential flow assumptions.

Pros: The current rate model, household sizes and flow data have been approved by the State Water Resources Control Board (SWRCB), and no changes are required by that agency. Keeping the current household size and flow amounts minimizes changes to property owners' SSUC rate as well as minimizes cost shifts between San José, Santa Clara, and the Tributary Agencies.

Cons: The current rate model is based upon 1975 data. Census data indicate that average household sizes have changed since 1975, and therefore, using the 1975 number does not properly allocate costs between household categories. Based upon the results of the recent flow study, the residential flow assumptions using 1975 data do not reflect current usage characteristics.

Reason for not recommending: Using the 1975 data does not result in the proper allocation of costs between the residential categories or between San José, Santa Clara, and the Tributary Agencies.

Alternative 2: Install individual meters to capture water consumption data at the individual dwelling unit level and establish volumetric pricing.

Pros: May result in more accurate individual sewer rates by charging ratepayers based upon the individual ratepayers' usage.

Cons: Sewer flow meters are not designed to measure residential sewer flow as these meters need constant sewer flow for accurate measurement, therefore, metered water consumption data would need to be used to estimate sewer flow. Switching from the current tax roll billing system would result in higher administrative and technology costs. Short term billing could also negatively impact financial ratings and future borrowing costs. The cost of installing water meters and piping at each individual multiple-family and mobile home dwelling unit would be borne by the property owners and could be cost prohibitive. Since water and wastewater services are provided by different entities and water consumption data is provided in different formats, accessing water consumption data would also be difficult due to technology constraints.

Reason for not recommending: Residential sewer flow meters would not accurately measure residential sewer flow. The cost of installing individual water meters, piping, and new billing system would actually result in higher costs to ratepayers without yielding significant benefits. Changing to volumetric pricing would also result in annual revenue fluctuations, which could negatively impact the financial standing of the RWF and increase the cost to borrow funds for the rebuild of the wastewater facility, which would be ultimately borne by the ratepayers. Additionally, a rate structure that is highly volumetric would not recognize that the majority of the annual wastewater treatment costs are fixed costs. Lastly, if the rate structure resulted in lower water consumption, it might actually result in higher concentrations of BOD, TSS, and NH3, and thus higher long-term treatment costs.

Alternative 3: Update average household size using the 2012 ACS data, and update tributary-wide average residential flow assumptions determined by the 2014 Flow Study.

Pros: Continues current rate model assumptions using service area averages.

Cons: Results in a shift in costs between agencies without taking into consideration each agency's specific residential flow assumption or each agency's service area average household size. Using agency-specific flow data for the four agencies which we have are able to update residential flow assumptions results in a more equitable allocation of costs for those agencies.

Reason for not recommending: Using system-wide averages does not result in the most equitable allocation of costs between the residential categories or between San José, Santa Clara, and the Tributary Agencies.

PUBLIC OUTREACH

In addition to the required posting of this item with the T&E and Council Agendas, the Flow Study was previously discussed at a T&E meeting on May 14, 2014. Special meetings of the TAC were held to discuss the study on July 16, 2014, September 22, 2014, and October 1, 2014 and the recommendations were discussed at the regular November meetings of TAC and TPAC. On January 15, 2015, ESD presented to the Housing and Community Development Commission preliminary information on the Flow Study, and is returning on February 12, 2015 with updated information. ESD will conduct outreach to multiple-family property owners through the Tri-County California Apartment Association. Feedback from these outreach meetings will be incorporated into recommendations brought forward as part of the 2015-2016 sanitary sewer rate setting process.

This item was heard at the November 3, 2014 T&E meeting and the November 13, 2014 TPAC meeting. It is scheduled for the February 12, 2015 TPAC meeting and March 3, 2015 Council Meeting.

COORDINATION

This memorandum has been coordinated with the City Attorney's Office, the City Manager's Budget Office, the Office of Economic Development, and the Housing Department.

COST SUMMARY/IMPLICATIONS

The consultant's analysis provided recommended updates to the assumptions for residential sanitary sewer rates that may result in 2015-2016 cost shifts between the Wastewater Facility owners and Tributary Agencies, as well as cost shifts between user groups; however, no final determination has been made for 2015-2016. The results of the consultant's report, as well as the San José-Santa Clara Regional Wastewater Facility Ten-Year Funding Strategy (which will be brought forward for TPAC consideration and City Council approval in March), will be considered in developing the 2015-2016 San José-Santa Clara Regional Wastewater Facility Revenue Program.

CEQA

Not a Project, File No. PP10-067(a), Increases or Adjustments to Fees, Rates & Fares.

/s/Ashwini Kantak for
KERRIE ROMANOW
Director, Environmental Services

For questions, please contact Ashwini Kantak, Assistant Director, at (408) 975-2553.

Attachment: City of San Jose Phase 3 Flow and Load Study Technical Memorandum No.3

CITY OF SAN JOSÉ

PHASE 3 FLOW AND LOAD STUDY

TECHNICAL MEMORANDUM NO. 3
FLOW ANALYSIS SERVICES

FEBRUARY 2015

2700 YGNACIO VALLEY ROAD, SUITE 300 • WALNUT CREEK, CALIFORNIA 94598 • P. 925.932.1710 • F. 925.930.0208

CITY OF SAN JOSÉ

PHASE 3 FLOW AND LOAD STUDY

TECHNICAL MEMORANDUM
NO. 3
FLOW ANALYSIS SERVICES

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PHASE 3 FLOW ANALYSIS

1.0 INTRODUCTION

The City of San José's (City's) existing rate structure consists of flow and strength-based charges. Flow is measured in terms of average wastewater flow and strength is measured in terms of biological oxygen demand (BOD), total suspended solids (TSS), and ammonia (NH_3). Treatment costs are recovered from San José and Santa Clara's customers and Tributary Agencies based on wastewater flow and strength.

Currently, the San José-Santa Clara Regional Wastewater Facility (RWF) Revenue Program allocates costs between the RWF Tributary Agencies, which include San José, Santa Clara, Milpitas, Cupertino Sanitary District (CuSD), County Sanitation District No. 2-3 (CSD 2-3), West Valley Sanitation District (WVSD), and Burbank Sanitary District (Burbank). In August 2012, the City Auditor recommended an update to the assumptions that are used in the sanitary sewer rates for residential customers, and to establish a policy to periodically evaluate the assumptions that influence rates, including household residential size, daily per capita flow, and housing stock composition.

In 2013, San José's Environmental Services Department (ESD) conducted a preliminary flow study for the treatment plant and San José's own residential customers. The study observed lower usages of water by San José households than has been assumed by the Revenue Program since 1975. It is also possible that the allocation factors currently used as the basis for the cost distributions in the Revenue Program are outdated and do not reflect current flow and loading discharge characteristics to the RWF. ESD concluded that a more robust analysis should be conducted to properly evaluate the flow and strength of contemporary wastewater in the service area. To this end, ESD has retained Carollo Engineers to review the Revenue Program's methodologies for equity and consistency and to evaluate that the current Program is consistent with State Guidelines.

This Technical Memorandum (TM) is the third phase in a two-step process that seeks to quantify the volume and strength of wastewater produced by residential and non-residential customer classes. The results of this study may be used to update San José's wastewater retail rates and the allocation of operations and maintenance (O&M) costs among the RWF agencies.

The objectives of this memo are:

- Conduct a detailed flow analysis for residential customers.
- Conduct a detailed strength analysis for residential and non-residential customers.
- Conduct a mass balance.

- Provide recommendations to update the wastewater flow and strength parameters used in the Revenue Program.

2.0 UPDATING RESIDENTIAL FLOW ASSUMPTIONS

Flow assumptions used in the Revenue Program are determined differently for residential and non-residential customers. This section discusses residential flow assumptions. Assumptions about residential sanitary flows and the composition of those (Flows, BOD, TSS, and NH_3) are paramount to the allocation of costs between not only the individual Tributary Agencies but also to the distribution of costs between customer classifications within the agencies.

2.1 Current Residential Flow Assumptions Used in the Revenue Program

San José, Santa Clara, and the Tributary Agencies calculate the "flow component" of the Revenue Program based on an estimated flow, gallons per day per household (GPD/household). This assumption is calculated from 1) the gallons per capita per day (GPCD) flow rate and 2) the number of persons per household. All the agencies with the exception of WVSD use a consistent set of assumptions.

San José, Santa Clara, Milpitas, CuSD, CSD 2-3, and Burbank base residential flow assumptions on household size derived from demographic information last updated in 1975, and per capita flows based on a 1975 study. These assumptions are given in Table 2.1.

Table 2.1 Current Residential Flow Assumptions Used in the Revenue Program for Current San José, Santa Clara, Milpitas, CuSD, CSD 2-3, and Burbank
Phase 3 Flow and Load Study
City of San José

	GPCD Flow(1)	Household Size(2)	Residential Flow Estimate, GPD/Household
Single-Family	65	3.37	219
Multi-Family	60	2.05	123
Mobile Home	65	1.90	124

Notes:
(1) Per capita flows based on a study conducted as part of the first submittal of Revenue Program data in or prior to 1975.
(2) Based on 1975 demographic information.

WVSD conducted its own wastewater flow study in 2005. The results of this study have been approved for use in the Revenue Program. The study estimated population densities and wastewater discharges per dwelling unit as shown in Table 2.2.

Table 2.2 Current Residential Flow Assumptions Used in the Revenue Program for West Valley Sanitation District[1] Phase 3 Flow and Load Study City of San José			
	GPCD Flow[2]	**Household Size[3]**	**Residential Flow Estimate, GPD/Household**
Single-Family	70	2.63	184
Multi-Family	65	2.46	160
Mobile Home	65	2.41	157

Notes:
(1) Capacity Allocation Study, RMC Water and Environment. February 2005.
(2) Dry weather flow monitoring data within WVSD.
(3) Based on a combination of census population and dwelling unit density data.

Table 2.3 presents the flow assumptions that ESD developed based on its preliminary flow study for the treatment plant and San José's own residential customers in 2013. Because of a limited data set, the results of San José's 2013 study have not been incorporated into the Revenue Program. San José's 2013 study relied on a single year of consumption data and recommended using county-wide estimates of household populations. For the purposes of this Report, "Countywide" refers to the population and household density estimates for the entire Santa Clara County.

Table 2.3 San José 2013 Flow Study, Not Part of The Revenue Program[1] Phase 3 Flow and Load Study City of San José			
	GPCD Flow[2]	**Household Size[3]**	**Residential Flow Estimate, GPD/Household**
Single-Family	65	3.15	205
Multi-Family	55	2.37	130
Mobile Home	58	2.71	157

Notes:
(1) "Estimated Residential Unit Flow Rates & Review of Strength Characteristics." RMC Water and Environment, February 2013.
(2) 2011 winter consumption in San José.
(3) 2011 Census countywide estimates.

WVSD's 2005 study used household population values unique to their service area. As shown in **Figure 2.1** and **Figure 2.2**, below, there is clearly a range of dwelling unit population densities throughout the RWF service area. Therefore, it is reasonable that San José, Santa Clara, and the Tributary Agencies use different household size assumptions in future Revenue Program updates. However, the current Revenue Program assumptions and the studies conducted by WVSD and San José are not based on consistent data sources or methodologies. Phase 3 of this study will use similar methods as these previous studies, but will rely on a longer historical consumption record and employ a uniform methodology that is clear, transparent, and consistent among all the Tributary Agencies.

Figure 2.1 Single-Family Dwelling Unit Density

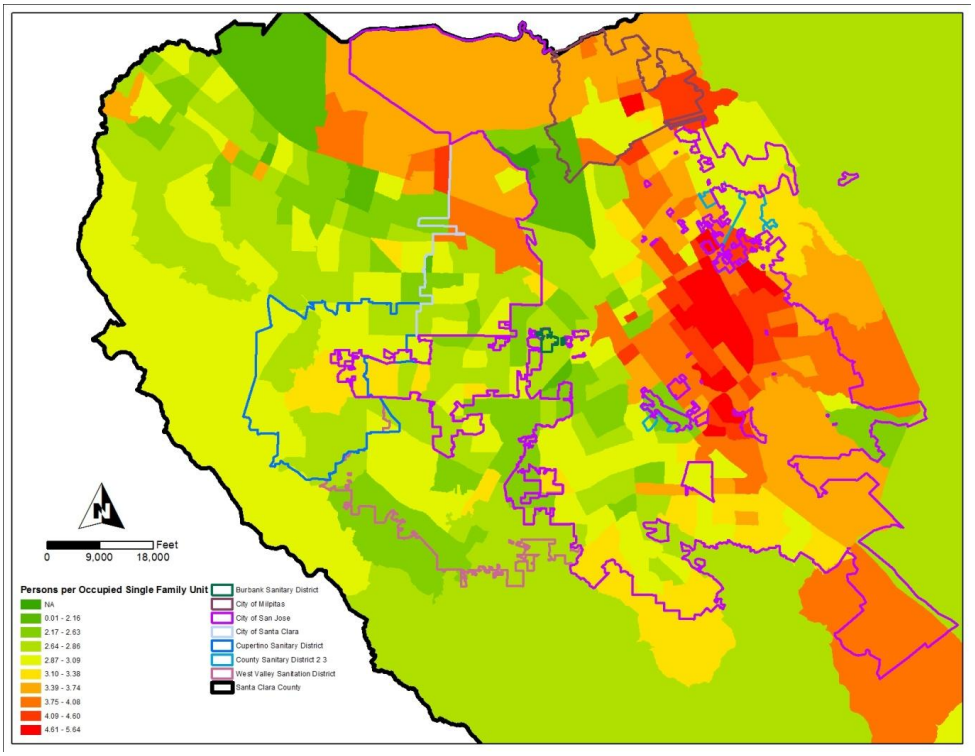
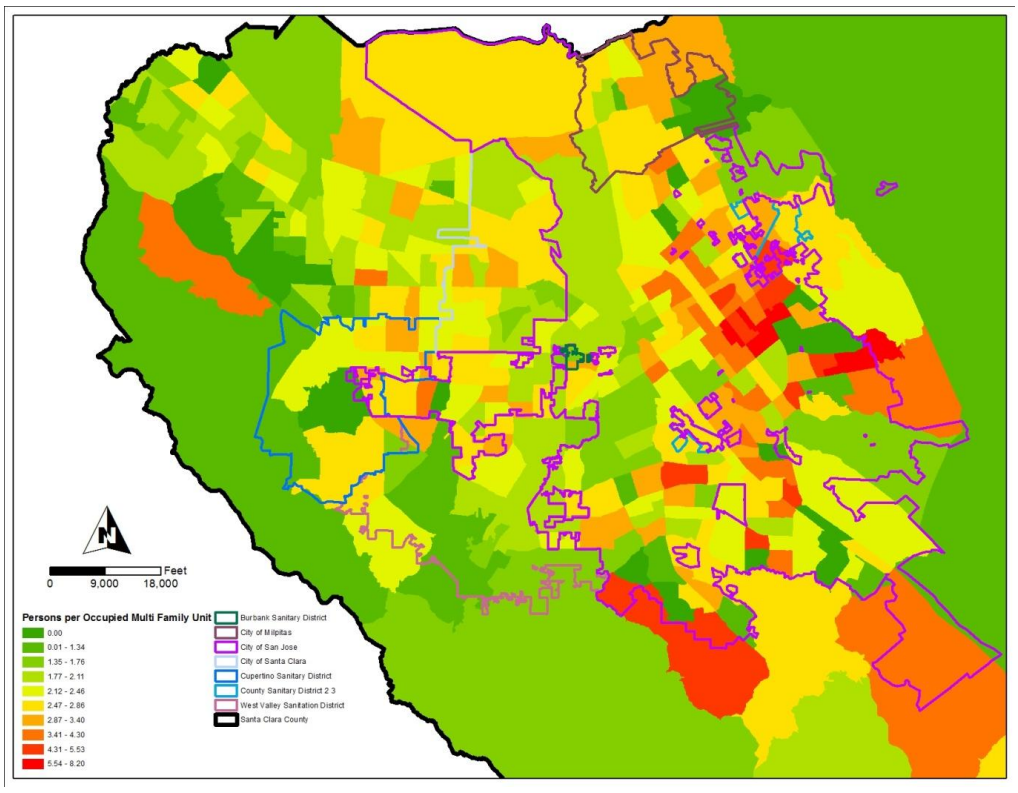


Figure 2.2 Multi-Family Dwelling Unit Density



2.2 Updating Residential Flow Assumptions

In order to provide any updates to the current flow assumptions used in the Revenue Program, a dataset larger than the dataset used for the 2013 Study had to be analyzed. The residential flow assumptions can be broken down into two components: (1) a residential per unit flow rate (GPD) per residential unit type; and (2) a residential household size (number of persons per residential unit type). Together, these two components can be used to obtain a residential per capita flow rate (GPD per person) in order to compare against the current Revenue Program assumptions. Residential flow assumptions were obtained for single-family, multi-family, and mobile home premise types since this is the basis for the Revenue Program

Updated residential flow assumptions were determined by reviewing residential water consumption data during the winter months when water use is assumed to be primarily indoor consumption. For this study, January, February, and March have been designated as the winter months as it is believed to provide a consistent low water demand period that best approximates residential sewer discharges. The process for estimating residential per unit flow rates for the different residential premise types (single family, multi-family, and mobile home) for the different entities is described in the following subsections.

2.2.1 Data Sources

Water consumption data was obtained from the San Jose Water Company, San Jose Municipal Water System (San Jose Muni Water), the City of Santa Clara, the City of Milpitas, Burbank, CSD 2-3, CuSD and WVSD. Water consumption data for the West Valley Sanitation District had been pre-processed by RMC Water and Environment for use in this study.

Specific data is summarized below.

- San José
  - San Jose Muni Water
    - Years: 2006 – 2014
    - Residential and non-residential accounts
  - San Jose Water Company
    - Years: 2011 – 2014
    - Residential and non-residential accounts
  - Great Oaks Water Company
    - Years: 2005 – 2013[1]
    - Non-residential only

[1] For consistency with San Jose's data, which went back to 2006, 2005 was not used in the analysis.

- Santa Clara
  - Years: 2005 – 2014
  - Residential and non-residential accounts
- Milpitas
  - Years: 2005 – 2014
  - Residential and non-residential accounts
- Burbank
  - Years: 2011 – 2013
  - Residential accounts
- CSD 2-3
  - Years: 2011 – 2013
  - Residential accounts
- CuSD
  - Years: 2011 – 2013
  - Residential accounts
- WVSD
  - Processed data was provided by RMC for the winters of 2010-2012

Other datasets used in this study include the 2012 San José wastewater-billing database and the residential water service points obtained from both the San Jose Water Company and San Jose Muni Water. These datasets were used to obtain both the number of units for each residential household type as well as the premise type of each residence. The 2012 5-year population and housing estimates from the United States Census Bureau were also used.

2.2.2 Flow Cap

A "flow cap" was used to cap residential flows as a way to eliminate outliers in the consumption data. Although winter consumption data is an industry-accepted standard for estimating residential sewer discharges, considering the breadth of data collected for this study (almost 666,000 individual billing accounts) outliers are inevitable. Fortunately, these outliers are also identifiable. For example, the databases included some billing accounts with substantial outdoor irrigation usage, given California's recent run of some of the driest winters on record. Additionally, some of the consumption records in San Jose Water Company's billing database were found to have database irregularities. For example, the number of multi-family units in San José's wastewater billing database did not always link cleanly to San Jose Water Company's billing database. Therefore, it was possible for the

number of units to be incorrect in which case the consumption was significantly overestimated.

To eliminate these outliers, Carollo employed two techniques: a cap specific to each premise type and a dynamic "IQR" cap unique to each agency and residential category.

- **IQR Cap.** This cap is calculated as 1.5 x Interquartile Range (IQR). This is the most common way to identify outliers. For this study, this approach accounts for natural high volume users unique to each residential category and each agency. The IQR method is statistically more valid but it creates a different cap across agencies and customer classes and could be considered biased. For example, an agency with a significant amount of outdoor irrigators (which would increase the IQR cap) would have a higher average sewer discharge. In addition, this approach results in higher average flows than are currently assumed in the Revenue Program. The calculated IQR caps are shown in Table 2.4.

Table 2.4 Calculated IQR Caps
Phase 3 Flow and Load Study
2010 – 2012 Data

Agency	Single Family IQR Cap	Multi-Family IQR Cap	Mobile Home IQR Cap
Milpitas	460	370	124
San José	545	425	380
Santa Clara	495	430	NA
Burbank	415	350	NA
CSD 2-3	615	490	NA
Cupertino	585	380	NA
WVSD	605	375	180
Weighted Average IQR Cap	**540**	**410**	**370**

- **Premise Type Specific Cap**. Carollo initially employed a cap of 400 GPD for all premise types in Technical Memorandum No. 2. After receiving and analyzing the customer data provided by all seven member agencies, it appears reasonable to develop customer class specific caps rather than a universal cap for all residential customer classes. Based on customer usage patterns for both multi-family and mobile homes, a lower cap seemed more appropriate for these two customer classes. After analyzing all customer data, the proposed class specific caps appear to be more reasonable than a single universal cap.

  For this Memorandum, Carollo employed a cap of 400 GPD/account for single family premise types and a cap of 300 GPD/account for both multi-family and mobile home premise types. The caps are approximately double the median flow values, which are

based on 2010 – 2012 winter water consumption data, for the respective premise types of the different agencies. The methodology for arriving at the different caps is similar to the methodology used in Technical Memorandum No.2 (double the median flow values). This approach attempts to eliminate anomalous account recordings. However, it does not recognize accounts that consume over 400 gpd for single family premise types and 300 gpd for both multi-family and mobile home premise types.

The premise type specific cap was found to be a reasonable method for eliminating unreasonably high data points that would otherwise skew the results. Applying a premise type specific cap across the different premise types has the advantage of consistency and does not favor one agency over the other. The caps and the distribution of the 2010 – 2012 data points for single family, multi-family and mobile home premise types can be seen in Figure 2.3, Figure 2.4 and Figure 2.5.

Figure 2.3Single-Family GPD Histogram (2010 – 2012)

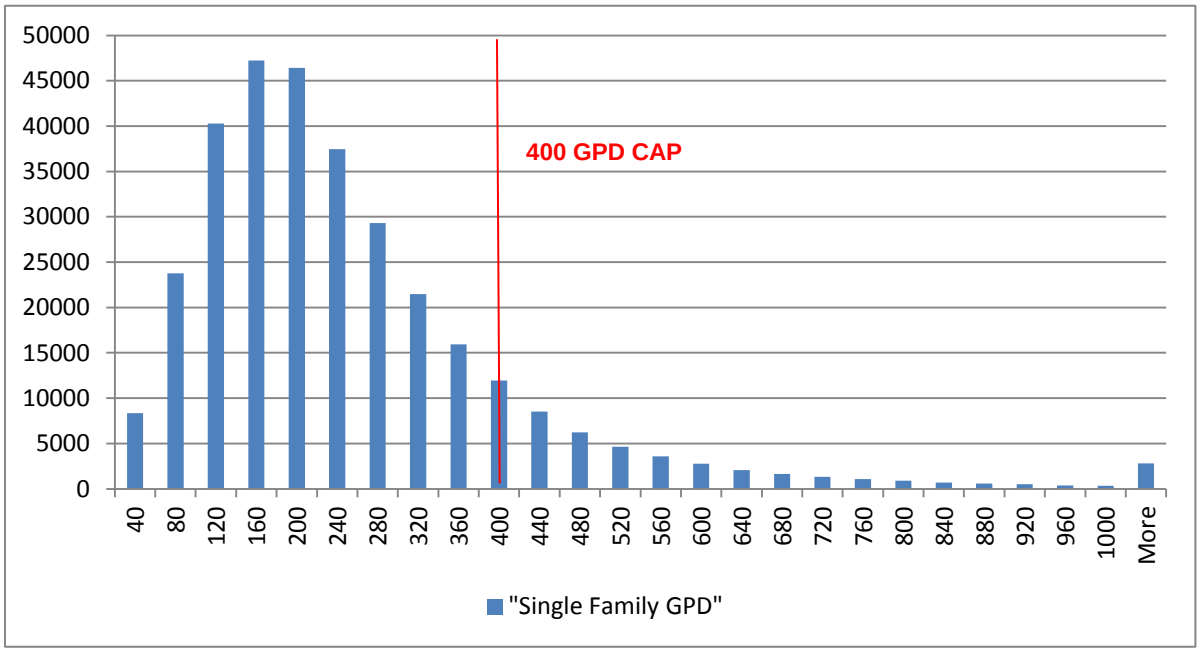


Figure 2.4 Multi-Family GPD Histogram (2010 – 2012)

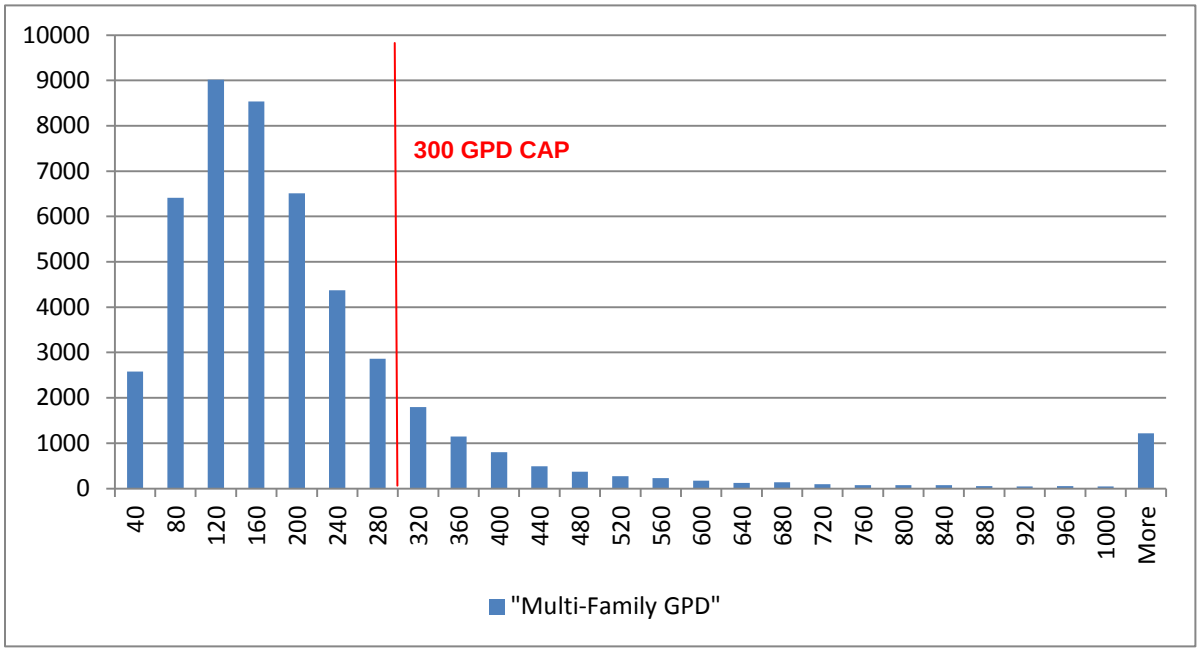
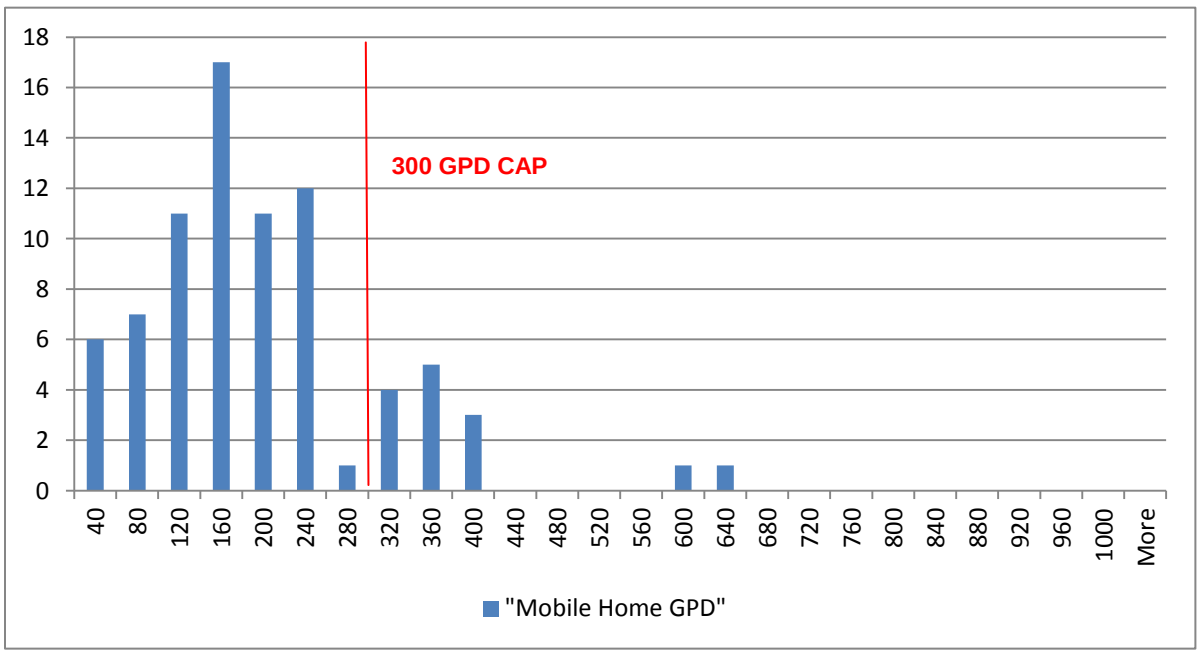


Figure 2.5 Mobile Home GPD Histogram (2010 – 2012)



2.2.3 Per Capita Flow Rate Methodology

Per-capita flow rates are based on residential household sizes as determined by the US Census Bureau 2012 American Community Survey (ACS). Specifically, Table B25033 (Total Population in Occupied Housing Units by Tenure by Units in Structure) and Table

B25032 (Tenure by Units in Structure) provide population and housing unit estimates for each census tract located in Santa Clara County. The two tables contain 5-year estimates, and thus were considered the most appropriate to use for this study since they contained the largest sample size. The population and housing unit estimates were used to calculate residential household sizes for each premise type for the different agencies as well as Santa Clara County. Table 2.5 presents the findings of this analysis.

Once the per unit flow rates and the household sizes were obtained, a per capita flow rate for each premise type for the different agencies was calculated by dividing the per unit flow rate by the corresponding household size. The results are presented in Table 2.7, Table 2.9, Table 2.9, Table 2.11, Table 2.13, Table 2.15, Table 2.17 and Table 2.19.

Table 2.5 Residential Household Sizes (Number of Persons per Unit) Phase 3 Flow and Load Study City of San José							
Residential Unit Type	**City of Milpitas**	**City of San José**	**City of Santa Clara**	**Burbank Sanitary District**	**County Sanitation District No. 2-3**	**Cupertino Sanitary District**	**West Valley Sanitation District**
Single Family	3.54	3.34	2.96	2.76	3.63	2.94	2.74
Multi-Family	2.73	2.53	2.26	2.64	3.29	2.47	2.06
Mobile Home	2.24	2.97	2.28	-	2.73	-	1.78

2.2.4 City of Milpitas

The City of Milpitas provided residential winter water consumption from 2005 to 2014 to estimate the City's residential flow rates (to be consistent with San Jose's data, only 2007-2014 was analyzed). The water consumption data already contained the premise type and the number of units for each household. A per unit flow rate was obtained by dividing the water consumption by the number of days between two successive meter reading dates, and dividing again by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater then 300 GPD per unit for multi-family premise types, was obtained for both single family and multi-family premise types. The results are presented in Table 2.6.

Table 2.6	City of Milpitas per Unit Flow Rates Phase 3 Flow and Load Study City of San José		
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2007	192	140	Not available due to data inconsistencies
2008	194	143	
2009	184	138	
2010	184	144	
2011	166	132	
2012	188	145	
2013	174	143	
2014	186	145	

Milpitas' mobile home data showed very low per-capita flow rates (approximately 30 GPCD in some years). After a close examination of the mobile home data, Carollo found two issues. The first was that the number of data points was very small, totaling only four accounts. The other issue was that although the consumption values for each account changed significantly from year to year, the number of units was relatively consistent. These issues led to the conclusion that the number of units in the database was incorrect, possibly due to fluctuating vacancies, and the number of data points too small to draw large conclusions. Therefore, Milpitas's mobile home data was not used in this analysis because a statistically significant number of reliable data points were not available. The per capita flow rates for Milpitas are presented in Table 2.7.

Table 2.7	City of Milpitas per Capita Flow Rates Phase 3 Flow and Load Study City of San José		
	GPCD SF	**GPCD MF**	**GPCD MH**
2007	54	51	Not available due to data inconsistencies
2008	55	52	
2009	52	51	
2010	52	53	
2011	47	48	
2012	53	53	
2013	49	52	
2014	53	53	

2.2.5 City of San José

For the City of San José, datasets from the San Jose Water Company, San Jose Muni Water and the City of the San José were used to estimate the residential per unit flow rates. The premise types and the number of units for each household were obtained from the City of San José's wastewater billing database and the residential water service points obtained from both the San Jose Water Company and San Jose Muni. Flow rates were obtained from winter water consumption from 2011 to 2014, provided by the San Jose Water Company as well as winter water consumption from 2007 to 2014 provided by San Jose Muni.

In general, water accounts that contained winter water consumption data were linked to the corresponding wastewater accounts to determine the premise type as well as the number of units each account serves. The first step involved linking water consumption data with residential water service points through the Water Service Point ID. This allowed the water consumption data to be paired with parcel numbers and addresses.

For San Jose Muni, the parcel numbers were used to link the winter water consumption data with the wastewater billing database obtained from the City of San José. This linkage assigned a premise type and the number of units to San Jose Muni's winter water consumption data.

For the San Jose Water Company, the addresses were used to link the winter water consumption data with the wastewater billing database obtained from the City of San José. This linkage assigned a premise type and the number of units to the San Jose Water Company's winter water consumption data.

Once the number of units for the winter water consumption data was obtained, a per unit flow rate was calculated by simply dividing the water consumption by the number of days between two successive reading dates, and then dividing again by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater than 300 GPD per unit for both multi-family and mobile home premise types, was obtained for single family, multi-family, and mobile home premise types. The results are presented in Table 2.8 and Table 2.9.

Table 2.8 City of San José per Unit Flow Rates Phase 3 Flow and Load Study City of San José			
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2007	223	142	198
2008	217	140	181
2009	214	140	169
2010	202	137	174
2011	183	128	150
2012	220	135	130
2013	187	129	134
2014	206	129	142

Table 2.9 City of San José per Capita Flow Rates Phase 3 Flow and Load Study City of San José			
	GPCD SF	**GPCD MF**	**GPCD MH**
2007	67	56	67
2008	65	55	61
2009	64	55	57
2010	61	54	59
2011	55	51	51
2012	66	53	44
2013	56	51	45
2014	62	51	48

2.2.6 City of Santa Clara

The City of Santa Clara provided residential winter water consumption from 2005 to 2014 to estimate the City's residential per unit flow rates (to be consistent with San Jose's data, only 2007-2014 was analyzed). The water consumption data already contained the premise type and the number of units for each household. A per unit flow rate was obtained by dividing the water consumption by the number of days in the month that the meter was read, and dividing again by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater than 300 GPD per unit for multi-family premise types, was obtained for both single family and multi-family premise types. Santa Clara does not report any mobile home accounts in the Revenue Program. The results are presented in Table 2.10 and Table 2.11.

Table 2.10 City of Santa Clara per Unit Flow Rates Phase 3 Flow and Load Study City of San José			
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2007	195	152	Not Applicable
2008	189	151	
2009	182	150	
2010	170	146	
2011	173	146	
2012	199	155	
2013	187	152	
2014	198	154	

Table 2.11 City of Santa Clara per Capita Flow Rates Phase 3 Flow and Load Study City of San José			
	GPCD SF	**GPCD MF**	**GPCD MH**
2007	66	67	Not Applicable
2008	64	67	
2009	61	67	
2010	58	65	
2011	58	65	
2012	67	69	
2013	63	67	
2014	67	68	

2.2.7 West Valley Sanitation District

West Valley Sanitation District provided data from 2010 to 2012 that had been obtained and processed by RMC Water and Environment as part of WVSD's 2014 Study titled "Residential Wastewater Unit Flow Rate Analysis." Since the number of units and the property type for the winter water consumption was already linked, the per unit flow rate was calculated by dividing the water consumption (in GPD) by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater than 300 GPD per unit for both multi-family and mobile home premise types, was obtained for single family, multi-family, and mobile home premise types. The results are presented in Table 2.12 and Table 2.13.

Table 2.12 West Valley Sanitation District per Unit Flow Rates Phase 3 Flow and Load Study City of San José			
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2010	176	136	100
2011	185	146	124
2012	201	153	121

Table 2.13 West Valley Sanitation District per Capita Flow Rates Phase 3 Flow and Load Study City of San José			
	GPCD SF	**GPCD MF**	**GPCD MH**
2010	64	66	56
2011	68	71	69
2012	73	74	68

2.2.8 Burbank Sanitary District

Burbank Sanitary District provided data from 2011 to 2013 to estimate the residential per unit flow rates as well as a list of residential accounts. Burbank did not have any mobile homes in the residential accounts provided. Flow rates were obtained from winter water consumption while the property types and the number of units for each household were obtained from the list of residential accounts provided.

In general, water accounts that contained winter water consumption data were linked to the corresponding wastewater accounts to determine the property type as well as the number of units each account serves. The first step involved linking water consumption data with residential accounts through the assessor's parcel number (APN). Once the number of units and the property type for the winter water consumption data was obtained, a per unit flow rate was calculated by dividing the water consumption (in gallons) by the number of days between two successive reading dates, and then dividing again by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater than 300 GPD per unit for multi-family premise types, was obtained for both single family and multi-family premise types. The results are presented in Table 2.14 and Table 2.15.

Table 2.14 Burbank Sanitary District per Unit Flow Rates Phase 3 Flow and Load Study City of San José			
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2011	141	120	Not Applicable
2012	160	131	
2013	147	119	

Table 2.15 Burbank Sanitary District per Capita Flow Rates Phase 3 Flow and Load Study City of San José			
	GPCD SF	**GPCD MF**	**GPCD MH**
2011	51	45	Not Applicable
2012	58	50	
2013	53	45	

2.2.9 County Sanitation District No. 2-3

County Sanitation District No. 2-3 provided data from 2011 to 2013 to estimate the residential per unit flow rates as well as a list of residential accounts.CSD 2-3 did not have any mobile homes in the residential accounts provided. Flow rates were obtained from winter water consumption while the property types and the number of units for each household were obtained from the list of residential accounts provided.

In general, water accounts that contained winter water consumption data were linked to the corresponding wastewater accounts to determine the property type as well as the number of units each account serves. The first step involved linking water consumption data with residential accounts through the assessor's parcel number (APN). Once the number of units and the property type for the winter water consumption data was obtained, a per unit flow rate was calculated by dividing the water consumption (in gallons) by the number of days between two successive reading dates, and then dividing again by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater than 300 GPD per unit for multi-family premise types, was obtained for both single family and multi-family premise types. The results are presented in Table 2.16 and Table 2.17.

Table 2.16 County Sanitation District No. 2-3 per Unit Flow Rates Phase 3 Flow and Load Study City of San José			
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2011	178	153	Not Applicable
2012	209	170	
2013	192	163	

Table 2.17 County Sanitation District No. 2-3 per Capita Flow Rates Phase 3 Flow and Load Study City of San José			
	GPCD SF	**GPCD MF**	**GPCD MH**
2011	49	46	Not Applicable
2012	58	52	
2013	53	50	

2.2.10 Cupertino Sanitary District

Cupertino Sanitary District provided data from 2011 to 2013 to estimate the residential per unit flow rates as well as a list of residential accounts. Cupertino did not have any mobile homes in the residential accounts provided. Flow rates were obtained from winter water consumption while the property types and the number of units for each household were obtained from the list of residential accounts provided.

In general, water accounts that contained winter water consumption data were linked to the corresponding wastewater accounts to determine the property type as well as the number of units each account serves. The first step involved linking water consumption data with residential accounts through the assessor's parcel number (APN). Once the number of units and the property type for the winter water consumption data was obtained, a per unit flow rate was calculated by dividing the water consumption (in gallons) by the number of days between two successive reading dates, and then dividing again by the number of units for each household. The per unit flow rates for each account for the winter months were then averaged per year. An average residential per unit flow rate, which excluded any flow rate greater than 400 GPD per unit for single family premise types and any flow rate greater than 300 GPD per unit for multi-family premise types, was obtained for both single family and multi-family premise types. The results are presented in Table 2.18 and Table 2.19.

Table 2.18 Cupertino Sanitary District per Unit Flow Rates Phase 3 Flow and Load Study City of San José			
	GPD/Account SF	**GPD/Account MF**	**GPD/Account MH**
2011	178	131	Not Applicable
2012	212	164	
2013	195	153	

Table 2.19 Cupertino Sanitary District per Capita Flow Rates Phase 3 Flow and Load Study City of San José			
	GPCD SF	**GPCD MF**	**GPCD MH**
2011	60	53	Not Applicable
2012	72	67	
2013	66	62	

2.2.11 Summary of Detailed Flow Analysis

Table 2.20, below, shows a summary of the data collected as part of this study relative to the current revenue program and RMC's 2013 study. The results for this study are shown as an aggregate of 2010 – 2012 data from all the agencies.

Although data was reviewed as far back as 2005, only 2010 – 2012 data was used since the data for WVSD was only obtained for these three years. Although Burbank, CSD 2-3 and Cupertino did not have data for 2010, this year was still used to allow for more data points in this analysis.

The years 2010 – 2012 were used to compare consumption data between the agencies since a review of longer consumption records show that this period had an overall lower winter water use than previous years. In fact, 2011 was substantially lower for all agencies across all residential categories. Lower water use could be indicative of low winter outdoor water use and thus a better representation of sewer flows. This is another reason the study relied on winter water consumption data from 2010 to 2012.

Table 2.20 Residential Flow Rate Comparison
Phase 3 Flow and Load Study
City of San José

Basis	Source	GPD/ Household			GPD/Capita		
		SF	MF	MH	SF	MF	MH
Current Revenue Program	1975 Data San José, Santa Clara, Milpitas, CSD 2-3, Burbank, CuSD	219	123	124	65	60	65
	2005 Study WVSD	184	160	157	70	65	65
2013 RMC Study	2011 San José Only				65	55	58
Results from this Study	All Agencies	188	138	139	59(1)	58(1)	51(1)

Note:
(1) Based on the residential household size of Santa Clara County (SF – 3.15, MF – 2.37, MH – 2.71)

2.2.12 Recommended Update to Revenue Program Residential Flow Assumptions

In order to determine the basis for updating the Revenue Program flow assumptions, several alternatives were considered. For each alternative, equity and consistency factors were considered.

- Flow Update Alternative 1: This alternative mirrors the current revenue program's methodology using a single per-capita flow assumption and countywide household densities for each customer class. Essentially, this means that each agency uses the same GPD/household value for each customer category. Because the range of per-capita flows varied among agencies (as shown in previous sections), a standard regional flow of 60 GPCD was selected as a single, representative flow. This flow, 60 GPCD, is consistent with both the results of this study and with indoor water use studies by other agencies (e.g. EBMUD) and industry design parameters (i.e., Metcalf & Eddy).
  - Pros: Consistent with most agencies in California and it can be easily administered
  - Cons: Does not consider differences between agencies, especially household densities and water demands that have been shown to vary across the region.
- Flow Update Alternative 2: This alternative is similar to Alternative 1 in that a standard 60 GPCD flow would be applied across all agencies; however, each agency would use unique household densities per the 2012 ACS census information. The result would be a unique overall flow/household for each agency.

  - Pros: Acknowledges different densities between agencies
  - Cons: May over or under estimate flow for certain agencies because specific density information is used with no corresponding adjustment to per-capita flow rates.
- Flow Update Alternative 3: Alternative 3 is the most detailed approach in that it uses agency-specific per-capita flow rates and densities.
  - Pros: This is perhaps the most equitable and defensible approach.

At a TAC workshop on October 1, 2014, the Agencies selected Alternative 3 as the preferred method because it was the most detailed and equitable. Table 2.21 presents the results of Alternative 3 (the recommended alternative). Detailed results for each alternative can be found in Appendix B. The resulting total residential flow from each agency using the Alternative 3 flow assumptions is shown in Table 2.22.

Table 2.21 Recommended Update to Revenue Program Residential Flow Assumptions
Phase 3 Flow and Load Study
City of San José

Single Family	GPCD based on 2010-2012 Consumption Data	Density – 2012 ACS Census	GPD/ Household
Milpitas	51	3.54	181
San José	60	3.34	200
Santa Clara	61	2.96	181
Burbank	55	2.76	152
CSD 2-3	53	3.63	192
CuSD	66	2.94	194
WVSD	68	2.74	186
Multi-Family	**GPCD based on 2010-2012 Consumption data**	**Density – 2012 ACS Census**	**GPD/ Household**
Milpitas	51	2.73	139
San José	53	2.53	134
Santa Clara	66	2.26	149
Burbank	47	2.64	124
CSD 2-3	49	3.29	161
CuSD	60	2.47	148
WVSD	70	2.06	144
Mobile Home	**GPCD based on 2010-2012 Consumption data**	**Density – 2012 ACS Census**	**GPD/ Household**
Milpitas(1)	63	2.24	141
San José	51	2.97	151
Santa Clara	-	2.28	-
Burbank	-	-	-
CSD 2-3	-	2.73	-
CuSD	-	-	-
WVSD	65	1.78	116

Notes:
(1) Based on weighted averages; a statistically significant dataset not available for this agency.

Table 2.22 Total Residential Flow Using the Different Flow Assumptions Phase 3 Flow and Load Study City of San José				
Flow Scenario	**Current Revenue Program (MG)**	**Alternative 1 Standard 60 GPCD Countywide Density (MG)**	**Alternative 2 Standard 60 GPCD Unique Densities (MG)**	**Alternative 3 Unique GPCD Unique Densities (MG)**
Milpitas	1,324	1,248	1,403	1,198
San José	20,362	19,374	20,604	19,727
Santa Clara	2,669	2,685	2,543	2,706
Burbank	104	98	94	81
CSD 2-3	369	319	370	326
CuSD	1,471	1,340	1,281	1,380
West Valley	2,744	2,735	2,372	2,704
Total	**29,044**	**27,800**	**28,666**	**28,122**

2.3 Residential Customer Classifications

San José, Santa Clara, and the Tributary Agencies use single-family, multi-family, and mobile home classifications to distribute O&M costs in the Revenue Program. Carollo investigated how San José, Santa Clara, and Milpitas classify each of the residential customers into each of these three groups.

In many cases, the billing data was not resolute enough to distinguish between special housing types. Instead, Carollo depended on municipal code definitions or a sampling analysis to place each of the special cases into one of the Revenue Program classifications. The sampling analysis consisted of comparing several multi-family data samples using Google Earth to the billing database classification. The results of this analysis are presented in the Table 2.23.

Ideally, each agency would use the same customer classification definitions. However, the overall discrepancies are relatively minor and potential equity discrepancies are at least partially mitigated by using each agency's unique consumption data to determined residential sewer flow rates (this is the approach recommended in Section 2.2.12). For example, Santa Clara classifies some customers as multi-family that other agencies would not consider multi-family. However, the average multi-family flows determined for Santa Clara accounts for this discrepancy and Santa Clara would pay accordingly.

Table 2.23 Residential Premise Types
Phase 3 Flow and Load Study
City of San José

Special Residential Type	San José	Santa Clara	Milpitas
Townhomes	A townhouse falls within the definition of a single family residence under San José Municipal Code Section 15.12.460, as it is designed, improved or used as a residence for one family only and does not fall into the category of a two-family residential, multiple-family residential or a residential condominium, which are also specifically defined in Section 15.12.460.	Based on a sampling analysis, Carollo found that Santa Clara classifies townhomes as multi-family units. This is consistent with Santa Clara's 2009 Wastewater Rate Study.	Based on a small sample analysis, Carollo found that Milpitas classifies townhomes as multi-family units.
Duplex	"Two-family premises" are combined with multi-family dwellings in San José's rate resolution. However, a duplex may be considered single family if it has two separate water meters.	Based on a sampling analysis, Carollo found that Santa Clara classifies duplexes as multi-family units. This is consistent with Santa Clara's 2009 Wastewater Rate Study.	Based on a sampling analysis, Carollo found that Milpitas classifies duplexes as multi-family units.
Assisted Living	Carollo found no indication that this category is associated with a residential dwelling unit type (it is considered non-residential)	Based on Santa Clara's billing database, assisted living facilities are classified as multi-family dwellings in the wastewater database. This includes the following NAICS codes: 623210 and 623312.	Carollo found no indication that this category is associated with a residential dwelling unit type (it is considered non-residential)
Rooming, Boarding Houses, Dormitories	Carollo found no indication that this category is associated with a residential dwelling unit type (it is considered non-residential)	Based on Santa Clara's billing database, boarding units are classified as multi-family dwellings in the wastewater database. This includes the NAICS codes 721310.	Carollo found no indication that this category is associated with a residential dwelling unit type (it is considered non-residential)

3.0 RESIDENTIAL LOAD CONSIDERATIONS

San José, Santa Clara, and the Tributary Agencies use consistent concentrations for residential BOD, TSS, and NH_3 discharges. Because the Agencies use different assumptions about the number of persons/dwelling unit and per-capita consumption, the calculated total loading (lbs/month or lbs/year) from each residential household is different as show in Table 3.1. Despite these differences, the Agencies are using concentrations (mg/L) that are consistent with industry practices. Without actual residential monitoring, using consistent concentrations (mg/L) is a defensible and reasonable approach. Therefore, no changes to residential strength assumptions are recommended at this time.

Table 3.1 Comparison of Residential Wastewater Strength Assumptions Used in the Revenue Program
Phase 3 Flow and Load Study
City of San José

	Flow gpd/ Capita	BOD		TSS		NH_3	
		mg/L	Lbs/ capita/ month	mg/L	Lbs/ capita/ month	mg/L	Lbs/ capita/ month
Single-Family							
All Agencies Except WVSD	65	250	4.13	250	4.13	35	0.58
WVSD	70	250	4.44	250	4.44	35	0.62
Multi-Family							
All Agencies Except WVSD	60	250	3.81	250	3.81	35	0.53
WVSD	65	250	4.13	250	4.13	35	0.58
Mobile Home							
All Agencies Except WVSD	65	250	4.12	250	4.12	35	0.58
WVSD	65	250	4.12	250	4.12	35	0.58

4.0 NON-RESIDENTIAL LOAD ASSUMPTIONS

Currently, the Agencies use Flow, BOD, TSS, and NH_3 to characterize non-residential wastewater strengths. The member agencies each employ their own set of loading assumptions. Often, these assumptions are not the same. In instances where there is no evidence to support these differences, it may more appropriate to rely on standard loading assumptions across customer types to complete the wastewater strength assessment. Carollo analyzes this alternative approach in Section 4.2.

4.1 Non-Residential Working Days

The number of working days for certain non-residential classifications is used in the revenue program to convert the total volume of sewage in each billing cycle (based on consumption data) to peak flow rate that is used for allocating capital costs in the Revenue Program. Carollo reviewed the working days assumptions used in the revenue program and found that the Agencies generally use a consistent set of assumptions that are based on common industrial workweek classifications:

- 261 Days: 5-Day workweek.
- 253 Days: 5-Day workweek with the most common 8 holidays off.
- 286 Days: 5-Day workweek with 1/2 day on Saturday.
- 278 Days: 5-Day workweek with 1/2 day on Saturday and the most common 8 holidays off.
- 313 Days: 6-Day workweek.
- 305 Days: 6-Day workweek with the most common 8 holidays off.
- 274 Days: “6/2” Schedule with 6 days on followed by 2 days off (more common in industrial practices).

Other specific schedules are applied on a per-household basis. Because the working day assumptions for a specific industrial classification may vary across cities and between businesses, it is valid for the Revenue Program to use a broad range of assumptions. Therefore, there are no specific recommendations for updating the working day assumptions in the Revenue Program.

4.2 Summary of Non-Residential Load Analysis

As described in Section 4.0, each agency employs its own set of loading assumptions for BOD, TSS, and NH_3 per non-residential customer type. These non-residential customers do not include monitored customers whose wastewater is actually measured. The other non-residential customers fall within Standard Industry Classification (SIC) Codes. In many cases, the loading assumptions are similar or identical for SIC codes in the Agencies. However, Agencies have for select SIC codes, employed loading assumptions that are different, believing that their customers actual load values deviate from the rest of the county’s. These differences can lead to a disparity between how different customers, with similar actual load values, in the same SIC code, are charged by different agencies. Table 4.1 shows a sampling of BOD loading assumptions for a few SIC codes across each agency. The sampling of BOD loading assumptions listed in Table 4.1 illustrates the fact that the Agencies occasionally, but not always, employ different loading assumptions.

Table 4.1 Examples of Current Agency BOD Load Assumptions
Phase 3 Flow and Load Study
City of San José

SIC Code	SIC Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD
2600	Paper and allied products					550	1,250	
2700	Printing and publishing			250		250		250
2800	Chemicals and allied products					130	360	
5812	Eating places	1,250	1,250	1,250	1,250	1,042		1,250
7011	Hotels and motels		310	405	310	310		310
7021	Rooming and boarding houses			250		310		
7200	Personal services				150		150	
7300	Business services	130	130	130		130	130	130

Where Agencies' loading assumptions differed, Carollo developed a single loading assumption for each SIC code in order to simplify the rate calculation process, and reduce the potential rate disparity between different customers from different agencies in the same SIC code. These values were derived from simple averages of the values from each agency. The proposed single BOD loading assumption updates are shown in Table 4.2 for the same set of SIC codes that were shown Table 4.1. A complete list of the current and proposed single value loading assumptions for all agencies is included in Appendix A.

Table 4.2 Single BOD Loading Assumption per SIC
Phase 3 Flow and Load Study
City of San José

Single BOD Loading Assumption per SIC

SIC Code	SIC Description	Proposed BOD mg/l
2600	Paper and allied products	900
2700	Printing and publishing	250
2800	Chemicals and allied products	245
5812	Eating places	1215
7011	Hotels and motels	329
7021	Rooming and boarding houses	280
7200	Personal services	150
7300	Business services	130

One of the goals in developing the single SIC code loading assumption across all agencies was to have values that would preserve county-wide revenue neutrality, and also revenue neutrality for each individual Agency. In order to test whether revenue neutrality results from the single SIC code, Carollo compared the two revenue estimates for each SIC code for each Agency. One set of estimates was based on current loading assumptions used by each Agency. The second set of estimates was based on proposed single values for each SIC code, applied uniformly across Agencies. Table 4.3 presents the shifts in Agency revenue produced by the proposed loading assumptions.

Table 4.3 Impact of Standardizing Countywide Non-residential Loading Assumptions
Phase 3 Flow and Load Study
City of San José

Agency	Current	% Share	Proposed	% Share	Change in % Share
Burbank	$8,046	0.05%	$8,006	0.05%	0.00%
CSD 2-3	35,591	0.23%	35,868	0.23%	0.00%
CuSD	1,034,398	6.76%	1,023,872	6.67%	-0.09%
Milpitas	1,391,443	9.09%	1,395,183	9.09%	-0.01%
San José	8,848,846	57.81%	8,898,703	57.94%	0.13%
Santa Clara	2,624,086	17.14%	2,627,020	17.10%	-0.04%
West Valley	1,364,344	8.91%	1,369,603	8.91%	-0.00%
Total	**$15,306,755**		**$15,358,255**		

As illustrated in Table 4.3, in aggregate, by implementing common loading assumptions across Agencies there is no shift in cost allocation between the respective Agencies. However, doing so would create a shift on an individual customer basis. Consequently, while Carollo believes that common loading assumptions across agencies would be beneficial, it should be implemented at the time that a sampling study is undertaken.

5.0 WINTER VERSUS ANNUAL NON-RESIDENTIAL FLOW ASSUMPTIONS

San José, Santa Clara, and the Tributary Agencies determine sewage flow from non-residential customers based on water consumption and, in some cases, a Return to Sewer Percentage is applied so that customers are billed a percentage of their metered water use. Specific methodologies for determining sewer flows from non-residential customers are as follows[2]:

- San José: Sewage flow is based on **winter** consumption data and a Return to Sewer Percentage is applied to approximately 164 non-residential customers over a variety of commercial types. Winter consumption data is defined as January, February, and

[2] Some exceptions may apply to specific “monitored” non-residential customers.

March in the annual Sanitary Sewer Service and Use Charges Resolution. Most reductions are applied to institutional classifications (schools, colleges, etc), medical centers, business parks, and (to a lesser extent) restaurants, hotels, motels, and boarding facilities. Return to Sewer Percentages range from 2 percent to 99 percent.

- Santa Clara: Sewage flow is based on **annual** water use and a Return to Sewer Percentage is applied to all non-residential classifications ranging from 70 percent to 90 percent. Schools are set at 24 percent and churches are set at 35 percent of meter water use to account for potential outdoor irrigation.
- WVSD: Sewage flow is based on **annual** water use. Winter consumption data and a Return to Sewer Percentage ranging from 40 to 99 is applied to approximately 158 non-residential customers over a variety of commercial types. In special circumstances, fixed consumption data is applied to approximately 33 non-residential customers.
- Burbank, CSD 2-3, and CuSD estimate non-residential sewage flows based on **annual** consumption data. For some non-residential customers, a Return to Sewer Percentage of 50 percent to 90 percent is applied. These factors are determined on an individual basis. For a few cases, parks for example, only 10 percent of the water use is assumed to return to the sewer. Newer developments install irrigation meters to separate exterior usage from indoor usage. In these cases, 100 percent of the metered indoor water usage is assumed returned to the sewer.
- Milpitas: Sewage flow is based on **annual** water use. Percent reduction factors are applied to only a handful of non-residential customers.

5.1 Winter Versus Annual Non-Residential Analysis

For non-residential water consumption, a comparison was made between estimated sewer flow based on 1) annual water consumption using Return to Sewer Percentages; and 2) the annualized winter water consumption without the application of the Return to Sewer Percentages.

5.1.1 Data Sources

Non-residential water consumption data was obtained from the San Jose Water Company, San Jose Muni Water, the City of Santa Clara, and the City of Milpitas. For the San Jose Water Company, non-residential water consumption data from January 2012 to March 2014 was available. For San Jose Muni Water, non-residential water consumption data from July 2006 to April 2014 was available. For the City of Santa Clara, water consumption data for the months of January, February, and March from 2005 to 2014 was available. For the City of Milpitas, water consumption data from January 2005 to June 2014 was available.

Other information used in this study includes the non-residential water service points obtained from both the San Jose Water Company and San Jose Muni Water. A sewer bill code report from the City of Santa Clara and water diversion rates for certain non-

residential water users obtained from the City of Milpitas were also used. The datasets all contain reduction factors that are used to indicate how much of the water usage is estimated to return to the sewers.

5.1.2 Sewer Flows based on Annual Water Consumption

Estimating sewer flows based on annual water consumption involved calculating estimated annual water consumption, with the application of the Return to Sewer Percentages. With the exception of the City of Santa Clara, the annual water consumption was estimated based on consumption data from January to December (all year).

For the City of Milpitas, non-residential water users were assigned Return to Sewer Percentages based on the information provided by the City of Milpitas. Approximately ten non-residential accounts had Return to Sewer Percentages assigned to them. The values ranged from 21 percent to 77 percent. It was assumed that the remaining non-residential accounts had a Return to Sewer Percentage of 100 percent.

For each non-residential account, using data from January to December, an average per day flow rate, which incorporates the Return to Sewer Percentages, was calculated per year. These per day flow rates were then multiplied by 365 days to obtain a yearly consumption, in million gallons (MG) of water. The estimated annual water consumption with the Return to Sewer Percentages is the sum of the estimated annual water consumption of all the non-residential water accounts. The City of Milpitas provided water consumption data from 2006 to 2013. The results are presented in Table 5.1.

For the City of San José, data was available from both the San Jose Water Company and San Jose Muni Water. Calculations were based on San Jose Muni Water consumption data from 2007 to 2013 and San Jose Water Company water consumption data from 2012 to 2013. The non-residential water consumption data was linked to the non-residential water service points to obtain the premise type as well as the corresponding Return to Sewer Percentage. The Return to Sewer Percentages ranged from approximately 1% to 100%. Any water consumption data not linking to a premise type and/or not having information regarding a Return to Sewer Percentage was excluded from the analysis.

Once the Return to Sewer Percentages were assigned, for each non-residential account, using data from January to December, an average per day flow rate, which incorporates the Return to Sewer Percentages, was calculated per year. These per day flow rates were then multiplied by 365 days to obtain a yearly consumption in million gallons (MG) of water. For each Agency, Table 5.1 presents the sum of estimated annual water consumption (including Return to Sewer Percentages) of all non-residential water accounts.

Table 5.1 Estimated Annual Consumption (MG) with Return to Sewer Percentages Phase 3 Flow and Load Study City of San José			
	City of Milpitas	**City of San José[(1)]**	**City of Santa Clara**
2006	1,960		
2007	1,641	849	
2008	1,699	881	
2009	1,401	860	
2010	1,412	839	
2011	1,445	843	2,504
2012	1,436	5,518	2,853
2013	1,575	5,525	2,774

Note:
(1) 2007-11 includes only San Jose Muni Water data, while 2012 and 2013 include San Jose Water Company data as well.

For the City of Santa Clara, the estimated annual water consumption was not calculated based on water consumption data. Instead, the estimated annual water consumption for the different years was obtained from the Revenue Program. Santa Clara's annual water consumption in the Revenue program is based on annual water use data with the application of a Return to Sewer Percentage applied to non-residential classifications. The Return to Sewer Percentage ranges from 70 to 90 percent.

5.1.3 Sewer Flows based on Annualized Winter Water Consumption

Sewer flows were estimated based on annualized winter water consumption by extrapolating annual water consumption from winter water consumption without the application of the Return to Sewer Percentages. Winter water consumption was defined as water consumed during January to March.

For the City of Milpitas, the annualized winter water consumption did not apply any Return to Sewer Percentages. The average per day flow rate for each non-residential account was calculated based on data from January to March, without incorporating any Return to Sewer Percentages. These per day flow rates were then multiplied by 365 days to obtain a yearly consumption, measured in million gallons (MG) of water. The annualized winter water consumption without the Return to Sewer Percentages is the sum of the annualized winter water consumption, without the application of the Return to Sewer Percentages, of all the non-residential water accounts. The City of Milpitas provided water consumption data from 2006 to 2013. The results are presented in Table 5.2.

For the City of San José, the annualized winter water consumption did not apply any Return to Sewer Percentages. Data was available from both the San Jose Water Company and San Jose Muni Water. Calculations were based on San Jose Muni Water consumption data

from 2007 to 2013 and San Jose Water Company water consumption data from 2012 to 2013. For each non-residential account, using data from January to March, an average per day flow rate, which did not incorporate any Return to Sewer Percentages, was calculated per year. These per day flow rates were then multiplied by 365 days to obtain a yearly consumption, in million gallons (MG) of water. The annualized winter water consumption without the Return to Sewer Percentages is the sum of the annualized winter water consumption, without the application of the Return to Sewer Percentages, of all the non-residential water accounts. The results are presented in Table 5.2.

For the City of Santa Clara, the annualized winter water consumption did not apply any Return to Sewer Percentages. The average per day flow rate for each non-residential account was calculated based on data from January to March without incorporating any Return to Sewer Percentages. These per day flow rates were then multiplied by 365 days to obtain a yearly consumption, measured in million gallons (MG) of water. The annualized winter water consumption without the Return to Sewer Percentages is the sum of the annualized winter water consumption, without the application of the Return to Sewer Percentages, of all the non-residential water accounts. The City of Santa Clara provided water consumption data from 2011 to 2013 to produce the results presented in Table 5.2.

Table 5.2 Estimated Annualized Winter Consumption (MG) without Return to Sewer Percentages
Phase 3 Flow and Load Study
City of San José

	City of Milpitas	City of San José	City of Santa Clara
2006	452		
2007	1,204	696	
2008	1,223	684	
2009	1,057	692	
2010	1,139	633	
2011	957	678	2,530
2012	1,143	3,944	2,491
2013	1,026	4,378	2,492

5.2 Winter Versus Annual Summary of Findings

The results show that in terms of non-residential water consumption, using annual water consumption data to estimate sewer discharges produces a higher water consumption estimate when compared to using annualized winter consumption data. The difference was found to be about 20 to 30 percent for San José and Milpitas, and about 10 to 15 percent for Santa Clara.

For the City of Milpitas, using annual consumption data (with Return to Sewer Percentages) was approximately 27 percent higher, based on the years from 2007 to 2013, than the

annualized winter consumption data without the application of Return to Sewer Percentages. The year 2006 was not factored into this percentage since the water consumption during this year was relatively low and did not seem to be representative of typical non-residential water consumption.

For the City of San José, using annual consumption data (with Return to Sewer Percentages) was approximately 22 percent higher than using annualized winter consumption data, based on the years from 2007 to 2013. The years 2012 and 2013 had significantly higher water consumption when compared to previous years but this is because starting in 2012, water consumption data was available for both San Jose Muni and the San Jose Water Company. Before 2012, only San Jose Muni Water consumption data was available.

For the City of Santa Clara, the estimated annual consumption with the application of Return to Sewer Percentages was approximately 11 percent higher, based on the years from 2011 to 2013, than the annualized winter consumption data without the application of Return to Sewer Percentages. Santa Clara applies aggressive reduction factors to its non-residential customers (relative to the other Tributary Agencies) and this is likely the cause of the smaller difference. For example, all non-residential customers are reduced by at least 90% if there is no separate irrigation meter. Therefore, Santa Clara was considered unique and, across the region, a difference of about 20 to 30 percent between the two non-residential sewer flow methodologies is more representative of the RWF Agencies.

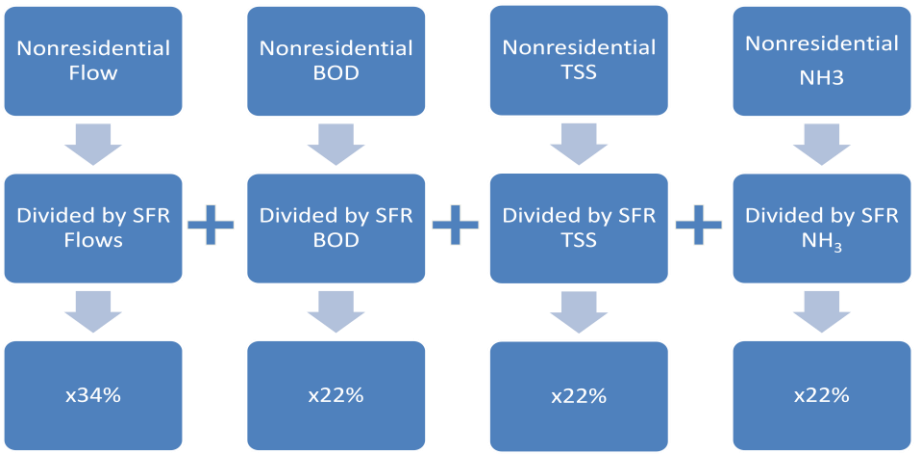
6.0 NON-RESIDENTIAL CLASSIFICATIONS

Between Agencies, there is variability in the assumed wastewater loading coming from a single class of non-residential customers. This variability was previously discussed in Section 4.2. There can be benefit in standardizing assumed loads when no Agency can show that their assumed customer class wastewater loads are significantly different the other Agencies. As Table 4.3 indicated, this method did not preserve revenue neutrality.

This section describes the potential benefit of classifying non-residential customers into groups based on common strength ratios. It will also describe the impact of this grouping method on agency cost allocation.

In order to simplify the administrative process while maintaining consistency in agency cost allocation, non-residential customer types can be grouped based on their respective Equivalent Residential Units (ERU). An ERU is the measure of customer's impact on the wastewater system as a ratio to the impact of a typical single-family residence. The ERU takes into account weighting factors such as the customer's flow, BOD, TSS, and NH_3 loadings. The ERU calculation process is presented in **Figure 6.1**.

Figure 6.1 ERU Calculation Process



The customer component inputs are represented in the top row of **Figure 6.1**. The second row represents the amount of flow, BOD, TSS, and NH_3 contributed by a single-family residence. The percentage factors in the bottom row represent the standard component weighting values. These weighting values are based on the assumed allocation of O&M and replacement capital costs from the treatment and collection facilities. An example of an ERU calculation is presented in Table 6.1.

Table 6.1 Example ERU Calculation
Phase 3 Flow and Load Study
City of San José

Customer Flow 300 gpd	Customer BOD 550 mg/L	Customer TSS 450 mg/L	Customer NH_3 80 mg/L
300 divided by 200 (typical SFR flow)	550 divided by 250 (typical SFR BOD)	450 divided by 250 (typical SFR TSS)	80 divided by 35 (typical SFR NH_3)
x34%	x22%	x22%	x22%
Flow factor = .51	BOD factor = .48	TSS factor = .40	NH_3 factor = .50
Sum of component factors = Customer's ERU value = 1.89 ERUs			

Once every customer's ERU factor is calculated, they are sorted and grouped based on a set of ERU per unit ranges. These ranges put customers with similar impacts on the wastewater system within the same group. Once grouped, each customer is assigned a strength factor derived from the average ERU per unit factor of the whole group. This assigned ERU/unit value replaces the customer's calculated ERU/unit value. This value is used to calculate the cost associated with each customer's discharge and the total cost for each city. While the ERU/unit value still needs to be calculated for each customer, the assigned value simplifies the agency cost calculations because it reduces the number of non-residential customer categories. Each group's range and assigned ERU per unit value are presented in Table 6.2.

Table 6.2 Strength Groupings
Phase 3 Flow and Load Study
City of San José

Strength Groupings	
ERU/unit Range	**Assigned ERU/unit value**
0<A<=1	0.6
1<B<=4	2.2
4<C<=7	5
7<D<=15	11
15<E<=30	20
30<F<=100	40
100<G	300

Table 6.3 presents the shifts in member agency cost allocation produce by applying the proposed grouping ranges. The right-hand column indicates that, for the most part, revenue neutrality is preserved using the grouping methodology.

Table 6.3 Impact of Grouping on Agency Cost Allocation
Phase 3 Flow and Load Study
City of San José

	Current Allocation		Allocation with Grouping		Change in
Agency	**Total Share**	**% Share**	**Total Share**	**% Share**	**%**
Burbank	$8,046	0.05%	$6,956	0.05%	-0.01%
CSD 2-3	35,591	0.23%	36,539	0.24%	0.01%
CuSD	1,034,398	6.76%	934,611	6.10%	-0.66%
Milpitas	1,391,443	9.09%	1,437,309	9.38%	0.29%
San José	8,848,846	57.81%	8,809,259	57.48%	-0.33%
Santa Clara	2,624,086	17.14%	2,649,849	17.29%	0.15%
West Valley	1,364,344	8.91%	1,450,652	9.47%	0.55%
Total	**$15,306,755**		**$15,325,175**		

The method of grouping customers by ERU factors both simplifies the administrative process and maintains consistency in agency cost allocation. Carollo recommends that the member agencies implement the proposed grouping methodology.

7.0 MASS BALANCE

A mass balance can be performed in order to evaluate the reasonableness of the current customer data assumptions for flow, BOD, TSS, and NH_3 relative to measured influent at the plant, as well as the assumptions for proposed changes to these components.

The mass balance compares the measured flow, BOD, TSS, and NH_3 entering the plant to the calculated values that result from the current rate calculation process, as well as the calculated values from the proposed alternatives.

The results of the mass balance are presented in Table 7.1. The first row of the table shows the measured values for flow, BOD, TSS, and NH_3 at the plant. The second row in the table shows the calculated values based on the flow and loading assumptions used in the current revenue plan. Subsequent rows show the calculated flow and load values for the various alternatives that are presented in this TM.

Table 7.1 Mass Balance
Phase 3 Flow and Load Study
City of San José

Mass Balance	Flow (mgd)	BOD (lbs/day)	TSS (lbs/day)	NH_3 (lbs/day)
Influent Plant Loading	113(1)	273,302(2)	260,579(2)	29,347(2)
Current Calculated Total	115	192,782	181,459	24,553
Calculated Total with Non-Residential Groupings	115	192,806	181,473	24,554
Calculated Total with Proposed Residential Assumptions(3)	113	192,782	181,459	24,553
Calculated Total with Proposed Residential Assumptions and Non-Residential Groupings(3)	113	192,806	181,473	24,554

Notes:

(1) Based on the latest (2013) Report to TPAC on November 6th, 2013. Based on peak dry weather flow that occurred from September 16th - 20th, 2013.

(2) Based on influent plant monitoring data from September 16th - 20th, 2013.

(3) Proposed Residential Assumptions are calculated under the 400 gpcd cap for SF, 300 gpcd cap for MF, and the 300 gpcd cap for MH.

Several conclusions can be reached from comparing the different rows in the table.

- The flow values for the current revenue plan as well as all of the alternatives roughly approximate the amount of flow that enters the plant on an aggregate basis.

- The loading values for the current revenue plan understate the amount of BOD, TSS, and NH_3 entering the plant.
- Each of the alternatives presented in this TM present calculated flow, BOD, TSS, and NH_3 values that are almost equal to the values used in the current revenue plan.

Based on these conclusions, the alternatives and their respective flow and loading assumptions are consistent with the current revenue plan. In order to improve the accuracy of the alternatives in relation to the loads measured at the plant, a load sampling evaluation should be undertaken. Such an effort would take several years to complete and could still likely result in a measured versus calculated loads discrepancy of somewhere in the 5 to 15 percent range.

8.0 SUMMARY AND RECOMMENDATIONS

The following sections summarize Carollo's major conclusions and recommendations.

8.1 Residential Flow Assumptions

Residential flow assumptions have not been updated since 1975. Based on the findings of this study and prior studies, the current revenue program residential flow assumptions do not reflect current usage characteristics on an agency by agency basis. Carollo recommends updating these assumptions using a unique flow assumption per household for each Agency and customer classification. The merits of this approach were weighed against several alternatives and discussed at a TAC Workshop on October 1, 2014. This methodology was found to be the most accurate and equitable. Based on this finding, detailed flow assumptions are provided based on winter water consumption data for all the agencies.

To create a unique set of flow assumption for each Agency, Carollo evaluated almost 666,000 consumption records to estimate sewer flows. Winter data was used to estimate sewer flows and Carollo's review of Return to Sewer Percentages shows that this is an industry-accepted approach and relevant to the RWF service area. However, a 400 GPD cap for single family premise types and a 300 GPD cap for both multi-family and mobile home premise types was used to eliminate outliers associated with outdoor irrigation (even in the winter), data integrity issues, as well as issues with linking the number of multi-family and mobile home accounts to the associated water consumption records. The result of this work is an approach that is equitable and defensible and provides the best representation of sewer flows. It also uses a methodology that is simple to update based on future census data and consumption records.

8.2 Residential Strength Parameters

Without actual residential monitoring of residential wastewater strength, following the standard industry practice of assuming consistent concentrations is a defensible and reasonable approach. Therefore, no changes to residential strength assumptions are recommended at this time.

However, because the mass balance resulted in inconsistent loadings at the plant relative to the Revenue Program, it is recommended that the Tributary Agencies conduct a wastewater strength-sampling program. It is unknown whether the cause of the discrepancy is due to residential or non-residential loading assumptions. A residential strength-sampling program should be commissioned first to see if the residential parameters are accurate. A residential sampling program will be easier to implement than one for non-residential customers.

8.3 Non-Residential Flow Analysis

There is no universal industry standard for estimating sewage flows across broad ranges of commercial and industrial classifications. Based on Carollo's experience, winter water usage with a reduction factor, if applicable, is a common approach. It is reasonable that flows from the various non-residential dischargers within the RWF service area will vary (even those with the same SIC designation). However, the methods for calculating those flows for the purposes of allocating costs in the Revenue Program should be consistent.

The major discrepancy among the RWF users is that San José uses winter consumption data to bill non-residential customers, while the City of Santa Clara and the other Tributary Agencies use annual water use with a Return to Sewer Percentage. This study investigated the potential differences caused by these two methods. The results show that using annual water consumption data to estimate sewer discharges produces about 20-30% more sewer flow when compared to using annualized winter consumption data.

Without substantial flow monitoring data, it is not possible to definitively determine which approach is more accurate. Because both approaches are reasonable, it is Carollo's opinion that the decision to use winter vs. annual billing data should be left to each Agency's judgment based on their unique characteristics, customer base, metering capabilities, and data collection abilities.

8.4 Non-Residential Strength Parameters

This study found that not all Agencies use the same non-residential loading assumption for all SIC codes. Although many of the SIC loading assumptions are the same, the study found some discrepancies. Single loading assumptions per SIC code would preserve overall revenue neutrality as well as equity amongst the Agencies. If the Agencies wish to maintain the current policy whereby Agencies have occasionally reported their own loading

assumptions to represent specific SIC codes, we suggest performing a sampling program, for the different SIC codes, where none has been recently performed, in order to develop defensible loading assumptions. As described in Section 4.2, standardizing non-residential customer loading assumptions results in a system that preserves revenue neutrality. Carollo does recommend that the member agencies implement the single value loading assumptions for non-residential customer types once a sampling study is completed.

Additionally, the method described in Section 6.0 of grouping customers by ERU factors both simplifies the administrative process and maintains consistency in agency cost allocation. Using categories that place commercial customers into common wastewater strength ranges may be a more realistic approach as it recognizes that the specific wastewater parameters of each SIC code is not known and is difficult to quantify. Carollo recommends that the Agencies implement the proposed grouping methodology. However, because the current approach is valid and the current parameters align with the State Revenue Program Guidelines, the ERU cost factor methodology should only be considered if the Tributary Agencies agree that the simplified methodology outweighs any administrative burden associated with its implementation.

8.5 Mass Balance Analysis

A mass balance was performed in order to evaluate the reasonableness of the current customer data assumptions for flow, BOD, TSS, and NH_3 relative to measured influent at the plant. It was also conducted to test how proposed changes (identified by this study) would change the mass balance relative to the current revenue program.

The study found that flow values for the current revenue program roughly approximates the amount of flow that enters the plant, but understates the amount of BOD, TSS, and NH_3 entering the plant. Because the mass balance resulted in inconsistent loadings at the plant relative to the Revenue Program, it may be necessary to conduct a wastewater strength-sampling program. It is unknown whether the cause of the discrepancy is due to residential or non-residential loading assumptions. A residential strength-sampling program should be commissioned first to see if the residential parameters are accurate.

Furthermore, the study tested how proposed changes would change the mass balance relative to the current revenue program, and found no inconsistencies. This includes the recommended residential flow assumptions and the non-residential “ERU groupings” described in Section 6.0.

9.0 REVENUE PROGRAM UPDATES

Overall, it is recommended that San José-Santa Clara evaluate the Revenue Program assumptions every 10 years to ensure accuracy and equity. This may include a combination of updating the household densities used to estimate residential sewer flows based on the latest census information and review of water consumption data. It may also

include updating residential and non-residential wastewater strength parameters based on more current loadings data.

APPENDIX A - PRELIMINARY FLOW ANALYSIS

APPENDIX A – COMPARISON OF NON-RESIDENTIAL WASTEWATER STRENGTH

BOD Assumptions used in the Revenue Program (mg/L)

SIC Code	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
1770	Concrete Work					130			130
2000	Food and Kindred Prod						1,120		1120
2011	Meat packing plants					415			415
2020	Dairy Prod					1,130			1130
2050	Bakery Prod					720			720
2084	Wines, brandy					1,870		1,870	1870
2086	Soft Drinks					1,030			1030
2600	Paper and Allied Prod					550	1,250		900
2700	Printing & Publishing			250		250		250	250
2800	Chemicals and Allied Prod					130	360		245
2851	Paints and Allied Prod					130			130
3400	Fabricated Metal Prod					10	10	10	10
3500	Industrial Machinery and Equipment			290		290	290	290	290
3600	Electronic Equipment			30		30	30	30	30
3800	Instruments and related						30		30
3900	Misc Manufacturing Prod					130			130
4225	General warehousing					150			150

SIC Code	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
4953	Refuse Systems					130			130
5261	Retail Nurseries					300			300
5411	Grocery Stores					475			475
5461	Retail bakeries					1,000			1000
5500	Automotive Dealer and Service					180	180		180
5541	Gas Service Station		180	180	180	180		180	180
5800	Eating and Drinking						1,250		1250
5812	Eating	1,250	1,250	1,250	1,250	1,042		1,250	1215
5813	Drinking					200			200
5900	Misc Retail					230			230
6000	Depository Institutions				130				130
6553	Cemetery Developers					150			150
7000	Hotels and other lodging						310		310
7011	Hotels and Motels		310	405	310	310		310	329
7021	Rooming and Boarding			250		310			280
7200	Personal Services				150		150		150
7211	Power Laundries		150	150		150		150	150
7216	Dry-cleaning plants					450			450
7218	Industrial Launderers							670	670
7231	Beauty Shops					150			150
7261	Funeral Services					800			800
7300	Business	130	130	130		130	130	130	130

SIC Code	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
	Services								
7384	Photofinishing Labs					150		160	155
7389	Other Business Services					3		3	3
7500	Auto repair Services						180		180
7521	Automobile Parking	180				130			155
7530	Automotive Repair Shops					180			180
7542	Carwashes			20		20		20	20
7549	Automotive Services					200			200
7832	Movie Theaters					190			190
7990	Misc Recreation		250			200			225
7996	Amusement Parks					130			130
7997	Sports & Clubs					150			150
7999	Other Amusement		180						180
8000	Health Services		180			190	230		200
8200	Educational Services	130		130	130		130	130	130
8211	Elementary and Secondary Schools					130			130
8220	Colleges and Universities					130			130
8300	Social Services		230	230	271	230		230	238
8661	Religious Organizations		250						250
8711	Architectural Services					130			130

TSS Assumptions used in the Revenue Program (mg/L)

SIC CODE	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
1770	Concrete Work					80			80
2000	Food and Kindred Prod						690		690
2011	Meat packing plants					233			233
2020	Dairy Prod					445			445
2050	Bakery Prod					400			400
2084	Wines, brandy					1,200		1,200	1200
2086	Soft Drinks					65			65
2600	Paper and Allied Prod					1,260	560		910
2700	Printing & Publishing			500		500		500	500
2800	Chemicals and Allied Prod					80	720		400
2851	Paints and Allied Prod					80			80
3400	Fabricated Metal Prod					60	60	60	60
3500	Industrial Machinery and Equipment			550		550	550	550	550
3600	Electronic Equipment			15		15	15	15	15
3800	Instruments and related						15		15
3900	Misc Manufacturing Prod					80			80
4225	General warehousing					150			150
4953	Refuse Systems					80			80
5261	Retail Nurseries					280			280

SIC CODE	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
5411	Grocery Stores					475			475
5461	Retail bakeries					600			600
5500	Automotive Dealer and Service					280	280		280
5541	Gas Service Station		280	280	280	280		280	280
5800	Eating and Drinking						560		560
5812	Eating	560	560	560	560	587		560	565
5813	Drinking					200			200
5900	Misc Retail					190			190
6000	Depository Institutions				80				80
6553	Cemetery Developers					150			150
7000	Hotels and other lodging						121		121
7011	Hotels and Motels		121	361	121	121		121	169
7021	Rooming and Boarding			250		121			186
7200	Personal Services				110		110		110
7211	Power Laundries		110	110		110		110	110
7216	Dry-cleaning plants					240			240
7218	Industrial Launderers							680	680
7231	Beauty Shops					150			150
7261	Funeral Services					800			800
7300	Business Services	80	80	80		80	80	80	80
7384	Photofinishing Labs					150		60	105
7389	Other					55		55	55

SIC CODE	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
	Business Services								
7500	Auto repair Services						280		280
7521	Automobile Parking	280				80			180
7530	Automotive Repair Shops					280			280
7542	Carwashes			150		150		150	150
7549	Automotive Services					1,350			1350
7832	Movie Theaters					210			210
7990	Misc Recreation		250			200			225
7996	Amusement Parks					80			80
7997	Sports & Clubs					150			150
7999	Other Amusement		280						280
8000	Health Services		250			90	85		142
8200	Educational Services	100		100	100		100	100	100
8211	Elementary and Secondary Schools					100			100
8220	Colleges and Universities					100			100
8300	Social Services		85	85	142	85		85	96
8661	Religious Organizations		250						250
8711	Architectural Services					80			80

NH^3 Assumptions used in the Revenue Program (mg/L)

SIC CODE	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
1770	Concrete Work					11			11
2000	Food and Kindred Prod						-		10
2011	Meat packing plants					2			7
2020	Dairy Prod					20			20
2050	Bakery Prod								20
2084	Wines, brandy					3		3	3
2086	Soft Drinks								11.5
2600	Paper and Allied Prod					7	10		9
2700	Printing & Publishing			-				-	11
2800	Chemicals and Allied Prod					11	-		11
2851	Paints and Allied Prod					11			11
3400	Fabricated Metal Prod					1	1	1	1
3500	Industrial Machinery and Equipment			-			-	-	5
3600	Electronic Equipment			30		30	15	30	26
3800	Instruments and related						15		15
3900	Misc Manufacturing Prod					11			11
4225	General warehousing					11			11
4953	Refuse Systems					11			11
5261	Retail Nurseries					11			11

SIC CODE	Description	Burbank	CSD 2-3	CuSD	Milpitas	San José	Santa Clara	WVSD	Proposed Countywide Assumptions
5411	Grocery Stores					11			11
5461	Retail bakeries					11			11
5500	Automotive Dealer and Service					11	11		11
5541	Gas Service Station		-	-	-			-	11
5800	Eating and Drinking						10		10
5812	Eating	10	10	10	10	11		10	10
5813	Drinking					11			11
5900	Misc Retail					11			11
6000	Depository Institutions				11				11
6553	Cemetery Developers					11			11
7000	Hotels and other lodging						7		7
7011	Hotels and Motels		7	21	7	7		7	10
7021	Rooming and Boarding			35		11			23
7200	Personal Services				5		5		5
7211	Power Laundries		5	5		5		5	5
7216	Dry-cleaning plants					11			11
7218	Industrial Launderers							2	2
7231	Beauty Shops					11			11
7261	Funeral Services					11			11
7300	Business Services	11	11	11		11	11	11	11
7384	Photofinishing Labs							-	11

7389	Other Business Services							-	11
7500	Auto repair Services						-		11
7521	Automobile Parking	-				11			11
7530	Automotive Repair Shops								11
7542	Carwashes			-				-	
7549	Automotive Services								11
7832	Movie Theaters					11			11
7990	Misc Recreation		35			11			23
7996	Amusement Parks					11			11
7997	Sports & Clubs					11			11
7999	Other Amusement		-						23
8000	Health Services		-			11	15		13
8200	Educational Services	30		30	30		30	30	30
8211	Elementary and Secondary Schools					30			30
8220	Colleges and Universities					30			30
8300	Social Services		15	15	13	15		15	15
8661	Religious Organizations		35						35
8711	Architectural Services					11			11

APPENDIX B – 2014 FLOW AND LOADS STUDY – RESIDENTIAL FLOW ASSUMPTIONS ALTERNATIVES

Agency		Current Assumptions			Alternative 1 Assumptions			Alternative 2 Assumptions			Alternative 3 Assumptions		
SFR	# of units	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd
Milpitas	12,229	65	3.37	2,678,762	60	3.15	2,311,281	60	3.54	2,597,440	51	3.54	2,207,284
San José	181,039	65	3.37	39,656,593	60	3.15	34,216,371	60	3.34	36,280,216	60	3.34	36,280,216
Santa Clara	17,103	65	3.37	3,746,412	60	3.15	3,232,467	60	2.96	3,037,493	61	2.96	3,088,118
Burbank	946	65	3.37	207,221	60	3.15	178,794	60	2.76	156,658	55	2.76	143,603
CSD 2-3	4,545	65	3.37	995,582	60	3.15	859,005	60	3.63	989,901	53	3.63	874,413
CuSD	15,390	65	3.37	3,371,180	60	3.15	2,908,710	60	2.94	2,714,796	66	2.94	2,986,276
West Valley	31,496	70	2.63	5,798,414	60	3.15	5,952,744	60	2.74	5,177,942	68	2.74	5,868,335
SFR Subtotal				**56,454,164**			**49,659,372**			**50,954,445**			**51,448,783**

Agency		Current Assumptions			Alternative 1 Assumptions			Alternative 2 Assumptions			Alternative 3 Assumptions		
MFR	# of units	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd
Milpitas	7,143	60	2.05	878,589	60	2.37	1,015,735	60	2.73	1,168,994	51	2.73	994,520
San José	120,294	60	2.05	14,796,162	60	2.37	17,105,807	60	2.53	18,244,560	53	2.53	16,130,222
Santa Clara	28,998	60	2.05	3,566,754	60	2.37	4,123,516	60	2.26	3,928,669	66	2.26	4,352,342
Burbank	633	60	2.05	77,859	60	2.37	90,013	60	2.64	100,179	47	2.64	78,543
CSD 2-3	114	60	2.05	14,022	60	2.37	16,211	60	3.29	22,484	49	3.29	18,378
CuSD	5,366	60	2.05	660,018	60	2.37	763,045	60	2.47	794,541	60	2.47	795,241
West Valley	10,287	65	2.46	1,644,891	60	2.37	1,462,811	60	2.06	1,270,354	70	2.06	1,483,385
MFR Subtotal				**21,638,295**			**24,577,137**			**25,529,781**			**23,825,631**

Agency		Current Assumptions			Alternative 1 Assumptions			Alternative 2 Assumptions			Alternative 3 Assumptions		
MH	# of units	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd	gpcd	Cap/unit	gpd
Milpitas	570	65	1.9	70,395	60	2.71	92,682	60	2.24	76,608	63	2.24	80,438
San José	10,801	65	1.9	1,333,924	60	2.71	1,756,243	60	2.97	1,924,738	51	2.97	1,636,027
Santa Clara	0	65	1.9	0	60	2.71	0	60	2.28	0		2.28	
Burbank	0	65	1.9	0	60	2.71	0	60	0	0		0	
CSD 2-3	0	65	1.9	0	60	2.71	0	60	2.73	0		0	
CuSD	0	65	1.9	0	60	2.71	0	60	0	0		0	
West Valley	483	65	2.41	75,662	60	2.71	78,536	60	1.78	51,584	65	1.78	55,883
MH Subtotal				**1,479,980**			**1,927,460**			**2,052,931**			**1,772,349**
RESIDENTIAL TOTAL				**79,572,440**			**76,163,969**			**78,537,156**			**77,046,763**

APPENDIX C – WEST VALLEY SANITATION DISTRICT 2014 STUDY

Technical Memorandum

West Valley Sanitation District Residential Wastewater Unit Flow Rate Analysis

Subject:	**Residential Wastewater Flow Rate Analysis**
Prepared For:	Ed Oyama, West Valley Sanitation District
Prepared by:	Winola Cheong, RMC
Reviewed by:	Marc Nakamoto, RMC
Date:	June 12, 2014

West Valley Sanitation District (District) uses wastewater flow factors to annually estimate wastewater discharged from their service area. The estimate is used as a basis for annual cost sharing for operation of the San Jose/Santa Clara Regional Wastewater Facility. As population and indoor water use change with time, the District retained RMC to study the District's latest residential wastewater flow factors. This technical memorandum (TM) summarizes the approach and findings for estimating the per capita wastewater flow rates for the District's three residential categories: single family, multi-family, and mobile homes.

This TM is organized in the following sections:

1 Summary of Approach & Findings 1

2 Data Analysis Process 1

3 Estimated Residential Household Population 6

4 Estimated Residential Water Use and Per Capita Flow Rate 6

5 Refined Residential Per Capita Wastewater Flow Rate 9

1 Summary of Approach & Findings

Winter water billing data obtained from the San Jose Water Company and the District's wastewater customer database provided the basis for estimating the wastewater flow rate for each housing category (single family, multi-family, mobile home). In addition, sewer flow monitoring data from 2011 to 2013 were used to validate and refine the wastewater flow rate estimates for the single family category. Household populations and housing estimates from the Census Bureau's American Community Survey (ACS) provided the basis for the household size estimates. Table 1 summarizes the findings of this analysis. Additional discussion on the basis of these findings is included in subsequent sections of this TM.

Table 1: Residential Flow Rate Analysis Summary

Housing Category	Average Household Wastewater Flow (gpd/HH)	Average Household Size (pp/HH)	Average Per Capita WW Flow Rate (GPCD)
Single Family	180	2.74	67
Multi-Family	135	2.06	65
Mobile Home	117	1.78	66

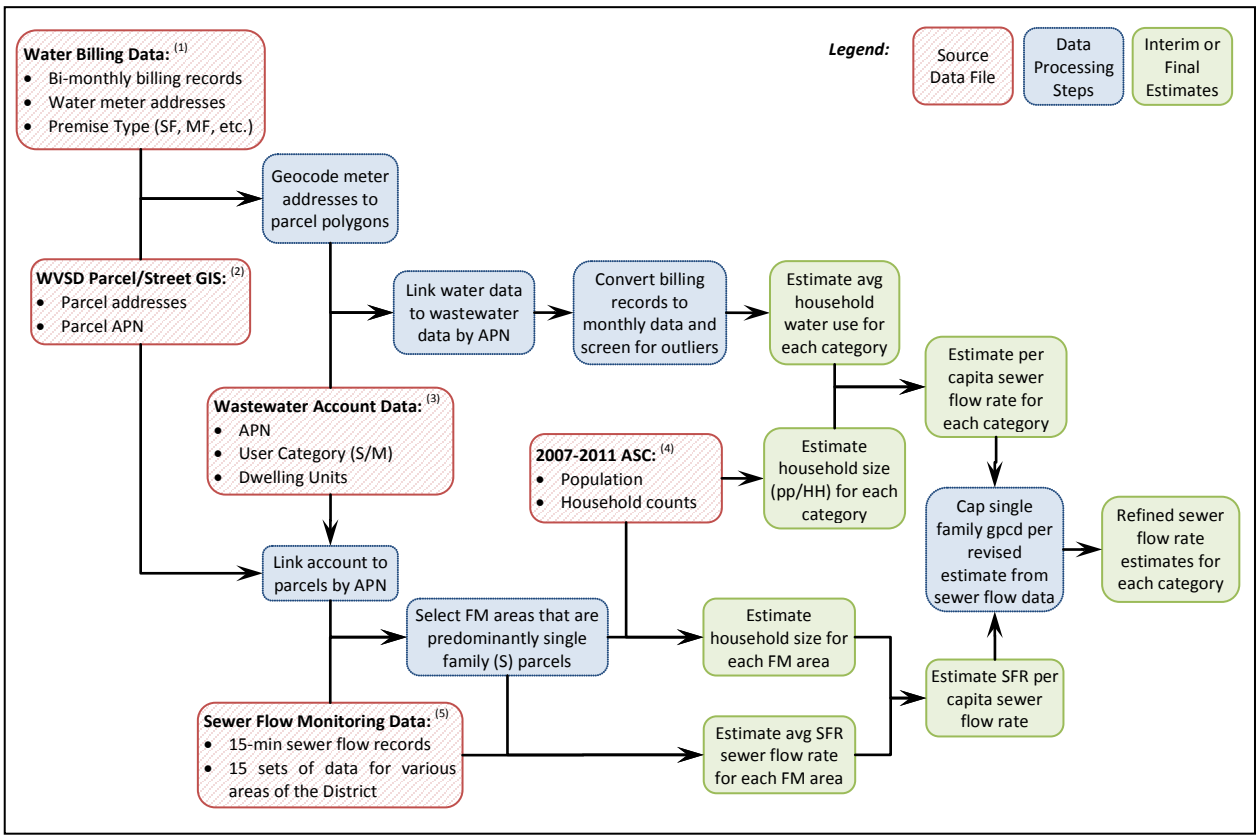
Notes:

1. Based on 2011 winter water use data with a flow cap on single family residential sewer flow. Refer to Section 2.3.

2 Data Analysis Process

Residential per capita wastewater flow rates for each housing category were estimated based on their average winter water use, number of dwelling units according to the District's wastewater account database, and estimated household sizes from the latest 5-year American Community Survey (ACS). Estimated flow rate for the single family category was further validated using sewer flow monitoring data from previous modeling efforts. **Figure 1** illustrates the data processing steps involved in this analysis.

Figure 1: Data Analysis Process



Footnotes:

(1) West_Valley_Sanitation_District_Dec_2009_to_May_2012_v2.xlsx, provided by San Jose Water Company
(2) WVSD 062212_RMC.gdb, provided by the District
(3) AIMS_WVSD_Apr_FY12.dbf, provided by the District
(4) 5-year (2007-2011) American Community Survey (ASC) estimates, from http://factfinder2.census.gov.
(5) Quito Basins 3 & 4 sewer flow monitoring data from 2011, V&A sewer flow monitoring data from 2012 and 2013.

2.1 Available Data and Files

The following data were used for this study:

- ***Winter Water Consumption:***

  The District's wastewater customers receive water services from the San José Water Company (SJWC). Water consumption data from December 2009 to May 2012 was provided for accounts within Los Gatos, Campbell, Saratoga, and Monte Sereno. In addition to these accounts, there are a few smaller areas that are within the District's service boundary but are located outside of these cities. Water consumption data for these accounts was difficult to extract from SJWC's database and was therefore excluded from this analysis. A total of about 35,000 water accounts were provided for this analysis.

The water account data included information on type of premise (single family, multi-family, etc.) and type of meter (e.g., irrigation, fire, or domestic water). Irrigation and fire meter records were excluded from this analysis. It should be noted that the premise designations for the water accounts do not necessarily correspond to the District's wastewater billing classifications. For example, a premise designated as "CO" for commercial water account could be an apartment complex and classified as multi-family in the District's wastewater account database. For this analysis, wastewater flow rate estimates for each residential category was based on the District's wastewater billing classifications, not SJWC's water account premise designations – with the exception of mobile homes – the District's database did not specify mobile homes from multi-family classification. There were a total of three mobile home accounts in the water database (premise type "MH"). These accounts were mapped to the corresponding wastewater accounts and are the basis for estimating the wastewater flow rate for the mobile home category.

Further, for the purpose of this analysis, "winter" consumption refers to the 3-month period from January through March, when irrigation/outdoor use is considered to be generally minimal during typical years, thereby providing an estimate of wastewater discharge.

- ***Residential Wastewater Accounts and Number of Dwelling Units***

  The District bills residential wastewater customers based on housing type (single family or multi-family). The District provided data from its wastewater billing database, including each account's billing classification (single family [S] or multi-family [M]), number of units, address and assessor's parcel number (APN). As explained above, wastewater flow rate estimate for each category was based on the District's wastewater billing classification, except for the three mobile home accounts.

- ***Parcel and Streets Mapping***

  Parcel and streets GIS mapping provided the basis for locating both wastewater and water accounts for the purpose of linking water use for individual water accounts to wastewater classification and number of units.

- ***ACS Population and Housing at the Census Tract Level***

  As part of a flow rate study conducted for the City of San Jose in 2012, population and household data from various sources were reviewed, and the 5-year ACS estimates were determined to be the most appropriate source of information for household size information for the different housing types. To be consistent with the 2012 study, the same ACS estimates were used for this analysis. Household size based on only those census tracts that overlay the available water use data were used.

In general, in order to estimate per capita wastewater flow rates, water accounts were linked to the corresponding wastewater accounts to determine the housing category as well as the number of units each account serves. Mapping of the accounts based on APN and/or address using the GIS parcels and streets layers provided the basis for linking these accounts. Water use data for matched accounts were screened to include only data with consistent usage. Average flow rates per dwelling unit were then estimated based on the number of wastewater units and linked water use data.

The preliminary per capita flow rate estimates for multi-family and mobile home were considered reasonable when compared to values used by other neighboring cities and matched wastewater flow estimates based on sewer flow monitoring data. However, the single family category showed a wide range of winter water use including a significant number of accounts with values above what is typically expected for single family household indoor use. Subsequent review of the large single family water users identified that many have large parcels and had consistently high water use throughout the year, suggesting irrigation during the winter periods was occurring. To evaluate the proportion of winter water

use discharging to the sewer from these large water users, sewer flow monitoring data from previous modeling efforts were analyzed. The results from this analysis were then used to refine the single family wastewater flow rate. This is further discussed in Section 4.

2.2 Linking Water Accounts to Wastewater Accounts

Correctly linking the water accounts to the wastewater accounts was a critical step in the process. The water database holds the information on average water use per account; while the wastewater database holds information such as the account category (single family versus multi-family) as well as the number of dwelling units. Once linked, they form the basis for estimating the average household wastewater flow rate for each category. In order to make the most use of the available data, several different approaches were used for linking single family, multi-family, and mobile home accounts. These approaches are discussed below.

Single Family Residential

Linking single family's wastewater and water accounts was fairly straightforward. Wastewater accounts include both address and APN. A high percentage of them were correctly mapped to the District's parcels GIS file by APN (over 90%). SJWC's water database includes only address, no APN. Accounts were therefore mapped to GIS parcels based on address. Over 80% of all water accounts were successfully mapped to the GIS parcels file. The rest were mapped to the GIS streets file such that the water accounts could be placed in the general vicinity. Selected accounts were then matched manually to their corresponding parcels. At the end, about 84% of all single family wastewater accounts were successfully linked to their water accounts. The remaining accounts were excluded from the analysis.

Multi-Family Residential

Linking multi-family's wastewater and water accounts was a more complex process. Many multi-family complexes have master water meters, in which several individual dwelling units with separate wastewater accounts may be served by a single water account, or vice versa. Sometimes the wastewater account(s) may be registered with the same or different street addresses as the water account(s), with the same or different APNs. A more manual process was required to associate these wastewater units with the correct water accounts. Several iterations of linking water use data and wastewater units were followed, each focusing on a different type of situation in order to link as many units to water data as possible. About 86% of multi-family wastewater units were linked to water use data. The remaining accounts were excluded from the analysis.

Mobile Homes

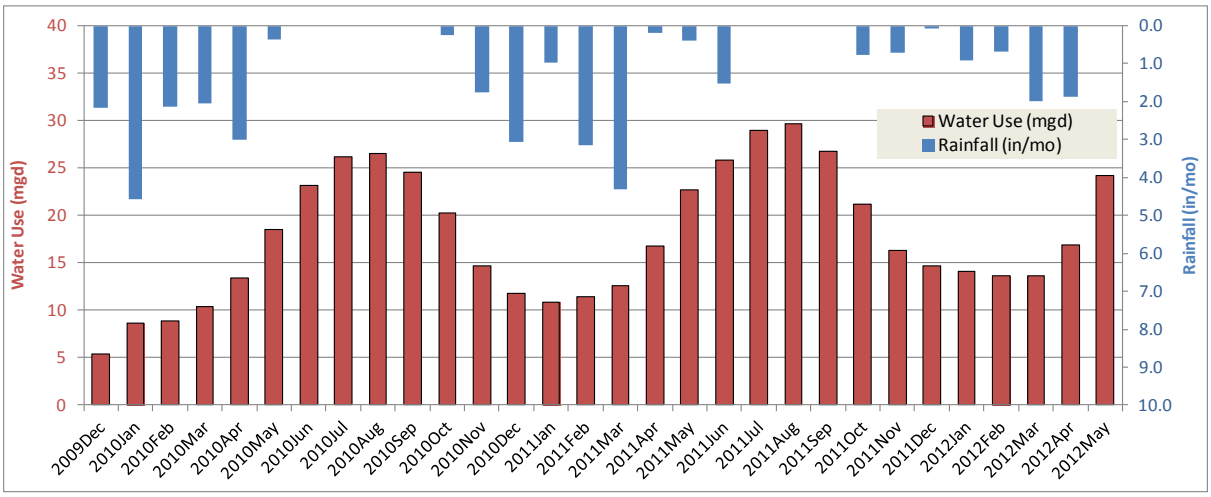
There are only three mobile home accounts in the SJWC's water account database. These accounts were manually mapped to their wastewater accounts. Therefore, 100% of mobile home units were linked to their water accounts.

2.3 Processing Water Use Data

The next step in the analysis was to convert the water use data into a usable format. SJWC bills most of its residential customers on a bi-monthly basis (but not always consistently on a 60-day period), in units of hundreds of cubic foot (CCF). The data were therefore first processed into daily usage (in units of gallons per day, or gpd) based on the reading dates and then averaged for each month. Data between the three winter years was then compared and screened to eliminate accounts with inconsistent use patterns.
The initial intention was to estimate average water use based on the three years of winter water use data collected. However, when comparing the total monthly water use (**Figure 2**), water usage from December 2009 to February 2010 was noticeably lower than the same months in 2011 and 2012. Review of the 2009/2010 winter data found that there were missing water use records in the data set. Therefore, January 2010 to March 2010 data were excluded from the analysis.

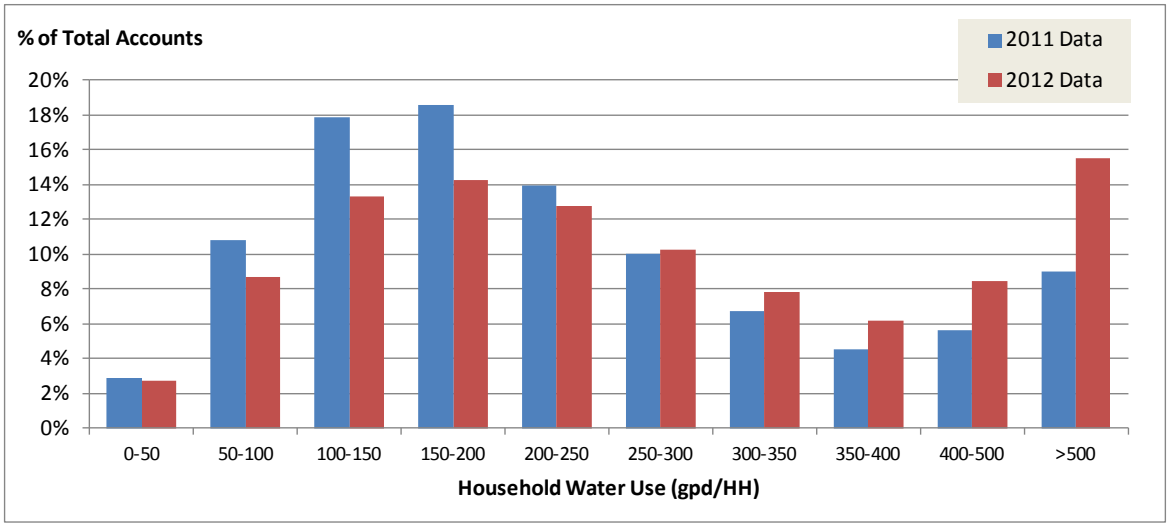
A comparison of 2011 and 2012 winter water data indicated significantly higher water use in 2012. Rainfall data were downloaded from the National Oceanic and Atmospheric Administration's (NOAA's) Climatic Data Center and reviewed. **Figure 2** shows that there was noticeably more precipitation in 2011 than in 2012, suggesting that the difference in total water use is likely due to greater irrigation use in 2012, as it was an unusually dry winter.

Figure 2: Total Water Use in December 2009 to May 2012



To validate this observation, we compared the number of accounts in 2011 versus 2012 that fell into a certain water use range. **Figure 3** shows the comparison for single family homes, which shows more 2011 accounts in the lower consumption ranges (<250 gpd/HH) compared to 2012. For multi-family and mobile homes, the 2011 and 2012 water use were similar. The impact of dry years on outdoor water use is greatest for single family homes with large parcels, as many have lawns, and separate landscape water meters are uncommon. Based on winter water use data and understanding of the District's service area, the study team concluded that water use in the winter of 2011 provided a more representative wastewater flow rate than 2012.

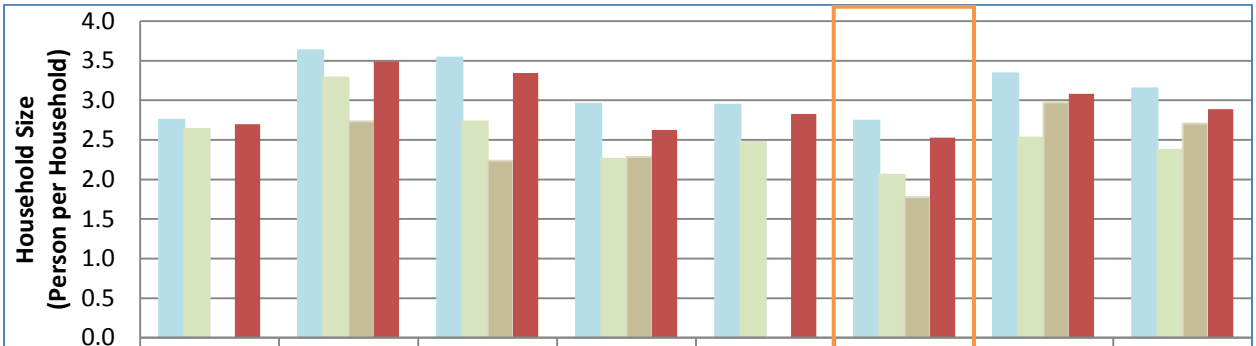
Figure 3: Single Family Water Use Distribution in 2011 vs. 2012



3 Estimated Residential Household Population

As part of a flow rate study conducted for the City of San Jose in 2012, population and household data from three sources were reviewed: United States Decennial Census, ACS, and California Department of Finance (DOF). The ACS was deemed the most complete source for this type of analysis, as it is the only one that provides estimates for both population and occupied housing units by residential category (single family, multi-family, etc). The ACS estimates are developed by the U.S. Census Bureau based on annual surveys of a sample of the population, and the Census Bureau releases 1-year, 3-year, and 5-year estimates annually. Since the 5-year estimates are derived from the largest sample size (5 years of participants), they were considered the most appropriate to use for this type of analysis. **Figure 4** provides the district-wide household sizes based on the 2007-2011 5-year ACS estimates (the most recent available), and also shows how they compared to those of other tributary agencies to the San Jose/Santa Clara RWF, as well as the county-wide estimates.

Figure 4: Household Size Estimates



	Burbank Sanitary District	County Sanitation District 2 & 3	City of Milpitas	City of Santa Clara	Cupertino Sanitary District	West Valley Sanitation District	City of San Jose	Santa Clara County
SFR	2.76	3.63	3.54	2.96	2.94	2.74	3.34	3.15
MFR	2.64	3.29	2.73	2.26	2.47	2.06	2.53	2.37
MH	0.00	2.73	2.24	2.28	0.00	1.78	2.97	2.71
Overall	2.70	3.49	3.34	2.63	2.83	2.53	3.08	2.89

4 Estimated Residential Water Use and Per Capita Flow Rate

The data and data analysis described above facilitated the development of average wastewater flow rates per dwelling unit. **Table 2** summarizes the number of wastewater units that were matched to water accounts, the number of units that were included in the analysis after the water data screening process, as well as the estimated flow rates per dwelling unit, household size (from Section 3), and the estimated per capita wastewater flow rate.

Table 2: Estimated Number of Accounts and Units Used in Analysis

	Unit in Wastewater Database	Units Matched to Water Use	Units included in Analysis	Est. Water Flow Rate per Dwelling Unit	Household Size	Per Capita Winter Water Flow Rate
Category	**Units**	**Units**	**Unit (% of ww database)**	**gpd/HH**	**pp/HH**	**GPCD**
Single Family	30,936	25,737	24,574 (79%)	247	2.74	90
Multi Family	10,290	8,900	8,688 (84%)	135	2.06	65
Mobile Home	312	312	312 (100%)	117	1.78	66

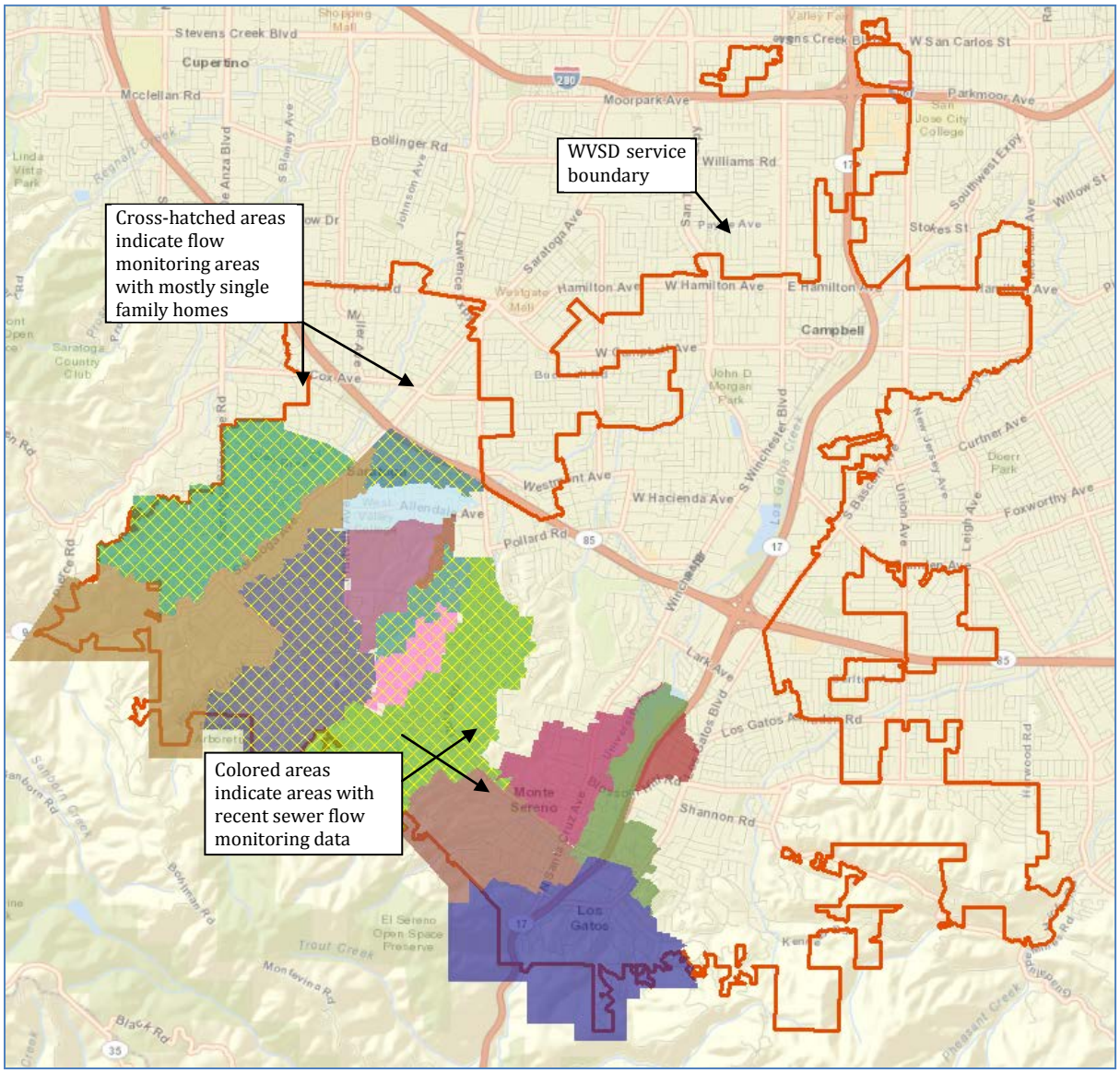
Notes:
1. Based on 2011 winter water use data.

The per capita flow rate estimates for multi-family and mobile home were considered reasonable as they are close to values used by other neighboring cities and matched wastewater flow estimates based on District sewer flow monitoring data. However, the estimate for the single family category was considered unusually high compared to neighboring cities and industry publication such as AWWA Research Foundation *Residential End Use Water Study* 1999 which indicates mean daily indoor water use of about 69 gpcd. Subsequent review of individual account data indicated water use beyond what a typical single family household could reasonably use to meet indoor demand. Many of these accounts are located in the southwest part of the District where the parcels are relatively large and have more outdoor landscaping than other areas within the District service area. Accounts in the southwest consistently had higher water use throughout the year, suggesting possible irrigation use during the winter periods and therefore skewed the overall average of the single family category.

To further evaluate single family wastewater flow, sewer flow monitoring data from previous collection system modeling efforts were analyzed. A total of fifteen data sets were available, covering the southwest part of the District's service area with high water users. The data included sewer flow records at a 15-minute time step over various periods from 2011 to 2013. Tributary areas for each monitoring location were reviewed, and those that include large non-residential users such as a commercial corridor or a college campus were excluded from the analysis. At the end, six of the fifteen data sets (

Figure 5) cover areas that are predominantly single family residences and were deemed suitable to use for further analysis.

Figure 5: Sewer Flow Monitoring Area



The six data sets covered a total of about 4,100 single family homes (about 13% of all single family homes in the District's service area). Specific household size for each monitoring area was based on the census tract with the greatest overlay of the monitored area.

Table 3 summarizes the findings of the sewer flow monitoring data analysis, and compared each area's results to their water billing data. A few notes regarding the findings:

1. The water billing data are noticeably higher than the corresponding sewer flow monitoring data for all six areas, suggesting that the water billing data had included some levels of outdoor irrigation use.
2. The estimated per capita flow rates fell within the range concluded in the *Residential End Use Water Study* (see Table 6), except one area: "2012 V&A Site 3," which has an estimated sewer flow rate of 119 gpcd. This unusually high flow rate could have been caused by a number of factors such as groundwater infiltration or inflow, which would require more extensive

investigations beyond the time and scope established for this study. As such, this site was deemed a potential outlier and excluded from the weighted average.

3. **Based on the five sewer flow data sets, the weighted average per capita sewer flow rate was 82 gpcd.**
4. In comparison, the 2011 winter water use in the five areas was 107 gpcd, or 25 gpcd higher than estimated sewer flow. This suggests that the single family homes in these areas and possibly homes with similar characteristics in the rest of the District's service area have an average outdoor water use of 25 gpcd during the winter, which further suggests that the winter water billing data are not representative of wastewater discharge.
5. Also note that the weighted average sewer flow rate of 82 gpcd is at the high end of the published values shown in Section 6 and is still significantly above the expected average per capita sewer flow rate of 65 gpcd for the service area based on previous model development and calibration using downstream flow monitoring points (See Appendix A – Hydraulic Model Documentation TM, July 2008).

Table 3: Sewer Flow Monitoring Data versus 2011 Winter Water Billing Data

Flow Monitoring Site	Avg Flow (mgd)[1]	Est. Population (from Census)	GPCD (Flow Monitoring Data)	GPCD (Water Billing Data)	Water GPCD % increase over FM data
2011 Quinto Site 3	0.0227	341	67	148	122%
2011 Quinto Site 4	0.0214	374	57	179	213%
2012 Site 1	0.3943	4,556	87	99	14%
2012 Site 3	0.1906	1,596	119	171	44%
2012 Site 4	0.1743	2,019	86	141	63%
2012 Site 5	0.1976	2,650	75	81	8%
Weighted Average	--	--	**82**	**107**	**33%**
Range	--	--	**57 -87**	**81 - 179**	--

Notes:
1. The average flow was based on a 7-day flow monitoring average minus groundwater infiltration and non-residential flows that were estimated in the original hydraulic model development.

5 Refined Residential Per Capita Wastewater Flow Rate

The flow monitoring analysis above indicated that winter water billing data for single family residents was not representative of per capita sewer flow rates. Therefore, an adjustment is necessary to account for outdoor irrigation that is significant in the District's service area. Several approaches were considered to account for the influence of outdoor use in the water billing data including 1) set a per capita flow cap for sewer discharge, 2) exclusion of high water users from the data set, and 3) use the difference between flow monitoring data and water billing data of 25 gpcd to adjust 90 gpcd estimate in Table 2.

Approach 1- Flow Cap: The flow cap approach includes setting a maximum indoor water use (sewer flow factor) value that is then used to set a maximum SFR sewer flow originating from a single family home. For example:

Assuming a flow cap of 90 gpcd

Average household population of 2.74 people

Household Flow Cap = 247 gallons per day per household

Therefore, if winter water record for household 'A' = 400 gpd, then the assumed sewer flow rate was set to 247 gpd. The household 'A' sewer flow rate of 247 gpd record was then used in the single family average wastewater flow rate estimate.

Approach 2 – High Water Record Exclusion: The high water flow exclusion approach eliminates the upper 'X' percent of the water billing data and then the average per capita sewer flow rate determined based on the truncated data set. The single family resident data set for the analysis included 24,574 water account records that matched the District database. A 5% data exclusion would eliminate the upper 1,229 records from the data set.

Approach 3 – Reduce SFR Winter Water Use 90 gpcd by Irrigation Estimate from Five Flow Monitoring Area: This approach assumes that the 25 gpcd difference between the five sewer flow monitoring sites and water billing data are representative of the entire service area. Using the 90 gpcd from Table 2, the average sewer flow rate can be estimated to be 65 gpcd.

A sensitivity analysis was completed to evaluate how different flow caps or varying level of excluded high water records impact the per capita sewer flow factor. Table 4 summarizes the result of the evaluation different approaches and the sensitivity analysis. The various approaches accounting for irrigation result in sewer flow factor estimates that are more in-line with industry standards and publications. Considering previous model development work (Appendix A – Hydraulic Model Documentation TM, July 2008), which found reasonable model result accuracy using a flow factor of 65 gpcd, Option A or Option E appear to be a reasonable estimates of the District's average SFR per capita flow factor.

Table 4: Comparison of Approaches to Account for Outdoor Irrigation (2011 Winter Water Billing Data)

Approach	Revised Average SFR Sewer Flow Factor (GPCD)
Option A - Flow Cap of 90 gpcd	67
Option B - Flow Cap of 95 gpcd	69
Option C – Exclude 5% of high water records	78
Option D – Exclude 10% of high water records	72
Option E – Reduce SFR Winter Water Use of 90 gpcd by 25 gcpd Irrigation	65

5.1 Recommended Residential Flow Factors

The flow cap approach using a 90 gpcd maximum indoor water use results in a 67 gpcd for SFR wastewater discharge (indoor water use) for the entire District's service area. The 67 gpcd estimate results in an overall District wastewater flow estimate that is in line with observed wastewater flow at downstream monitoring points leaving the District collection system and entering the City of San Jose collection system. The 67 gpcd wastewater flow factor is also in line with industry publications and neighboring community estimates shown in Section 6. Table 5 summarizes the per capita wastewater flow rates with the revised single family residential wastewater flow factor.

Table 5: Residential Flow Rate Analysis Summary

Housing Category	Average Household Wastewater Flow (gpd/HH)	Average Household Size (pp/HH)	Average Per Capita WW Flow Rate (GPCD)
Single Family	180	2.74	67
Multi-Family	135	2.06	65
Mobile Home	117	1.78	66

Notes:

1. Based on 2011 winter water use data with a flow cap on single family residential sewer flow.

It should be noted that the District's service area includes a significantly number of large parcels compared to the blend of SFR units observed in other neighboring communities. Therefore, the winter water records analysis did not result in reasonable values for the District SFR dwelling units as it has for other communities. For future residential flow studies, the District should focus efforts on sewer flow monitoring at focused areas, particularly areas with predominantly single family houses, to further validate the estimated single family wastewater flow rate.

The District should consider re-evaluating the flow factors for the service area periodically as population densities vary with time and water conservation programs reduce wastewater flows to collection systems.

6 Wastewater Flow Comparison

Table 6 shows a comparison of the District's estimated residential flow factors compared to the estimates used by the cities of San Jose and Santa Clara. Similar to the District's evaluation, the City of San Jose evaluation used 2011 winter water use records as other years exhibited higher water use due to drier winter conditions. The City of San Jose evaluation did not use a flow cap approach, rather they excluded unusually high water use data from their estimates.

Table 6: Residential Wastewater Flow Rate Comparison

Housing Category	Average Per Capita WW Flow Rate (GPCD)		
	WVSD[1]	City of San Jose[2]	Santa Clara
Single Family	67	65	68
Multi-Family	65	55	56
Mobile Home	66	58	n/a

Notes:

1. Based on 2011 winter water use data with a flow cap of 90 gpcd on single family residential sewer flow.
2. Based on *Estimated Residential Unit Flow Rates & Review of Strength Characteristics* by RMC Water and Environment, February 28, 2013.

Relative to industry publications like the *Residential End Use Water Study*, AWWA Research Foundation 1999, the District's estimated wastewater flow factor is in-line with the range of the mean indoor per capita use (See Table 7).

Table 7: *Residential End Use Water Study,* AWWA - Comparison of daily per capita indoor water use

Study Site	Sample size	Mean persons per household	Mean daily per capita indoor use (gpcd)	Median daily per capita indoor use (gpcd)
Seattle	99	2.8	57.1	54.0
San Diego	100	2.7	58.3	54.1
Boulder	100	2.4	64.7	60.3
Lompoc	100	2.8	65.8	56.1
Tampa	99	2.4	65.8	59.0
Walnut Valley	99	3.3	67.8	63.3
Denver	99	2.7	69.3	64.9
Las Virgenes	100	3.1	69.6	61.0
Waterloo & Cambridge	95	3.1	70.6	59.5
Phoenix	100	2.9	77.6	66.9
Tempe & Scottsdale	99	2.3	81.4	63.4
Eugene	98	2.5	83.5	63.8
Total	**1188**	**2.8**	**69.3**	**60.5**
Range			**57.1 – 83.5**	**54.0 - 66.9**

Notes:

1. Reference: *Residential End Use Water Study,* AWWA Research Foundation, 1999 - Table 5.1.

COUNCIL AGENDA: 2/24/15
ITEM:

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: HONORABLE MAYOR AND CITY COUNCIL

FROM: Kerrie Romanow
Jennifer A. Maguire

SUBJECT: SEE BELOW

DATE: February 2, 2015

Approved D-DSyL Date 2/4/15

SUBJECT: FIRST AMENDMENT TO THE CONSULTANT AGREEMENT WITH BROWN AND CALDWELL FOR ENGINEERING SERVICES FOR THE DIGESTER AND THICKENER FACILITIES UPGRADE PROJECT

RECOMMENDATION

(a) Approve the First Amendment to the Consultant Agreement with Brown and Caldwell for engineering services for the Digester and Thickener Facilities Upgrade project at the San José-Santa Clara Regional Wastewater Facility, modifying the scope of services and increasing the amount of compensation by $1,999,884, for a total agreement amount not to exceed $14,017,410; and extending the term of agreement from December 31, 2019 to June 30, 2020.

(b) Adopt the following 2014-2015 Appropriation Ordinance Amendments in the San Jose-Santa Clara Treatment Plant Capital Fund:
   (1) Decrease the Energy Generation Improvements appropriation to the Environmental Services Department in the amount of $955,000;
   (2) Decrease the Digested Sludge Dewatering Facility appropriation to the Environmental Services Department in the amount of $545,000; and
   (3) Increase the Digester and Thickener Facilities Upgrade appropriation to the Environmental Services Department in the amount of $1,500,000.

OUTCOME

Council approval of the First Amendment to the Consultant Agreement with Brown and Caldwell will allow for the incorporation of additional design elements and engineering support services related to but previously not contemplated under the original scope of work for the Digester and Thickener Facilities Upgrade project.

EXECUTIVE SUMMARY

This amendment will increase the amount of compensation for engineering consultant services by $1,999,884, for a total agreement amount not to exceed $14,017,410 to allow for the incorporation of additional design elements, in part to follow direction given by Council at the December 2, 2014 meeting with regards to the biosolids transition strategy. It also extends the original term of agreement from December 31, 2019, to June 30, 2020.

BACKGROUND

On October 8, 2013, Council approved a Consultant Agreement (Agreement) with Brown and Caldwell (Consultant), in the amount of $12,017,526, to provide engineering service for the Digester and Thickener Facilities Upgrade project (Project) at the San José-Santa Clara Regional Wastewater Facility[1] (RWF). This amount included $2,236,429 in optional services to be authorized by the Environmental Services Department (ESD) Director at the City's sole discretion. To date, $490,474 in optional services has been authorized for the following work: 1) condition assessment of the gas flare; 2) feasibility review and design modifications related to the conversion from mesophilic to thermophilic digestion; 3) evaluation of the cooling water system; and 4) development of a 30% cost estimate. The remaining balance of $1,745,955 is anticipated to be authorized for optional services as mentioned in this memo.

The Project will completely rehabilitate four digesters, including new covers and mixing systems; structural repairs and seismic retrofits; heating system and gas collection conveyance system upgrades; electrical, instrumentation, and control systems upgrades; and retrofit of six Dissolved Air Flotation Thickeners (DAFT) units to allow for the co-thickening of primary and secondary sludge, including new odor control treatment. The construction estimate for this scope of work is $60 million and represents the first phase of work. A second phase of work to rehabilitate an additional four to six digesters is planned to be completed as part of a future capital improvement project, subject to approval by Council.

The original term of the Agreement is from October 8, 2013 to December 31, 2019. The original Project schedule assumed 18 months for design, 6 months for bidding including contractor pre-qualification, 30 months for construction and start-up, and 12 months for post-substantial completion operations training and engineering support.

ANALYSIS

Since Council's October 8, 2013 approval of the original agreement with Brown & Caldwell, additional elements of work have been identified through the program validation efforts, and

[1] *The legal, official name of the facility remains San Jose/Santa Clara Water Pollution Control Plant, but beginning in early 2013, the facility was approved to use a new common name, the San José-Santa Clara Regional Wastewater Facility.*

completion of conceptual planning and detailed condition assessment work. There has also been recent program direction to pursue financing through the Clean Water State Revolving Fund (SRF) for the construction portion of the Project. The First Amendment to the Agreement will add $1,999,884 in compensation for additional professional services. Of this amount, $1,744,253 is allocated for engineering services related to the incorporation of new design elements; and, $255,631 is allocated for various additional services related to the environmental clearance and SRF processes.

New Design Elements

A. New Gas Flare System

During the program validation process and conceptual planning phase, operations and maintenance (O&M) staff identified the need for a new waste gas flare system, based on recent failures to other components of the digester gas handling system. The digester gas handling system is comprised of four key components: 1) gas holder(s); 2) gas compressor(s); 3) gas piping; and 4) gas flare(s). Separate projects to replace the existing gas holder and gas compressors are currently under construction. The gas piping will be replaced as part of the Project. Once these components are replaced, the existing gas flare system would be the oldest and most vulnerable part of the overall gas handling system.

To inform a decision whether to replace the existing gas flare system with this phase of the Project or to defer the work to a subsequent phase, a detailed condition assessment was completed. The condition assessment found that the gas flare system is now over 30 years old and showing signs of corrosion and deterioration, which subjects the flares to future operational and reliability issues. Staff recommends incorporating a new gas flare system as part of this project, and making minimal improvements to the existing flares to serve as redundant backup units. The new flare system will be designed to the latest codes and current technology. This will ensure the overall digester gas handling system will work as a complete and integrated system upon completion of this Project, the Digester Gas Storage Replacement project, and the Digester Gas Compressor Upgrade project, which, collectively, will provide long term operational reliability, flexibility, and redundancy to the RWF. The estimated cost of the new gas flare system is $2,500,000. This component of the Project may be packaged and awarded as a separate construction contract depending on air permitting requirements.

B. New Primary Sludge Screening Facility

The original Project scope included retrofits and seismic upgrades to the existing DAFT to allow co-thickening of primary and secondary sludge. This process improvement will reduce the volume of sludge going to the digesters which, in turn, will reduce the total number of digesters that would need to be rehabilitated from 16 to a maximum of 10, sufficient to serve the RWF over the next 30 years. During the conceptual planning phase, O&M staff raised concerns about residual debris and rags in the primary sludge

that currently cause O&M issues in the DAFT process. Thickening the sludge could further exacerbate these issues; thus, the need for a primary sludge screening facility was identified. The addition of sludge screening was also identified during the program validation process and Plant Master Plan (PMP), except that this component was previously contemplated to be included as part of the Digested Sludge Dewatering Facility project. Primary sludge screening will address O&M concerns and improve the overall quality of the biosolids and provide more flexibility in final disposition options. Because the new primary sludge screening facility will be located within close proximity to the digesters and DAFT and will work as an integrated component of the overall thickening process, staff recommends incorporating this component into the Project (effectively removing it from the Digested Sludge Dewatering Facility project). The estimated construction cost for this new facility is $5,000,000.

C. Extension of Gas Piping & Support System

The original Project scope included bringing all tunnels associated with the digester system into compliance with current National and Fire Protection Association (NFPA) codes by decommissioning all hazardous materials piping located inside the tunnels and installing new piping in a robust pipe rack support system that will span the RWF. The original scope included replacing approximately 3,500 linear feet of piping for digester gas and other flammable materials (e.g., natural gas, blended gas, and fuel oil) and connecting the digesters to the new digester gas compressor building (being completed as a separate project). During the conceptual design review phase, it was identified that additional gas and hazardous materials piping located beyond the limits of the digester complex would need to be decommissioned in order to fully declassify the tunnel system as an explosion hazard. An estimated 1,700 feet in additional piping, located in the various basement buildings and connected to the tunnels, have been identified as needing to be decommissioned and replaced. This extension would span from the new digester gas compressor building to the Secondary Blower Building and complete the digester gas interface to the new cogeneration facility (being constructed as part of a separate project). Staff recommends incorporating the extended piping system as part of this project for design continuity and to enable declassification of the tunnel system. This extension will complete the gas piping conveyance system needed for integrated operations of the digesters, digester gas compressors, and new cogeneration facility. The estimated construction cost for the extended piping system is $4,000,000.

D. Conversion from Mesophilic to Thermophilic Digestion Process for Class A Biosolids

The original anaerobic digestion process was designed to operate under mesophilic conditions to produce Class B biosolids in accordance with U.S. Environmental Protection Agency (USEPA) Title 40 Part 503. On April 10, 2014, staff presented preliminary information on the Biosolids Transition Strategy to the Treatment Plant Advisory Committee (TPAC) at a Biosolids Study Session. During the session, TPAC members and various stakeholders provided input on the transition strategy and requested staff to explore the possibility of producing Class A biosolids instead of Class B

biosolids, including impacts on operation and maintenance cost. A feasibility study was completed to evaluate options for producing Class A biosolids. The study determined that Class A biosolids could be achieved through modification of the current mesophilic digestion process to a two-stage Thermophilic Phased Anaerobic Digestion (TPAD) process. In comparing the various alternatives, it was determined that TPAD was a cost effective way to provide a superior overall sludge digestion process as well as position the RWF to economically produce Class A biosolids at a future date. At a special meeting held on November 20, 2014, TPAC members accepted staff's recommendation to proceed with the TPAD configuration. On December 2, 2014, Council approved and directed staff to proceed with the TPAD configuration.

To prepare the digesters to operate under thermophilic operating conditions, the existing heat exchangers and cooling water systems will need to be upgraded as part of the Project. This process modification is also expected to increase digester gas production, improve pathogen removal in the digested biosolids product, and reduce the volume of biosolids to be disposed. The estimated construction cost for the heat exchanger and cooling water upgrades is $7,000,000.

In the future, if biosolids regulations change and the demand for Class A biosolids materializes, new batch tanks would need to be added at an estimated cost of $10 million to produce Class A biosolids directly out of the digestion process. This strategy was determined to be more economical and result in lower operating costs when compared to the alternative of constructing a full thermal drying facility to produce Class A biosolids. The cost of a new thermal drying facility is estimated at over $100,000,000, not including operating costs.

Additional Optional Services

The original agreement includes $2,236,429 in optional services to be authorized at the sole discretion of the ESD Director, or designee. To date, $490,474 in optional services has been authorized and the remaining balance of $1,745,955 is anticipated to be fully utilized as follows:

Optional Services Task Description	Not-to-Exceed Amount	Authorized to Date	Remaining Balance Anticipated to be Authorized
A. Major Design Modifications & Miscellaneous Additional Services	$299,956	$125,919*	$174,037
B. Conversion from Mesophilic to Thermophilic (Class A Biosolids)	$364,555	$364,555	N/A
C. Separate Construction Packaging	$356,025	$0	$356,025
D. Detailed Instrumentation & Control Wiring Diagrams	$379,151	$0	$379,151

E. Contractor Pre-Qualification Assistance	$15,274	$0	$15,274
F. Controls Systems Programming & Documentation Services	$821,468	$0	$821,468
Total	$2,236,429	490,474	$1,745,955

*Condition assessment of gas flare, feasibility review and design modifications from mesophilic to thermophilic process, evaluation of heating & cooling system, and development of 30% cost estimate

Staff is recommending an increase of $255,631 to the Optional Services task to allow for additional geotechnical and underground investigation work associated with the new design elements, and for technical support services associated with the environmental clearance and SRF application process. This recommendation increases the original optional services task budget from $2,236,429 to $2,492,060, to be authorized at the sole discretion of the Director, or designee.

Summary of Recommendations

This amendment will increase the amount of compensation for engineering consultant services by $1,999,884, for a total agreement amount not to exceed $14,017,410. Of this amount, $1,744,253 is allocated for engineering services related to the incorporation of new design elements, and $255,631 is allocated for additional optional services. Incorporation of the additional design elements will increase the Project construction estimate from $60,000,000 to $78,500,000, or by $18,500,000. The proposed consultant services increase (not including additional optional services) represents 9.4% of the additional estimated construction cost of $18,500,000. This fee compares favorably to the original fee for the Project which was 19.5% of the construction cost, reflecting a significant savings due to the economy of scale of the Project and building upon efforts already underway on the Project. Staff recommends proceeding with the additional design elements and believes that the associated fee increase is reasonable for the complex scope of work.

This amendment also extends the original term of agreement to reflect the additional design efforts and construction timeline. With this change, the Project schedule now assumes 24 months for design, 6 months for bidding including contractor pre-qualification, 33 months for construction and start-up, and 12 months for post-substantial completion, including operations training and engineering support. The Project is estimated to reach substantial completion by spring 2019.

EVALUATION AND FOLLOW-UP

No additional follow-up action with City Council is expected at this time. Monthly progress reports, on this and other RWF capital projects, will be submitted to TPAC and posted on the City's website.

POLICY ALTERNATIVES

***Alternative #1*:** Direct staff to complete the additional scope of work utilizing in-house resources.
Pros: None
Cons: Staff does not have the capacity or expertise to complete the required work. Design of the digester and gas handling facilities requires in-depth wastewater design and process engineering expertise spanning multiple engineering disciplines (e.g., civil, structural, mechanical, electrical, process, instrumentation and controls).
Reason for not recommending: The complexity of this project requires the use of specialized expertise and experience in the anaerobic digestion and biosolids processing field.

***Alternative #2*:** Direct staff to not incorporate the additional design elements.
Pros: There would be no increase needed to the consultant contract. There would be no increase to the estimated construction contract.
Cons: Not incorporating the additional design elements would result in the inability to declassify the digester tunnels as an explosion hazard, leave a gap between the new digester gas piping system and the new cogeneration facility, and defers addressing operational and maintenance concerns.
Reason for not recommending: Economy of scale and continuity of the current design team would be lost. No actual savings in construction cost would be realized since the additional design elements would still need to be completed as part of other projects.

PUBLIC OUTREACH

This memorandum will be posted on the City's website for the February 24, 2015 Council agenda and scheduled to be heard at the February 12, 2015 TPAC Meeting.

COORDINATION

This amendment and memorandum have been coordinated with the Finance Department, the Public Works Department, Planning, Building, and Code Enforcement, and the City Attorney's Office.

FISCAL/POLICY ALIGNMENT

This Project is consistent with the Council-approved Budget Strategy to focus on rehabilitating aging Plant infrastructure, improve efficiency, and reduce operating costs. This agreement is also consistent with the budget strategy principle of focusing on protecting our vital core services.

COST SUMMARY/IMPLICATIONS

1. AMOUNT OF RECOMMENDATION: $ 1,999,884

2. COST ELEMENTS OF AGREEMENT:

	Original	Add	Amended
Project Administration	$ 553,816	$ 306,081	$ 859,897
Preliminary Engineering	929,486	40,382	969,868
Design Development	5,608,560	833,442	6,442,002
Support Services during Bidding & Construction	2,351,152	489,449	2,840,601
Commissioning & Training Services	338,083	74,899	412,982
Optional Services	2,236,429	255,631	2,492,060
TOTAL AGREEMENT AMOUNT	**$12,017,526**	**$1,999,884**	**$14,017,410**

3. SOURCE OF FUNDING: San José-Santa Clara Plant Capital Fund (Fund 512)

4. OPERATING COSTS: The proposed amendment will have no impact on the San José-Santa Clara Treatment Plant Operating Budget (Fund 513).

Funding for the Digester & Thickener Facilities Upgrade appropriation in 2014-2015 is insufficient for this amendment. A budget action is recommended to increase the appropriation budget by $1,500,000. To offset this increase, decreases to the Energy Generation Improvements and Digested Sludge Dewatering Facility appropriations are also recommended, based on projected expenditures in 2014-2015.

BUDGET REFERENCE

The table below identifies the fund and appropriations proposed to fund the agreement.

Fund #	Appn # / RC#	Appn. Name	Current Appn.	Recom'd Budget Action	2014-2015 Adopted Capital Budget	Last Budget Action (Date, Ord. No.)
512	4127 / 144943	Digester and Thickener Facilities Upgrade	$1,555,000	$1,500,000	V-190	10/7/14, 29496
512	7454	Energy Generation Improvements	$25,877,000	($955,000)	V-193	10/7/14, 29496
512	7452	Digested Sludge Dewatering Facility	$2,940,000	($545,000)	V-189	6/17/14, 29431
Total			**$30,372,000**	**$0**		

CEQA

Statutorily Exempt, File No. PP10-066 (d), CEQA Guidelines Section 15262, Feasibility and Planning Studies.

/s/
KERRIE ROMANOW
Director, Environmental Services Department

JENNIFER A. MAGUIRE
Interim Senior Deputy City Manager /
Budget Director

For questions please contact Ashwini Kantak, Assistant Director, Environmental Services Department, at (408) 975-2553.

City Manager's Contract Approval Summary

For Procurement and Contract Activity between $100,000 and $1.08 Million for Goods and $100,000 and $270,000 for Services

DECEMBER 1, 2014 - JANUARY 31, 2015

Description of Contract Activity [1]	Fiscal Year	Req#/ RFP#	PO#	Vendor/Consultant	Original $ Amount	Start Date	End Date	Additional $ Amount	Total $ Amount	Comments
TEMPORARY STOCKROOM CLERK	FY13-14	18062	49052	TRENDTEC INC	$31,812	7/1/2013	6/30/2015	$110,280	$142,092	4TH EXTENSION (PO WAS UNDER $100K WITH PREVIOUS ADDITIONS); CANDIDATE WAS SELECTED AND HIRED BUT SEPARATED AFTER ONE DAY; TEMP ASSIGNED UNTIL RECRUITMENT IS COMPLETED
TRAVELING WATER SCREEN	FY14-15	19795	78158	SCREENING SYSTEMS INTL INC	$116,839	1/7/2015	1/6/2016			
SAND BLASTING AND PAINTING AT RWF	FY14-15	20050	50781	JEFFCO PAINTING & COATING INC	$400,000	12/17/2014	12/16/2015			
CATERPILLAR 980M WHEEL LOADER	FY14-15	20174	78165	PETERSON TRACTOR CO	$625,288	1/12/2015	1/11/2016			
PRIME MOVER PARTS & SERVICE	FY14-15	20249	50853	NRG ENTERGY SERVICES LLC	$180,000	1/3/2015	1/2/2016			
OVERHAUL OF TPS & FLOWAY PUMPS	FY14-15	20284	50892	MARTECH INC (MECHANICAL ANALYSIS REPAIR INC)	$200,000	2/1/2015	1/31/2016			

[1] This report captures completed contract activity (Purchase Order Number, Contract Term, and Contract Amount)