



THE PLANT MASTER PLAN

NOVEMBER 2013

TABLE OF CONTENTS

1. PURPOSE OF THE PLAN	1
The Plant	1
2. USE OF THE PLAN	3
3. BACKGROUND	5
Previous Plant Planning Efforts	5
Current Plant Processes and Statistics	9
Plant Master Plan Drivers	11
4. PLANNING PROCESS	19
Goals, Objectives, Decision-Making Criteria	19
Stakeholder Process	20
Technical Review	22
5. PLANT PROCESS IMPROVEMENTS	23
Liquids Treatment	24
Biosolids Treatment	29
Odor Control	32
Energy Management	33
Greenhouse Gas Emissions	35
Support Facilities	36
Capital Costs and Phasing	37
Impacts to Operations and Routine Maintenance (O&M) Costs	41
6. LAND USE COMPONENT	45
Land Use Principle and Key Elements	47
Land Use Plan	49
Land Use Policies and Guidelines for Development	54
Economic Benefits	56

ACKNOWLEDGMENTS

The Plant Master Plan could not have been completed without the exceptional work of many City of San José staff members, partner agency staff, the consultant team, the Technical Advisory Group, and the Community Advisory Group.

City of San José

Environmental Services

Kerrie Romanow – Director
Ashwini Kankar – Assistant Director
René Eyerly – Sustainability and Compliance Manager
Ken Davies – Project Manager
Sanhita Ghosal – Project Planner
Cheryl Wessling – Marketing Representative
Kristen Yasukawa – Marketing Representative

Additional support from: Carolina Camarena, Janet Hayes, Kenneth de Kay, Kent Brown, Melanie Harmon, Paul Prange, Rong Liu, Steve Colby, and Tim Hayes

San José City Manager’s Office

Jennifer Easton

Department of Planning, Building and Code Enforcement (PBCE)

Joe Horwedel, Laurel Prevetti, John Davidson, and Bill Roth

OED

Kim Welsh, Nanci Klein, Chris Burton, and John Lang

Parks

David Mitchell, Marybeth Harasz, and Yves Zsutty

Public Works

Mike O’Connell and Shelley Guo

City Attorneys

Rosa Tsongtaatarii, Mollie Dent, and Sandra Lee

We would also like to acknowledge the contribution of previous employees: Alex Ekster, Andrew Crabtree, Anil Kar, Barbara Goldstein, Bhavani Yerrapotu, Bill Pounders, Bruce Frisbey, Bryan Berdeen, Dale Ihrke, Dan Bruinsma, Darryl Boyd, David Tucker, Denise Elliott, Dennis Korabiak, Edith Ramirez, Jennifer Garnett, Joe Theissen, John Stufflebean, Jon Newby, Ken Rock, Kirsten Struve, Kristen Yasukawa, Lindsey Wolf (in memoriam), Manuel Pineda, Matt Krupp, Ricardo Barajas, Stephane Lannoye, Susan Walton, Sylvia Kang, and Ting Ong

City of Santa Clara

Alan Kurotori, Bob Wilson, Chris de Groot, Nina Hawk, and Jeff Schwilk

City of Milpitas

Kathleen Phalen and Leslie Stobbe

West Valley Sanitation District

Bob Reid

Cupertino Sanitary District

Steve Machida and Nichol Bowersox

Carollo Engineers

Jamel Demir – Project Manager
Jan Davel – Lead Engineer
Steve McDonald – Project Director

Additional contributions from: Allan Briggs, Andre Gharagozian, Anir Bhagwat, B Narayanan, Bob Gillette, Cari Ishida, Debra Dunn, Deepti Chatti, Elisa Garvey, Erin Mackey, Jason Nikaïdo, Jason Pretzlaf, Kaumudi Atapattu, Kris Maddox, Lorien Fono, Mary Hansel, Matt Stucky, Nitin Goel, Priscilla Bloomfield, Rudy Killian, Sarah Deslauriers, Sarwan Wason, Tavy Wade, and Tracy Clinton

Brown and Caldwell

Tracy Stigers, Tim Banyai, and Perry Schafer

Additional contributions from: Chris Muller, Dave McEwen, Denny Parker, Fran Burlingham, Jennifer Chen, Jenny Gain, John Bratby, John Willis, Jose Jimenez, Kyle Sandera, Linda Sawyer, Meng Siew, Pervaiz Anwar, Rion Merlo, Ron Appleton, Ron Crites, Soumya Kini, and William Kennedy

Skidmore, Owings and Merrill

Ellen Lou, Michael Powell, Joo Im, and Andrea Wong,

Hargreaves and Associates

Alan Lewis and Peter Frankel

Bay Area Economics

Ron Golem



Community Advisory Group (CAG)

Nicholas Dewar, Facilitator
James (Jim) Alves, Santa Clara
Larry Ames, At-large
Carl Cilker, At-large
Diana Foss, San José
Michael Gross, At-large
Dolores Hovey, Milpitas
Carrie Jensen, San José
Robert (Bob) Levy, San José
Gina Marin, Santa Clara
Joseph McCarthy, Jr., At-large
Eileen McLaughlin, At-large, Spokesperson
Donald Peoples, At-large
Bob Power, Cupertino
Tony Santos, Alviso
Patrick Wong, Milpitas
Richard Yanda, Los Gatos

David Zwack, Campbell
Bobby Ram, At-large
Dave Baxter, Monte Sereno
Eve Matelan, Saratoga
José Chavez, San José
Nancy Yu, Saratoga
Steve Soriano, Milpitas
Teresa Helwig, At-large
Wai-Ying Lieu, San José

Technical Advisory Group (TAG)

George Tchobanoglous, Chair
David Jenkins, Vice Chair
Bob Gearheart
Bruce Wolfe
Cecil Lue-Hing
Glen Daigger
John Rosenblum
Walter Niessen

1. PURPOSE OF THE PLAN

The Plant Master Plan involved a three year planning process to evaluate the San José/ Santa Clara Water Pollution Control Plant (Plant), the largest advanced wastewater treatment plant on the west coast. This process utilized principles of sustainability to develop a central planning document to guide improvements at the Plant for the next 30 years (through the year 2040). The Plant Master Plan (Plan) provides both a roadmap to help determine the projects and funding needed to repair and replace the Plant's aging facilities and processes as well, as a land use plan that defines the future treatment needs along with zoning designations and guidelines for the future development, restoration, and use of the Plant's four-and-a-half square mile site.

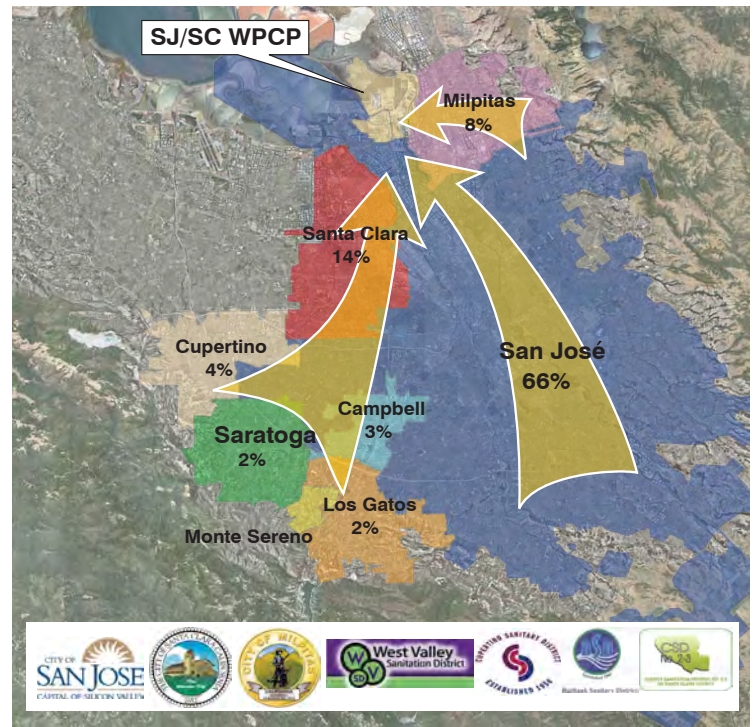
The Plan:

- Creates an overall vision for the Plant and the Plant lands
- Identifies future projects with estimated costs and construction timing, a total \$2.2 billion investment
- Designates future land uses on Plant lands
- Illustrates how to connect the community to the Bay
- Outlines a strategy to protect the Plant from sea-level rise

The Plan's goals were modeled on the "triple-bottom" line concept with the additional goal to ensure the Plant's ability to treat wastewater in the future.

- **Operational:** Result in a reliable, flexible Plant that can respond to changing conditions
- **Economical:** Maximize economic benefits for customers through cost-effective options
- **Environmental:** Improve habitat and minimize impacts to the local and global environment
- **Social:** Maximize community benefits through improved aesthetics and recreational uses

The Plan does not address the sanitary sewer collection system, recycled water distribution, development of water efficiency programs, or any area outside of the Plant's property. It does, however, consider several external factors potentially impacting planned



The Plant currently serves approximately 1.4 million residents and about 17,000 main commercial/ industrial sewer connections in the cities of San José, Santa Clara, Milpitas, Cupertino, Campbell, Los Gatos, Monte Sereno, and Saratoga.

wastewater treatment capacity, level of treatment, and selected technologies. These factors include: community concerns regarding traffic, odor, noise, and aesthetic impacts to adjacent land uses; potential impacts to flows and loads of upstream stormwater diversion, recycled water demand, water conservation, and upstream source reductions; and the need to address both the Plant's contribution to and the consequences of global climate change.

THE PLANT

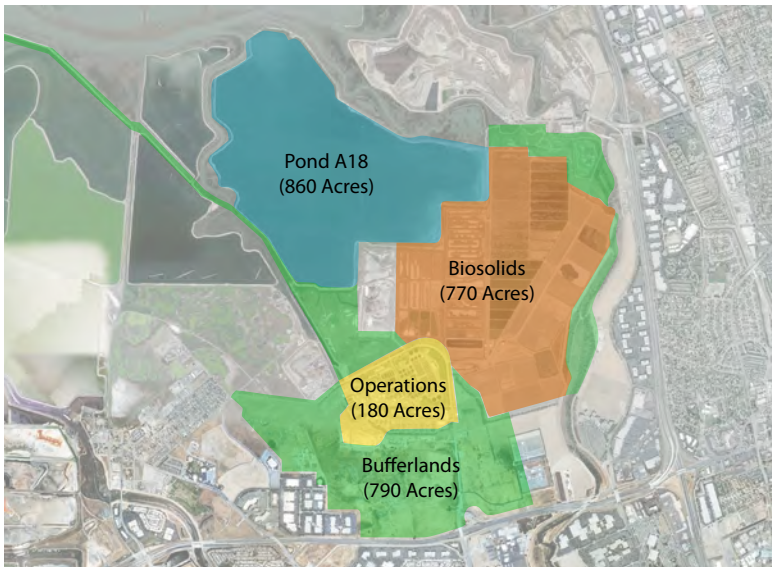
The Plant is operated by the City of San José's Environmental Services Department on behalf of the Plant's co-owners, the cities of San José and Santa Clara, and its tributary partners, the City of Milpitas, West Valley Sanitation District, Cupertino Sanitary District, County Sanitation District 2-3, and the Burbank Sanitary District. While the Plant has successfully served the community since 1956, aging pipes, pumps, concrete, and electrical systems need immediate and long-range attention in order to continue those successful operations well into the future.



The Plant is located on the very northern edge of the City of San José and the southern margin of South San Francisco Bay.

Located on approximately 2,600 acres, the Plant lands include the wastewater treatment operations, former Salt Pond A18, and hundreds of acres of bufferland located along CA Highway 237. The “bufferlands” were purchased over the past 50 years to provide a buffer that limited the community’s exposure to odors emanating from the Plant’s treatment processes and limits risk in the event of an accidental chemical release.

Rebuilding and improving the Plant is an exciting project that stands among the largest public works efforts in the history of the South Bay. The Plan will ensure the Plant’s continued role in protecting public health and the environment, while supporting the region’s economy and creating a new vision for San José’s South Bay shoreline. The \$2.2 billion investment to rebuild the Plant will enable the Plant to achieve the community’s sustainability goals by maximizing the use of waste products, protecting and restoring habitat, and reconnecting the community to the South Bay.



The Plant lands include the wastewater treatment operations, former Salt Pond A18, and hundreds of acres of bufferland located along CA Highway 237.

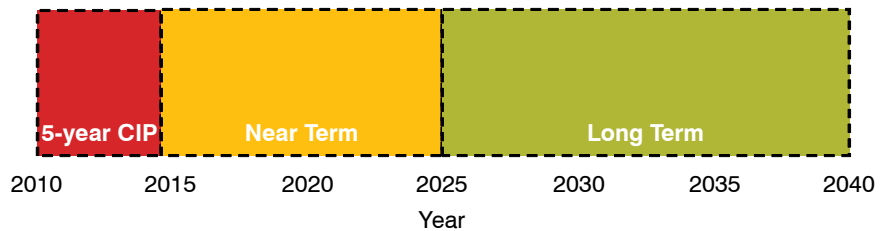


The Plant will be able to move beyond “pollution control” and become a complete “resource recovery” facility that is fully integrated into the surrounding community and environment.

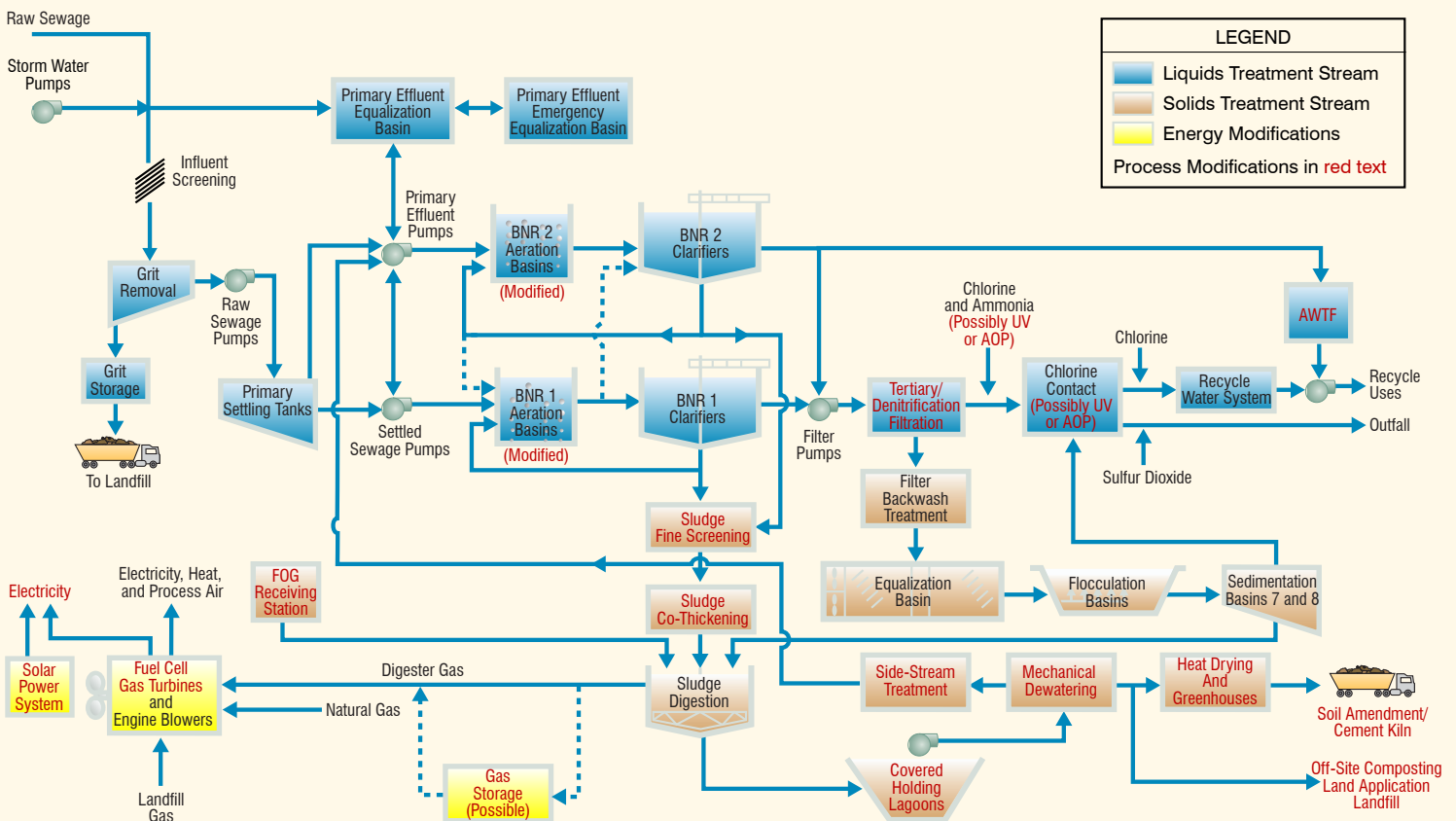
2. USE OF THE PLAN

The various uses of the Plan can be summarized as follows:

- Inform future capital projects through a “general plan” type of document to coordinate project development and overall project priorities. Future projects are listed in a 30-year Capital Improvement Program (CIP). Project manager checklists will include an analysis of how each new project is consistent with the Plan and, if not, provide an explanation.
- Determines the appropriate uses for the Plant lands not used for treating wastewater through a General Plan land use map and complementary policies.



The 30-year CIP will help in the preparation of future budgets and cash-flow analysis.



The Plan provides a roadmap for plant improvements over a 30-year period.



30-year Planning Horizon Concept Plan

Legend

- Project Boundary
- Existing Levee
- - - Tentative Shoreline Levee
- Existing Trail
- Proposed Trail
- Proposed Boardwalk Trail

- The Plan will need to be updated every five years to evaluate whether the Plan’s assumptions and priorities have changed and whether projects are triggered earlier/later due to changes in flows and loads.
- The Plan is accompanied by an Environmental Impact Report (EIR) to comply with the California Environmental Quality Act (CEQA). Projects included in the Plant Master Plan EIR include projects in the Plan not scheduled for implementation within the first five years of the 30-year Capital

Improvement Program (CIP). Some well-defined projects will be evaluated at a project-level of detail. However, most of the projects and the land use plan will be evaluated at a programmatic level and will, prior to implementation, require additional CEQA clearance. Projects to be completed within five years and identified as critical rehabilitation projects will be evaluated independently to comply with CEQA. These projects are critical to the continuing operation of the Plant and are not dependant or proscribe future actions.

3. BACKGROUND

PREVIOUS PLANT PLANNING EFFORTS

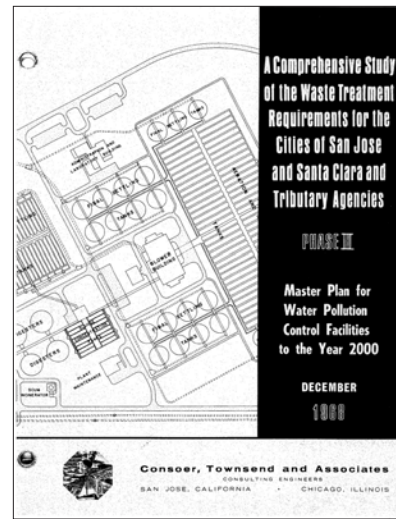
The Plant’s planning efforts in the past focused on increasing treatment capacity, addressing new regulations, reducing impacts to the environment, and maintaining a sufficient buffer to limit development.

In 1956, the City of San José completed the construction of a 36 mgd wastewater treatment plant located to the east of the City of Alviso at the Bay margin. The past 50-plus years have seen dramatic changes to the Plant that reflect the changing nature of the Santa Clara Valley. The Plant became a regional facility in 1959 when the City of Santa Clara

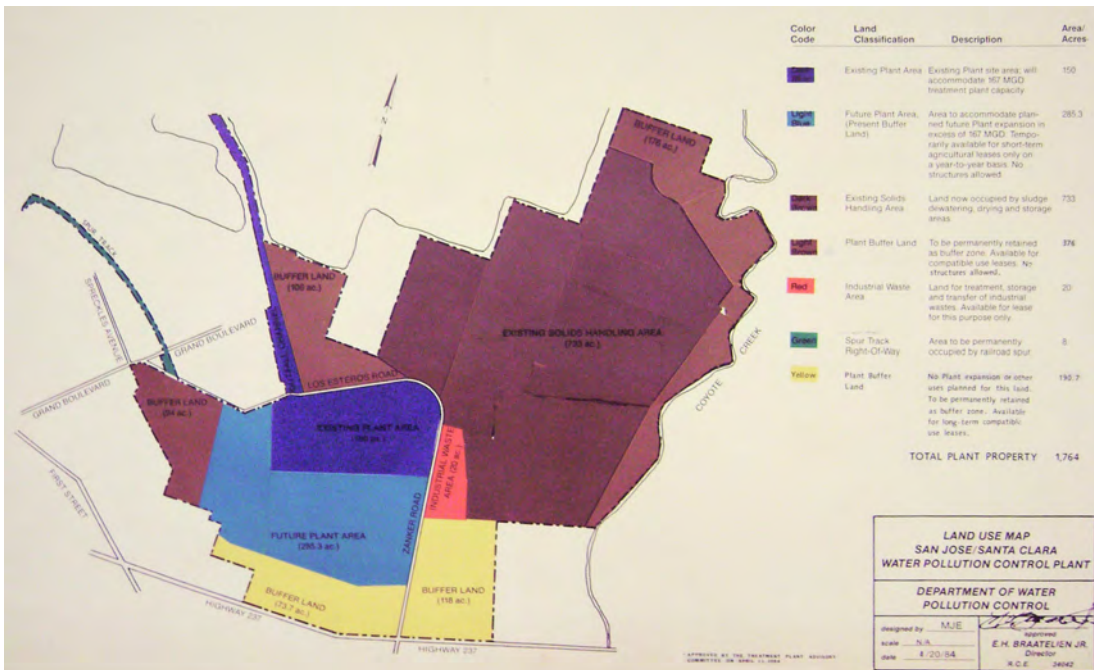
became a co-owner. The next decade saw the Plant create agreements with the Santa Clara County sewer districts and tributary partners: City of Milpitas, West Valley Sanitation District, Cupertino Sanitary District, County Sanitation District 2-3, Burbank Sanitary District, and the Sunol Sanitary District (no longer in operation). The City of San José also consolidated with the City of Alviso in 1968. This allowed for further expansion of the Plant’s facilities.



The original Plant was operated by eight workers and consisted of just primary treatment, three digesters, and a small pump and engine building.



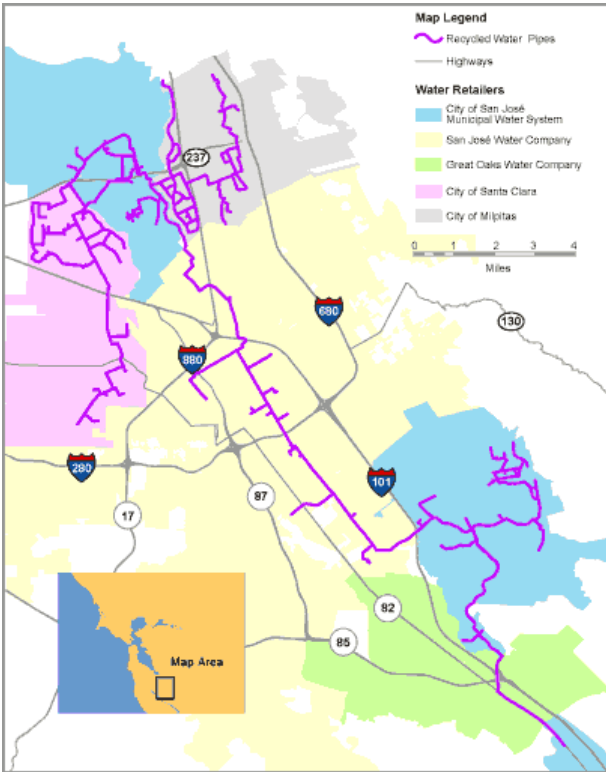
The 1968 report prepared the Plant for the additional treatment steps of nitrification and filtration to address new regulatory limits but did not address land use.



The 1980s land use maps reflect expansion related to anticipated population and industrial growth.

Previous master planning efforts included a 1968 report. In the 1980s, the Plant prepared a series of land use maps to prepare for the construction of a major Plant expansion project to accommodate projected future flows related to population and industrial growth that would result in a new “mirror image” of the existing Plant. These two efforts had one common thread. Both effects assumed a continuing increase in water use by households and industry and resulting increase in flows to the Plant, which were used to identify the facilities needed for nitrogen removal and filtration.

In the 1990s, with continued droughts and the loss of the canning industry along with subsequent loss of the high-tech manufacturing sector in Santa Clara Valley, the previous flow assumptions no longer held true. This confluence of events led to a dramatic decrease in overall wastewater flows coming to the Plant. The 1968 plan projects wastewater influent flows in the year 2000 to be 216 million gallons per day (mgd). By the year 2000, influent flows had reached just 131 mgd, and the flows continued to decrease to less than 110 mgd by the year 2010.



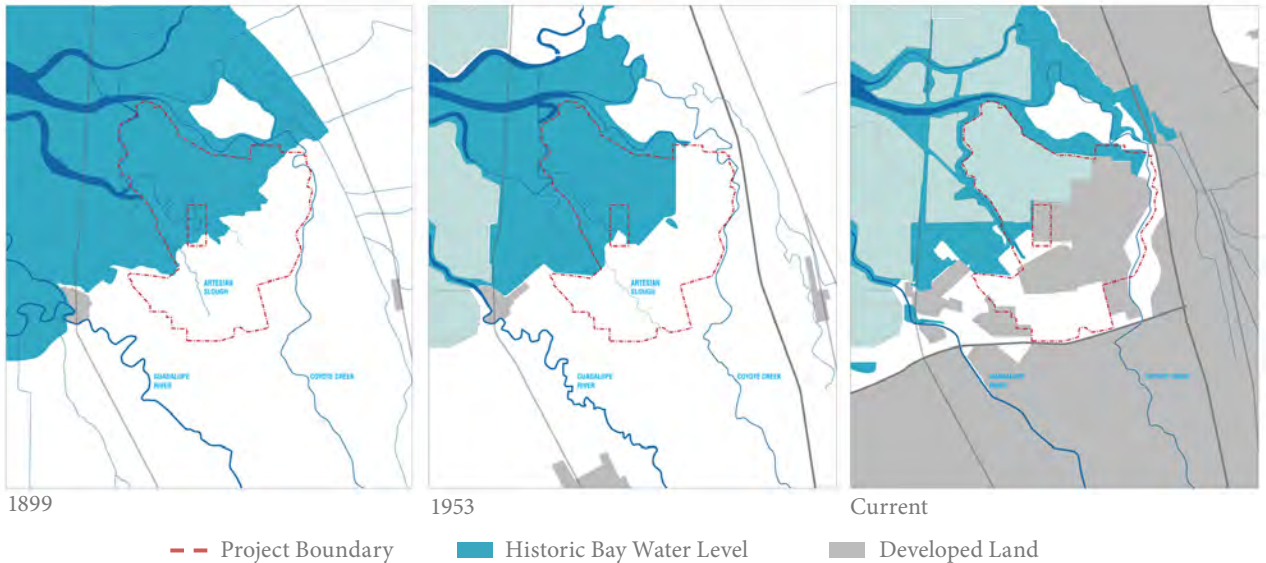
The South Bay Water Recycling system was designed to help divert treated wastewater from the Bay and provide a beneficial use for the product and help offset demands for potable water in the region.

The State Water Board also issued an order (WQ 90-5) compelling the Plant to reduce effluent flows to the South San Francisco Bay to protect salt marshes from conversion to brackish and freshwater marshes. As a result, the City of San José and Santa Clara and their partner agencies agreed to develop the regional water recycling program that eventually became South Bay Water Recycling (SBWR). A total of \$240 million was invested in SBWR so that Plant effluent flows discharged to the Bay would remain below a prescribed flow capacity during the summer months.

Contributing to the reduction of flows to the Bay has been the growth of SBWR. The Plant now produces over 10 mgd of Title 22 recycled water for use in cooling towers, irrigation, fountains, and flushing toilets. The Plant is partnering with the Santa Clara Valley Water District on an Advanced Water Treatment Facility, currently under construction, that will further treat the recycled water and open up additional uses for recycled water.

Between the years of 1968 and 1981, the Plant purchased over 1,300 acres of neighboring farmland for facilities’ expansion and bufferlands. More than half of this land is used currently to process biosolids for beneficial use. The bufferlands provided a significant security barrier for the Plant and helps to buffer the community from light, noise, chemicals, and odors that are associated with the wastewater treatment process.

During the 1990s Dot-Com boom, developers submitted numerous proposals to take advantage of the bufferlands, which were then farmed. Proposals ranged from data centers to golf courses to a professional stadium. In response to these unsolicited development proposals, the San José City Council adopted Council Policy 6-31 “Use of San José/ Santa Clara Water Pollution Control Plant Lands” on November 7, 2000. This policy established a set of rules for future bufferland development but allowed for “dual uses” that both benefit the community and the Plant. This policy is predicated on the assumption that active uses of the bufferlands need to be discouraged because of the risks and offsite impacts associated with the chemicals used as part of the wastewater treatment process.



As the region grew, the farms that surrounded the Plant became the shopping centers, office complexes, and residences of north San José and Milpitas.

Policy 6-31 Use of San José/Santa Clara Water Pollution Control Plant Lands

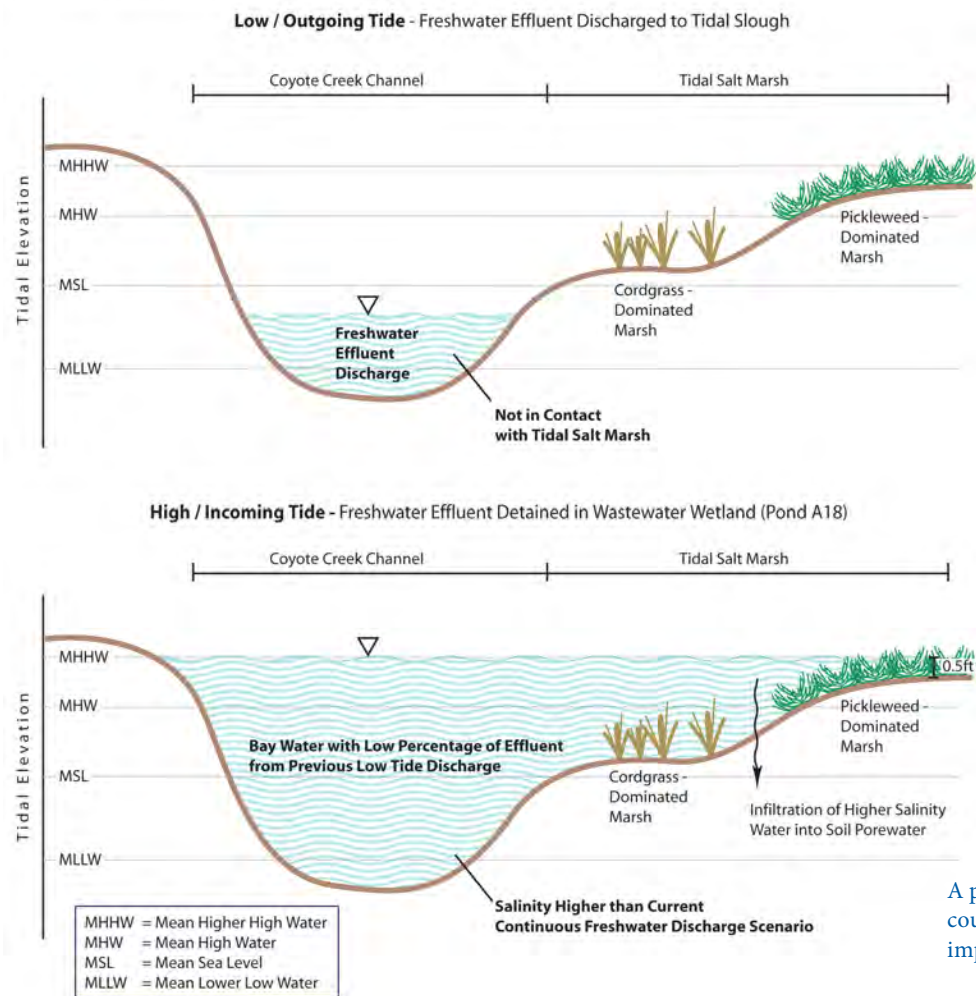
It is the policy of the City of San José that the highest priority land use for Plant lands is to support present and future operations of the Plant and NPDES permit compliance consistent with the General Plan and the Alviso Master Plan.

The following additional policies apply to Buffer Lands as defined above. In addition these policies also apply to any short term uses proposed for the Plant expansion areas.

1. Buffer Land uses must ensure sufficient buffer for odors and potential toxic releases.
2. Buffer Land uses must support NPDES permit compliance and not constrain the Plant's flexibility to respond to unknown future requirements.
3. Buffer Land uses must protect existing biological resources.
4. Buffer Land uses should provide environmental benefit.
5. Buffer Land uses should encourage public support for Plant land uses consistent with Plant operations.
6. Buffer Land uses must be compatible and consistent with the City's General Plan and the Alviso Master Plan.
7. Buffer Land uses may be considered that provide "Dual Use" benefits.

To better prepare for the possibility of "dual-use" proposals, in 2007 the Plant completed a "Plant Lands and Pond A18 Opportunities and Constraints" report. The report looked at different opportunities to harness the Plant lands and the newly purchased Pond A18, a former saltpond, to aid in the treatment process. However, the recommendations in the report could not be implemented without an understanding of the Plant treatment needs in the future, particularly related to biosolids treatment.

That same year, the Plant completed an "Infrastructure Condition Assessment" to address the impacts of decades of deferred maintenance. The report identified \$1 billion in repairs so that the Plant could continue operating into the future with current technologies. Two parts of the Plant were targeted for immediate repair, the electrical distribution system and solids digestion. This assessment noted that the only way to successfully implement the needed repairs was to consider how the different treatment processes interrelate, the possibility that flows may increase, or that regulations may change and recommended the development of a master plan.



A pulse-discharge wetland could reduce freshwater impacts to the Bay.

Repairs Identified in the “Infrastructure Condition Assessment” Report

Additionally, the original Plant designers never could have anticipated the proximity of development. Any rebuilding of the Plant would need to consider the Plant’s impacts on the surrounding community.

These two reports set the stage for the Plant Master Plan to create a new vision for a rebuilt Plant that would not only address the impact of future regulations and flows and loads, on fundamental wastewater treatment needs, but also address community values and envision San José’s San Francisco Bay Shoreline.

Asset Category	Total Capital Cost (millions)
Sitework	\$102.2±
Preliminary Treatment	\$36.6±
Primary Treatment	\$127.6±
Secondary Treatment	\$179.8±
Nitrification	\$77.9±
Tertiary	\$77.6±
Disinfection	\$13.9±
Outfall	\$8.9±
Sludge Thickening	\$17.2±
Anaerobic Digestion	\$87.6±
Digester Gas System	\$10.0±
Residual Solids Management	\$185.8±
Support Facilities	\$71.1±
Total	\$996.2±

Source: CH2MHill 2007 Infrastructure Condition Assessment (Table ES-9)

CURRENT PLANT PROCESSES AND STATISTICS

How does the Plant clean our wastewater?

Indoor water (wastewater) flows from homes and businesses through the sanitary sewer system to the Plant for treatment, where solids are separated from the liquids.



Solids

Flotation thickeners (5 - 6 hours)

Solids from secondary clarifiers (step 5) are taken to **flotation thickeners**, where air is pumped into the sludge to separate it further into solids and water. Water is returned to the primary tanks for further processing.



Digesters (up to 30 days)

In the **digester tanks**, naturally occurring **anaerobic bacteria** digest sludge and produce the methane gas that helps meet the Plant's energy needs.



Lagoons (3 years)

Sludge is pumped into **lagoons** to stabilize, and covered with water to control the odors.



Drying beds (up to 6 months)

Sludge moves to the **drying beds** to be dried by the sun. This step produces high-quality Class A biosolids.



Landfill

Biosolids are then used as daily cover at **Newby Island Landfill** to prevent wind-blown debris and discourage animal scavengers.



Storm water

Flows untreated through the storm sewer system are sent directly to South Bay



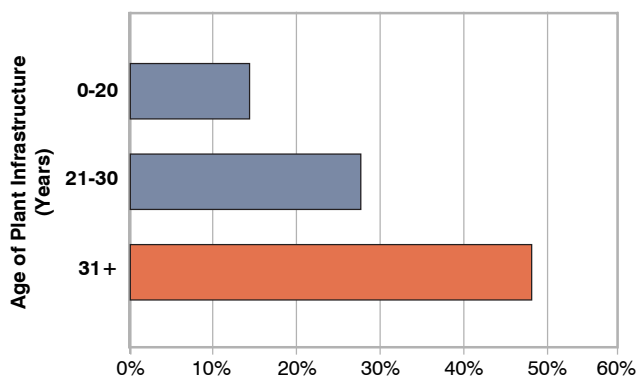


Page Intentionally Blank

PLANT MASTER PLAN DRIVERS

Aging Infrastructure

The Plant was built over three main periods: the original Plant in 1956, the expansion to secondary in 1964, and the completion of secondary process upgrades for nitrogen removal and filtration in 1979. The major capital improvement projects since then include the construction of the South Bay Water Recycling system from 1998 to the present and the wet weather reliability project in 2007. The Plant has also completed major projects to reduce the use of hazardous chemicals. The Plant converted to sodium hypochlorite in 2011 for the disinfection process, greatly reducing the public safety risk from the Plant.



Nearly half of the plant infrastructure is over 30 years old.

The Plan confirmed the findings of the 2007 Infrastructure Condition Assessment and the \$1 billion needed to repair the existing processes. By looking at the complete picture of how wastewater moves from headworks to disinfection, the Plant Master Plan team evaluated whether certain processes would need to be modified, rebuilt, abandoned, or replaced with a new technology. This holistic approach would ensure that public investments in rebuilding facilities or new facilities provide the community with the best return on investment while meeting the community's values.

The Plant faces a list of repairs to every process area and facility to repair crumbling concrete, corroded pipes, frayed electrical systems, and worn out engines, pumps, and valves. Because the Plant must operate on a 24 hours per day/365 days per year schedule, work has already begun to address the areas in need of critical repair: the electrical distribution system and the solids digestion.



The Plant Master Plan showed that every process required major rehabilitation. By looking at the complete picture of how wastewater moves from headworks to disinfection, the Plant Master Plan team evaluated whether certain processes would need to be modified, rebuilt, abandoned, or replaced with a new technology. This holistic approach would ensure that public investments in rebuilding facilities or new facilities provide the community with the best return on investment while meeting the community's values.

Regulations

The Plant is subject to strict regulatory requirements set by the Federal Government and the State of California to ensure the health and safety of the Plant's staff, the environment, and users of the Plant's products – recycled water and biosolids. The regulations can be divided up into the six categories: treated wastewater discharged to the South San Francisco Bay, use of recycled water, disposal or reuse of biosolids, air emissions from Plant processes and engines, safety requirements to protect Plant workers, and land use controls. The Plant Master Plan team focused on the impacts to treatment processes that may result from changes in wastewater discharge, biosolids disposal regulations, and air emissions. The land use controls defined the opportunities and constraints for the entire Plant site and are addressed in

the companion Programmatic Environmental Impact Report for the Plan. Regulations related to recycled water and worker safety were assumed to remain the same and are not addressed by the Plan.

Summary of Federal, State, and Regional Regulations Applicable to WPCP

Discharge to Receiving Water	Discharge to Land	Air Emissions
Federal		
<ul style="list-style-type: none"> • Clean Water Act (CWA) of 1972 • National Pollutant Discharge Elimination System (NPDES) (40 CFR 122) • Water Quality Standards (40 CFR 131) 	<ul style="list-style-type: none"> • Sewage Sludge Regulation (40 CFR Part 503) • Landfill Requirements (40 CFR Parts 257 and 258) • Clean Air Act (CAA) of 1970 (amendments in 1977 and 1990) • Resource Conservation and Recovery Act (RCRA) of 1976 (amended in 1984 and 1986) • Clean Water Act (CWA) of 1972 • 40 CFR Part 761 (promulgated under Toxic Substances Control Act) • Federal Endangered Species Act of 1973 	<ul style="list-style-type: none"> • Clean Air Act (CAA) and National Ambient Air Quality Standards (NAAQS) of 1970 (amendments in 1977 and 1990) • National Emission Standards for Hazardous Air Pollutants (NESHAPS) (40 CFR 61) • Sewage Sludge Regulation (40 CFR Part 503) • Occupational Safety and Health Administration (OSHA) (29 CFR 1910)
State		
<ul style="list-style-type: none"> • Porter-Cologne Act of 1969 • Reclaimed Water Requirements (CCR Title 22) • Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, 2005 (SIP) • Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays And Estuaries Of California, 1998 (California Thermal Plan) 	<ul style="list-style-type: none"> • CCR Title 23, Chapter 3, Chapter 15 • CCR Title 22, Article 3 • Toxic Pit Clean Up Act of 1984 (Katz Bill AB 3566/3121) • Porter-Cologne Act of 1969 • General Waste Discharge Requirements (GWDR) for Discharge of Biosolids to Land for Use as a Soil Amendment in Agriculture, Silviculture, Horticulture, and Land Reclamation Activities 	<ul style="list-style-type: none"> • CARB State Implementation Plan, 2007 (SIP) • CARB Air Toxic Pollutant Program (Tanner Bill AB 1807) • Air Toxics “Hot Spots” Information and Assessment Act of 1987 (Connelly/ Stirling Bill AB 2588) • California Clean Air Act of 1988
Regional		
<ul style="list-style-type: none"> • San Francisco Bay Basin Water Quality Control Plan, 2007 (Basin Plan) • Whole Effluent Toxicity Characterization Program 		<ul style="list-style-type: none"> • Bay Area Air Quality Management District (BAAQMD) Rules and Regulations • Santa Clara County Toxic Gas Ordinance, 1990 (TGO)

Notes:

CARB = California Air Resources Board.
 CCR = California Code of Regulations.
 CFR = Code of Federal Regulations.



Discharge to the Bay


The National Pollutant Discharge Elimination System (NPDES) permit allowing the Plant to discharge treated wastewater into the South San Francisco Bay is issued by the San Francisco Bay Regional Water Quality Control Board (Water Board) to comply with the federal Clean Water Act and the California Porter-Cologne Water Quality Control Act. The final effluent water quality discharged to the Bay is measured over a number of parameters:

Current WPCP NPDES Permit Effluent Requirements (No. CA0037842)

Constituent	Units	Monthly Average	Daily Maximum	Instantaneous Maximum	Total Monthly	Range
Carbonaceous Biochemical Oxygen Demand (CBOD)	mg/L	10	30	–	–	–
Ammonia-Nitrogen	mg/L	3	8	–	–	–
Total Suspended Solids (TSS)	mg/L	10	20	–	–	–
Oil and Grease	mg/L	5	10	–	–	–
Settleable Matter	mg/L-hr	0.1	0.2	–	–	–
Turbidity	NTU	–	–	10	–	–
Chlorine Residual	mg/L	–	–	0.0 ⁽¹⁾	–	–
pH	-	–	–	–	–	6.5 8.5
Copper	mg/L	12	18	–	–	–
Mercury ⁽²⁾	mg/L	0.012	2.1	–	–	–
Mercury	kg/month				0.231 ⁽³⁾	
Nickel	mg/L	25	34	–	–	–
4,4-DDE ⁽²⁾	mg/L	–	0.05	–	–	–
Dieldrin ⁽²⁾	mg/L	–	0.01	–	–	–
Heptachlor Epoxide ⁽²⁾	mg/L	–	0.01	–	–	–
Benzo(b)Fluoranthene ⁽²⁾	mg/L	–	10.0	–	–	–
Indeno(1,2,3-cd)Pyrene ⁽²⁾	mg/L	–	0.05	–	–	–
Enterococcus	Colonies /100 mL	35	–	276	–	–

Notes:

- (1) Requirement defined as below the limit of detection in standard test methods defined in the latest EPA approved edition of Standard Methods for the Examination of Water and Wastewater.
- (2) Interim Limits, valid until October 31, 2008, or until the RWQCB amends the limitations based on additional data, site-specific objective, or the waste load allocation in respective TMDLs.
- (3) Dry weather months (May through October), the total mercury mass load shall not exceed the mercury mass emission limitation of 0.231 kilogram per month (kg/month).



After consultation with the Water Board and investigating national trends, the Plant Master Plan team concluded that future regulations related to nutrient removal (total nitrogen) and contaminants of emerging concern (CECs) may require additional consideration.

Contaminants of Emerging Concern (CECs) are pollutants not currently regulated or included in routine monitoring but may be regulated in the future. Ultraviolet disinfection in combination with peroxide has been shown to neutralize CECs and is recommended as one of the potential technologies to be evaluated for future implementation.

The Plant Master Plan team investigated treatment scenarios based on requirements to reduce total nitrogen (TN) in the range from 3 to 8 mg/L, which could be included in a future NPDES permit. However, if the scientific and data-driven decision making does not indicate that nutrients discharged to the Bay need to be further restricted, the regulations may never materialize. This scientific uncertainty is also related to future regulations on CECs, since the impacts

on aquatic life are not yet fully understood.

Biosolids Disposal or Reuse

The disposal or reuse of biosolids generated by the Plant is regulated primarily by the Clean Water Act according to the rules specified by the Sewage Sludge Regulation of 40 CFR Part 503 and enforced by the US EPA. While the EPA has given no indication that it is looking to change biosolids regulations, the ability to beneficially reuse biosolids has been under threat through municipal bans on land application of biosolids. The uncertainty around future biosolids disposal or reuse options required that the Plant Master Plan team investigate a broad range of options. The team worked with a premise that biosolids disposal or reuse should be handled with “three 50 percent options”; that is, the Plant would have at least three options to handle the biosolids, and each option could handle a minimum of 50 percent of the Plant’s biosolids.

Air Emissions

In order to treat the wastewater, the Plant uses over 10 MW (megawatts) of energy. Over two-thirds of the energy is generated at the Plant by combusting digester and landfill gas in engines and gas-driven blowers (air for secondary treatment). The air emissions from these engines and blowers, along with the other Plant processes, are regulated by the Bay Area Air Quality Management District (BAAQMD) under the authority of the Clean Air Act and the California Clean Air Act.

The Plant operates under the Major Facility Review Permit, issued to San José/Santa Clara Water Pollution Control Plant, Facility No. A0778. It lists the Plant’s permitted equipment that emits airborne pollutants, as well as its abatement devices. It lists which of the regional emissions limits and other regulations and rules are applicable to which equipment, and compliance is to be determined with performance testing. Additionally, there are specifications as to the quality of fuels used by Plant combustion equipment. This permit outlines the Plant’s limit on NO_x, SO_x, particulate matter, and other smog causing pollutants.

New regulations have recently been issued to address greenhouse gas (GHG) emissions in California and in the San Francisco Bay area in particular. The State of California issued Assembly Bill AB 32 – Global Warming Solution Act (AB 32) in 2006. AB 32 requires global warming emissions in California to be reduced to the 1990 level by the year 2020. There will be a statewide cap on GHG emissions to accomplish the goals set by AB 32 that will commence in 2012.

The current regulatory trends indicate that air emissions will be further limited. The Plant’s emissions are considered primarily biogenic (i.e. from organic sources that would decompose and release carbon without additional fuel). However, the Plant’s engines operate inefficiently, need constant maintenance, and lack the ability to further reduce emissions. The limitations and the age of the existing engines make them a prime target to be replaced. While not a regulatory requirement, the Plan also investigated the “off gassing” of methane and reduced sulfur compounds in the different process areas to achieve additional GHG reductions.



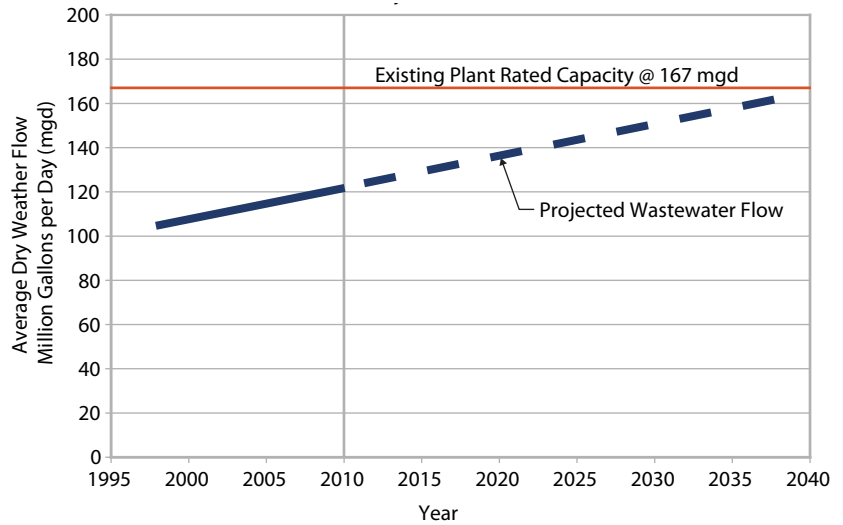
Other Regulations Potentially Impacting the Plant Master Plan

Investigation of the possibility that the Municipal Regional Permit issued by the San Francisco Bay Regional water Quality Control Board for stormwater discharge would require treatment of either diversions of “first-flush” rains or stormwater pump station discharges to the Plant. The Plant Master Plan team found both of these options to be infeasible. Diversions would be neither cost effective nor provide the appropriate treatment for stormwater.

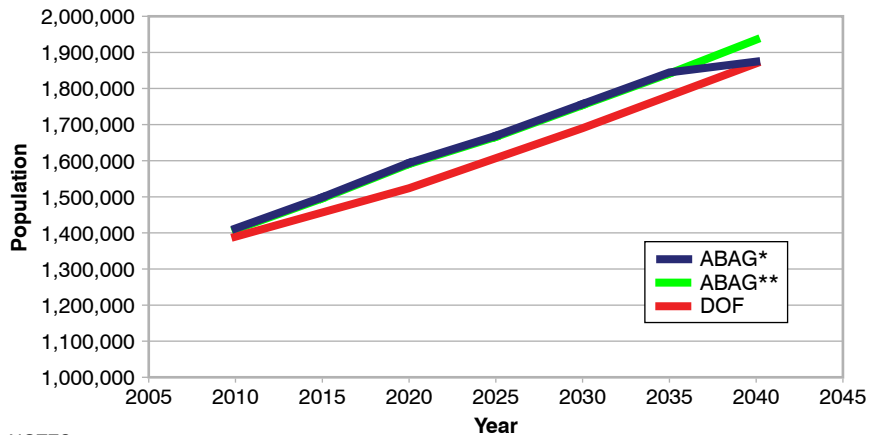
Flows and Loads

Despite a steady increase in population served by the Plant, influent wastewater flows to the Plant have decreased over the past 15 years due to the loss of industry and increased water conservation. This same trend is common throughout the Bay area. However, flows are expected to increase in the future as new homes are built to house the 400,000 new residents in San José over the next 30 years (since water conservation measures will have already been fully implemented).

The flows from population growth help determine the Plant’s influent wastewater flows during the “dry season” (from May to October), but the Plant Master Plan team also considered the impacts of increases in wet-weather flows during the “wet season” (November to April). Because the sanitary sewer collection system is not pressurized, the Plant is subject to increases in wet-weather flows due to leakage into cracks or joints in older pipelines or stormwater from illegal sewer connections. This phenomenon, called I&I (Infiltration and Inflow), can contribute to increases in the Plant’s flow to 450 mgd in extreme wet-weather events. While this scenario would not be a frequent occurrence, the Plant must be prepared to move this amount of wastewater through the Plant to avoid untreated wastewater spills in



The population driven flows are projected to reach 172 million gallons per day (mgd) during the “dry season” by 2040 and may require a modification to the Plant’s NPDES permit.

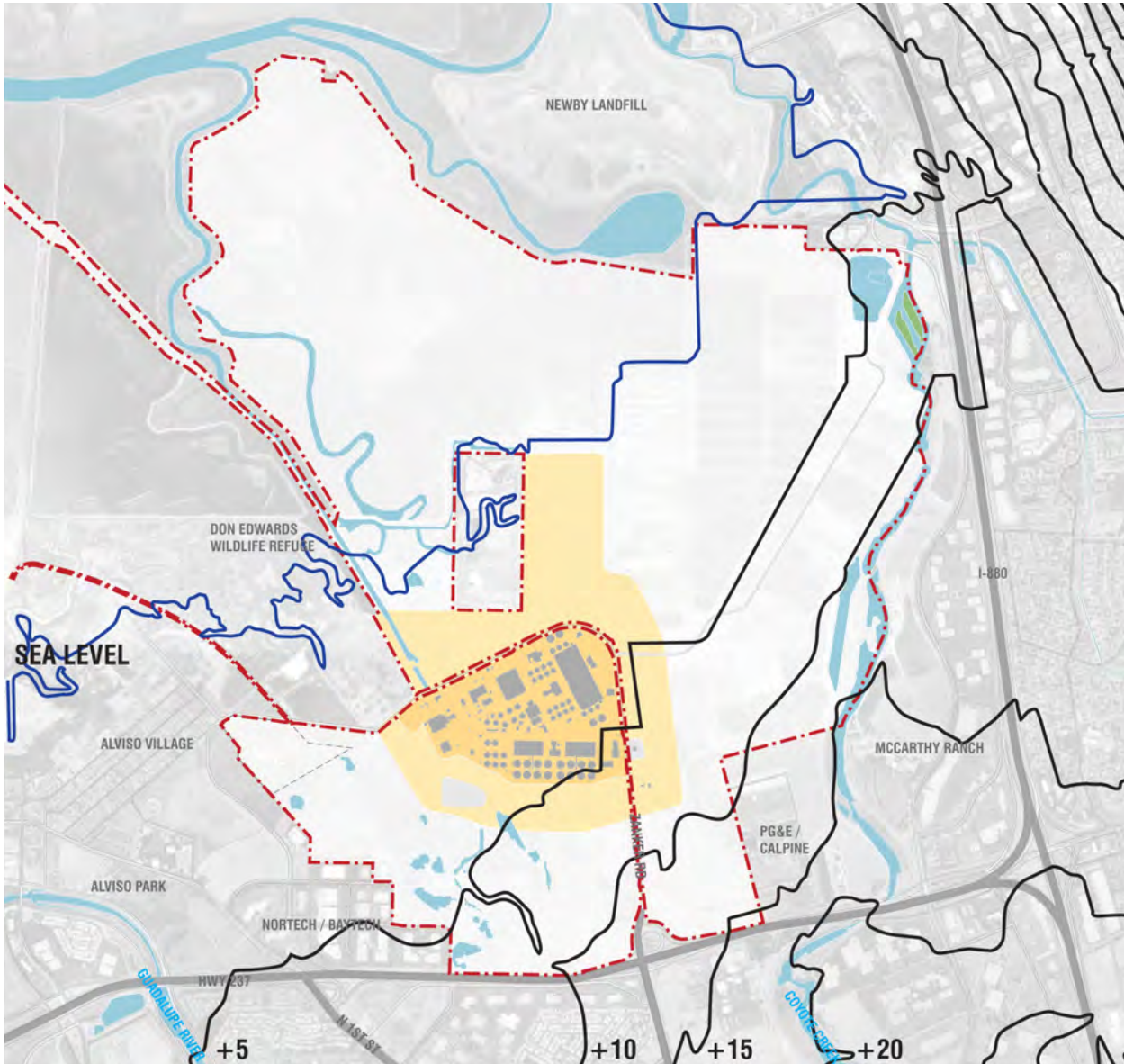


NOTES:

- * ABAG projection based on the projected 2035 to 2040 City of San Jose growth rate of 1.6 percent for WPCP service area.
- ** ABAG projection based on historical average 5-year growth rate of 5.1 percent for WPCP service area.

The number of San José residents is expected to increase by approximately 400,000 over the next 30 years.

neighborhood streets. The Plant Master Plan team used the 450 mgd maximum flow rate to establish the wet-weather hydraulic capacity for the Plant.



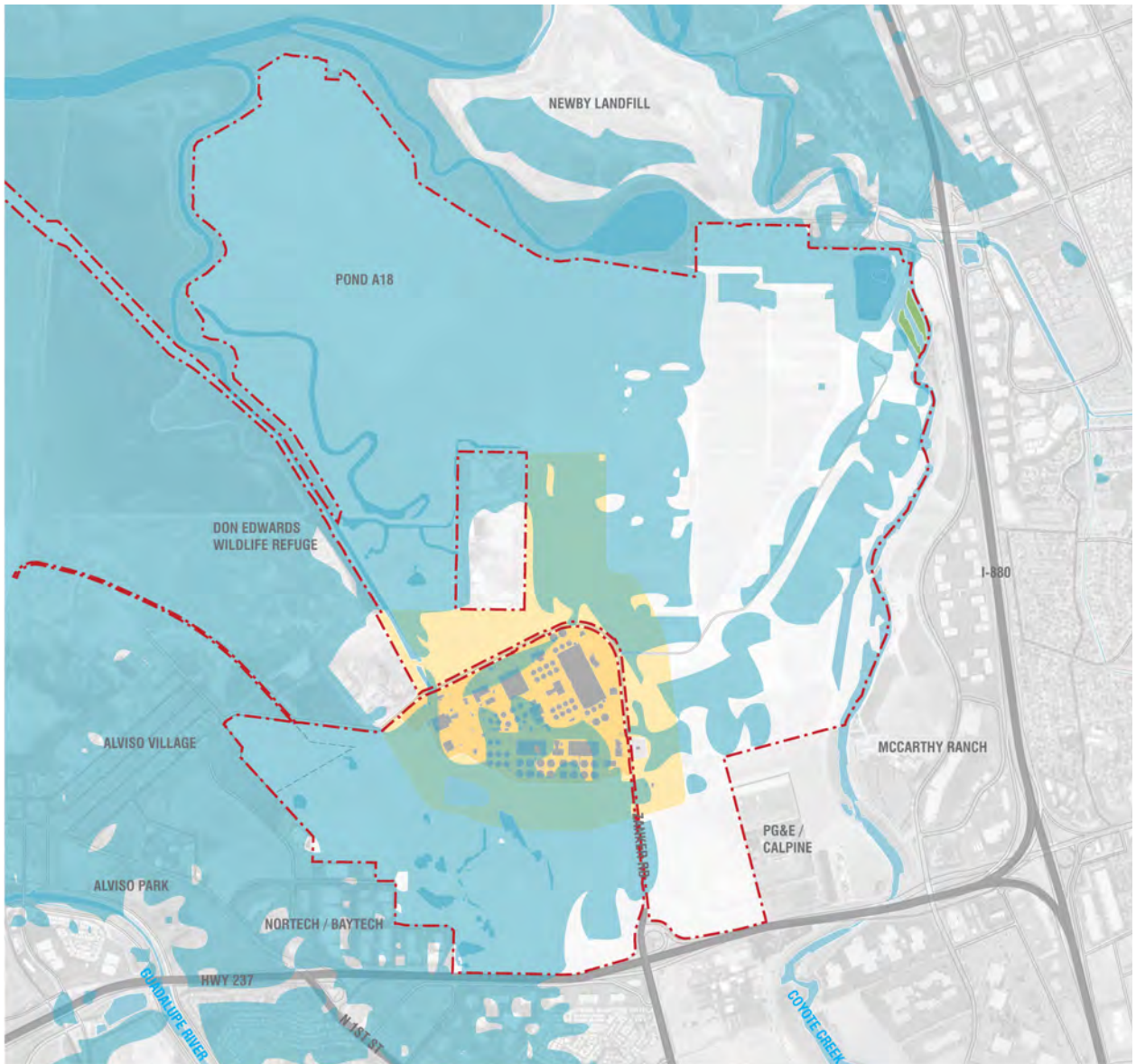
Much of the Plant is below sea level due to ground subsidence.

Preparing for Sea-Level Rise

The Plant, located at the confluence of the Guadalupe River and Coyote Creek watersheds along the Bay margin sits at the low point of the Santa Clara Valley basin. Much of the Plant is below sea-level due to ground subsidence. The Plant's operational area is protected from a 100-year flood event (a FEMA designation that every year there is a one percent chance that the area may flood) by a perimeter berm. The region is protected from fluvial flooding by Santa Clara Valley Water District flood control projects along the Guadalupe River and Coyote Creek.

However, estimates for sea-level rise clearly show that the Plant is at risk from tidal flooding from a

higher San Francisco Bay. There are three strategies to address sea-level rise: one, to build flood-control structures (i.e. levees) that will hold back the Bay; two, to design facilities that can tolerate occasional flooding; or three, to retreat from the area and allow for a new shoreline to be created. While some facilities can be placed above the projected flood areas, most of the Plant's facilities cannot be elevated. The Plant cannot operate underwater. Flooding the Plant's network of tunnels will leave many of the electronic components inoperable. Therefore, option two was dismissed. Option three, moving the Plant to a new location, was also dismissed. New treatment plant sites would be nearly impossible to permit and the costs would easily exceed \$3 billion to replace the



Sea-level rise estimates clearly show that the Plant is at risk from tidal flooding from a higher San Francisco Bay.


Plant. The only viable option for the Plant would be to work with the flood control agencies and the South Bay Shoreline Study partners, the US Army Corps of Engineers, Santa Clara Valley Water District, and State Coastal Conservancy, to build appropriate flood-control structures. The Plant Master Plan team considered the optimal alignment and design for the levee that would inform the Shoreline Study.

Community Values

The Plant's core function, to protect the public health and the water quality of the South San Francisco Bay, emerged from state and federal regulatory requirements. For decades the Plant looked to minimize its impact on the community by keeping rates low and remaining, literally, out of sight. Few commuters

traveling down Highway 237 are aware that they are passing the largest wastewater treatment plant in the Bay area. A community survey showed that less than a fifth of the community even knew that the Plant existed or that it treated wastewater. The job of the Plant has been to comply with regulations by treating and disposing of waste products as inexpensively and invisibly as possible.

Within the City of San José and its partner agencies, the community shifted towards a recognition that waste products should be considered resources and the Plant should aim towards achieving sustainability. The Plant has already begun this transformation into a sustainable operation where the Plant's byproducts have been transformed into resources. The tributary area has utilized treated wastewater from the South



Bay Water Recycling program since 1998. Biosolids also have been beneficially reused as alternative daily cover (ADC) at the Newby Island landfill for the past 20 years. The Plant has generated much of its own power through methane gas capture from the operation of the Plant's digesters. These efforts have provided both economic benefits as well as environmental benefits.

The move towards sustainability has been a reflection of community values that prioritize not only economic efficiency but also environmental benefits and social equity, often referred to as the "triple-bottom line." The concept of the "triple-bottom line" was reinforced with the notion that, no matter what technology or land use was considered, the ability of the Plant to effectively treat wastewater was the paramount concern.

Embracing sustainability impacted all parts of the Plan. First, the Plant Master Plan team needed to understand how the treatment processes, existing and proposed, would impact the local, regional, and global environment. For example, a process that provides an improvement in water quality (a local and regional benefit to Bay habitat) may also require additional energy (potentially a global impact with increased greenhouse gas emissions). The team considered these tradeoffs in preparing a recommendation. The Plant Master Plan team also looked at opportunities for the Plant to help the City of San José achieve the ten goals of the Green Vision adopted by the San José City Council in 2007.

City of San José Green Vision Goals

- Create 25,000 clean tech jobs.
- Reduce per capita energy use by 50%.
- Use 100% clean renewable energy.
- Build or retrofit 50 million sq. ft. of green buildings.
- Divert 100% of waste from landfill.
- Recycle or beneficially reuse 100% of wastewater (100 mgd).
- Adopt a general plan with measurable standards for sustainable development.
- Use alternative fuels in 100% of public fleet vehicles.
- Plant 100,000 trees.
- Create 100 miles of interconnected trails.

Source: City of San José (2008).

Second, the process evaluation would also need to consider how the treatment process may impact surrounding land uses. While the Plant provides a direct benefit to the entire community through efficient and reliable wastewater treatment, the Plant must also consider the direct, external impacts of the treatment process (noise, odors, loss of visual character, and traffic) on the surrounding communities of Alviso, North San José, and Milpitas.

The Plan also became an opportunity for the Plant to directly address community odor concerns. Milpitas officials and community members looked to the Plant to help improve the overall quality of life for the Milpitas community by reducing odors from the Plant. As a result, the Plant Master Plan team evaluated how to contain and treat the foul air from the Plant's processes. The San José City Council in 2010 requested that projects addressing the most odorous sources be prioritized.

Finally, the proposed land uses for the bufferlands reflected the community values of sustainability. Housing on the Plant lands was ruled out immediately as an incompatible land use next to the Plant. Through a series of community workshops, the community members from throughout the Plant's service area embraced land-use choices that provided a mix of uses (commercial development, institutional uses, parks, trails, and habitat restoration) with a focus on retaining open space for habitat along the Bay, Coyote Creek, and in the bufferlands.

The proposed new uses on Plant lands would need to be financed independently from the wastewater treatment plant operations and driven by the private sector. The Plant would retain ownership of the land and look to raise future revenues through ground leases. When the Plant Master Plan process began in 2007, the team believed, based on the economic activity at the time, that the revenue collected from ground leases on any future development in the Plant lands could substantially offset Plant capital and operations and maintenance costs. However, as the subsequent "great recession" hit the global economy, the expectations for revenue generation from the Plant lands were significantly curtailed. The proposed new uses, nevertheless, would need to be examples of sustainable development to include opportunities to use the byproducts from the Plant (energy, heat, biosolids), include energy generation, a minimization of stormwater impacts, and infrastructure investments to help build a clean-tech economy by providing good, green jobs in the community.

GOALS, OBJECTIVES, DECISION-MAKING CRITERIA

Goals

The following goals for the Plan were developed based on the principles of sustainability:

Operational: Result in a reliable, flexible Plant that can respond to changing conditions.

Economical: Maximize economic benefits for customers through cost-effective options.

Environmental: Improve habitat and minimize impacts to the local and global environment.

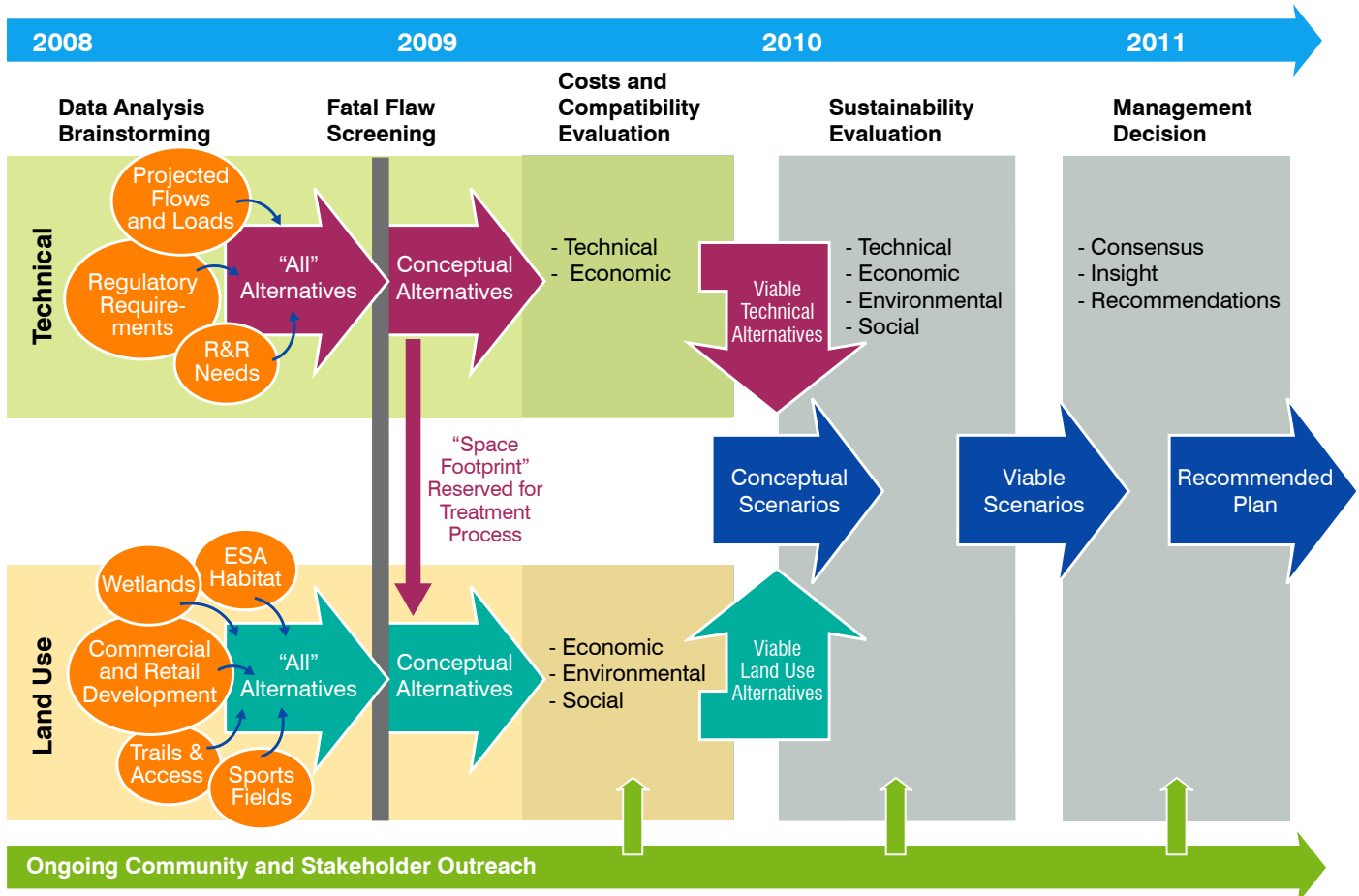
Social: Maximize community benefits through improved aesthetics and recreational uses.



Objectives

The following 15 objectives guided the development of the Plan:

- Protect the environment, public health, and safety through reliable wastewater treatment that can accommodate population growth and meet foreseeable future regulations.
- Maximize the long-range efficient use of the Plant's existing facilities and reduce the footprint of the existing biosolids treatment area.
- Maintain cost-effective Plant operations and competitive sewer rates through enhanced operations, flexibility, and rigorous evaluation of new technologies.
- Reduce visual, noise, and odor impacts from Plant operations to neighboring land uses to the extent practicable.
- Promote additional resource recovery from Plant operations by supporting recycled water production, increasing biogas production, and diversifying biosolids reuse options.
- Pursue energy self-sufficiency and reduced greenhouse gas emissions by promoting renewable energy generation, increased energy efficiency, and enclosed biosolids processing.
- Allow for the beneficial use of Plant effluent through multiple effluent release points and creation of freshwater habitats.
- Allow for complementary economic development that enhances job growth, generates revenue, provides for partnerships with educational institutions, and supports the regional growth of the Clean Tech industry.
- Locate economic development on Plant lands to maximize viability and visibility.
- Protect the small-town character of the Alviso Village.
- Allow for complementary recreational uses, including interconnected trails to the Bay, environmental education, and addressing regional recreational needs.
- In partnership with other agencies, protect, enhance, and/or restore habitat, including upland areas, wetlands, and riparian vegetation near creeks.
- Allow for Pond A18 to provide water quality, ecosystem benefits, and flood control benefits.
- Promote access to recreational, educational, and economic development uses by improving transportation connections through the Plant lands.
- In partnership with other agencies, protect the Plant from flooding and risks associated with sea level rise.



The Plan decision-making process involved a facilitated, consensus-building approach, aimed at establishing how well different technologies and land use alternatives achieved the goals and objectives.

Decision Making Process

The method by which sustainability would be incorporated would be through the decision framework. The decision framework consists of developing a vision, goals, and objectives.

The Plan decision-making process included a series of facilitated workshops at which technical leaders and key stakeholders provided expert advice to City staff to reach decisions on the selected alternatives. The alternatives were refined in an iterative process. This process is called The Delphi Technique, which was developed by the RAND Corporation and the U.S. military as a forecasting methodology. Using this process, the workshop includes City technical experts and managers, outside experts and input from the public outreach process. The appropriate metrics for each alternative are presented and discussed, with the group summarizing the recommendations for the elected officials to make a final decision.

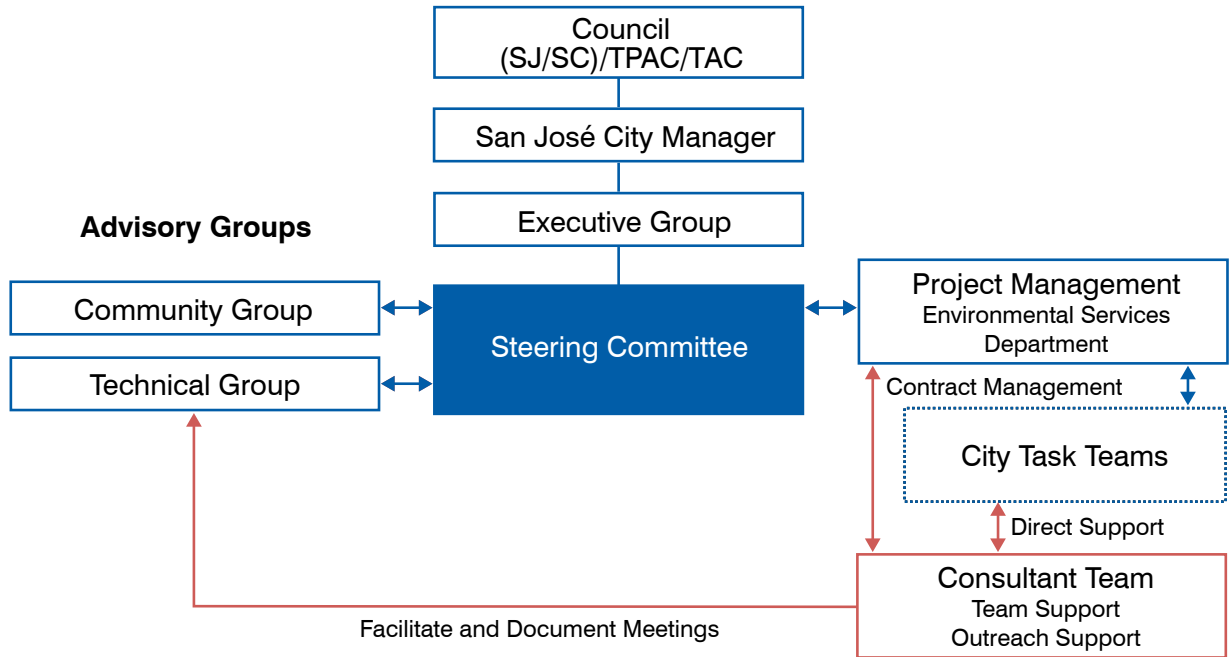
STAKEHOLDER PROCESS

Staff developed the Plant Master Plan with extensive technical oversight, agency feedback, and public and stakeholder input. In addition, staff addressed comments from the Plant's tributary partners.

Early in the Plan development, members of the Plant's Technical Advisory Committee (TAC) appointed 20 community members from the City of San José, City of Santa Clara, and the other cities within the Plant's service area, to serve on a Community Advisory Group (CAG). The CAG members also represented different stakeholder groups who included Plant neighbors, community leaders, business interests, and environmental advocates. The CAG met over 20 times and provided guidance on land use issues and the timing and prioritization of technical improvements related to odor control.



The Plant Master Plan project team was guided by the Plant Master Plan Steering Committee, made up of staff from the Plant’s two co-owning cities (San José and Santa Clara) and from the tributary agencies served by the Plant, as well as representatives from various City of San José departments. The project team also provided quarterly updates to the Treatment Plant Advisory Committee (TPAC) and San José’s Transportation and Environment Council Committee (T&E) to obtain comments from elected officials.



- Community Advisory Group (CAG)**
- Nicholas Dewar, Facilitator
 - James (Jim) Alves, Santa Clara
 - Larry Ames, At-large
 - Carl Cilker, At-large
 - Diana Foss, San José
 - Michael Gross, At-large
 - Dolores Hovey, Milpitas
 - Carrie Jensen, San José
 - Robert (Bob) Levy, San José
 - Gina Marin, Santa Clara
 - Joseph McCarthy, Jr., At-large
 - Eileen McLaughlin, At-large, spokesperson
 - Donald Peoples, At-large
 - Bob Power, Cupertino
 - Tony Santos, Alviso
 - Patrick Wong, Milpitas
 - Richard Yanda, Los Gatos
 - David Zwack, Campbell

Inviting stakeholder and community input on possible new land uses and proposed Plant improvements has been a key part of the planning process. In addition to the input from the Community Advisory Group (CAG) throughout the process, there were three phases for input from the general public:

- **May to November 2009:** input was collected on community values for the Plant lands, and this input was used to develop three land use alternatives. The community showed a preference towards a mix of uses with a focus on retaining open space for habitat and limiting development.
- **May to November 2010:** input was collected on the three land use alternatives: Back to the Bay, Riparian Corridor, and Necklace of Lakes. The input was used to refine the alternatives into one Draft Recommended Alternative. Community comments focused on similar themes from the previous workshops where development would be limited and a maximum amount of open space would be preserved. The community also showed a preference for the clean-tech institute concept as well as an extensive network of trails.



- **November 2010 to January 2011:** input on the Draft Recommended Alternative was collected and used to develop the Recommended Preferred Alternative. Community comments addressed potential traffic impacts to the Coyote Creek and Alviso by the creation of a road connecting Zanker Road and Dixon Landing Road near the San José, Milpitas, and Fremont boundary. Community comments also requested the development of an interim management plan to benefit burrowing owl habitat in the bufferlands on unimproved areas zoned for industrial and commercial development. The initial Plan concept to create a delta and upland connection between the Bay and Coyote Creek by moving a Santa Clara Valley Water District flood control levee was modified to follow the current levee alignment. However, additional open space near Coyote Creek was allocated to allow for the reconsideration of this opportunity to create a delta and upland connection.

Summaries of the stakeholder input received are collected in separate volumes as Plant Master Plan Land Use Alternative Input Summaries.

TECHNICAL REVIEW

A Technical Advisory Group (TAG) was formed to aid the master planning process as follows:

- Ensure that the planning process is comprehensive and consistent with the needs of the City and the tributary agencies.
- Review and confirm the master planning direction for the technical evaluations.
- Explore innovative and creative concepts for transforming the Plant site to its highest and best use.

The TAG was comprised of the following eight members, many of whom are internationally renowned figures in the wastewater industry:

- George Tchobanoglous, Ph.D., P.E., NAE (TAG Chair)
- David Jenkins, Ph.D., NAE (TAG Vice Chair)
- Bob Gearheart, Ph.D.
- Bruce Wolfe, P.E.
- Cecil Lue-Hing, D.Sc, P.E., DEE, NAE
- Glen Daigger, Ph.D., P.E., BCEE, NAE
- John Rosenblum, Ph.D., P.E., BCEE, NAE
- Walter Niessen, P.E., BCEE

Three workshops were conducted with the TAG during the master planning process. The TAG recommended investigating innovative wastewater strategies related to nutrient mining, distributed wastewater systems, and energy recovery. Due to the Plant's objectives to maximize reuse of the existing wastewater infrastructure, many of the TAG's recommendations would not be incorporated into the final Plan. Nonetheless, the TAG provided a valuable level of technical review to ensure that the recommendations were based on sound science and technical judgment.

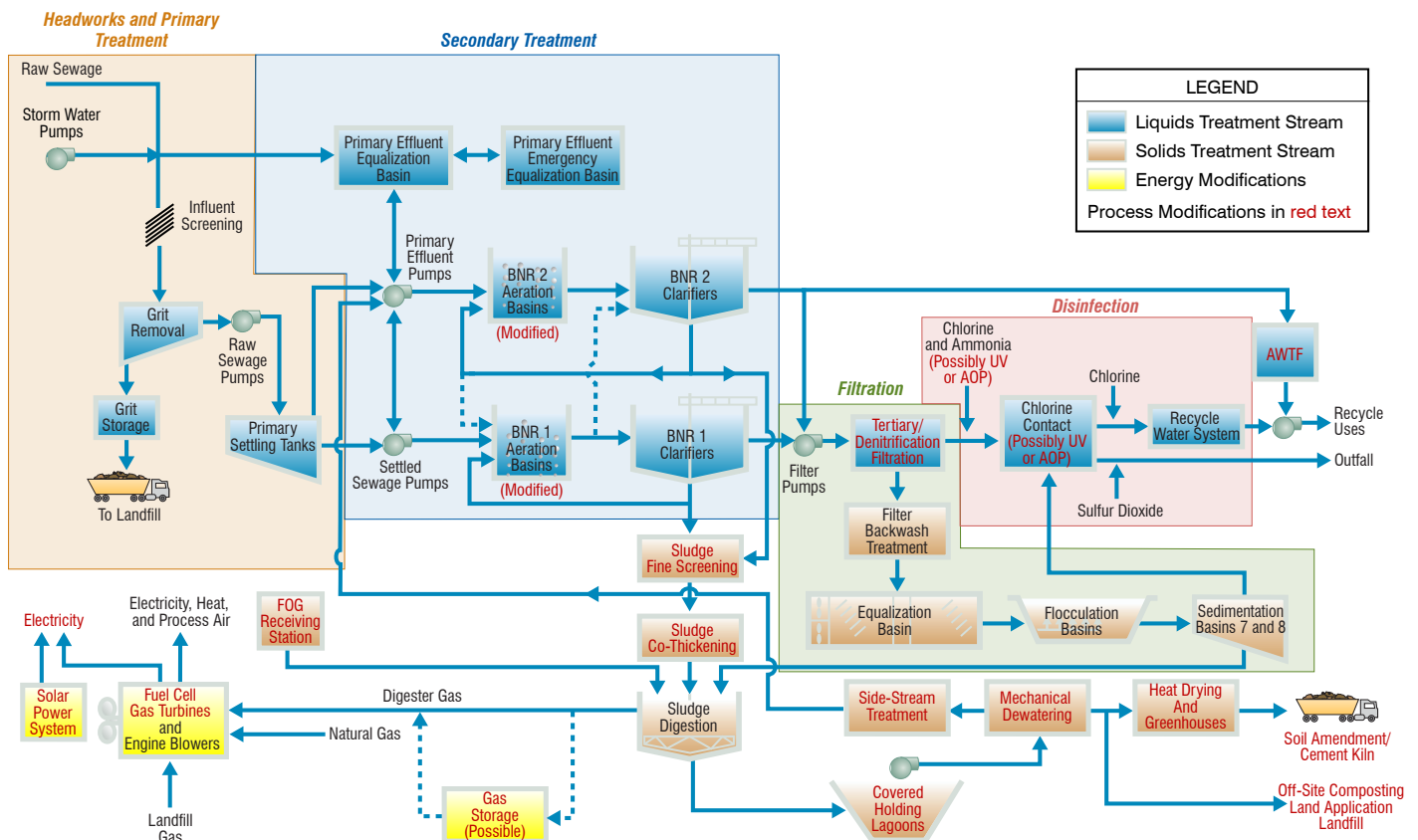
5. PLANT PROCESS IMPROVEMENTS

The rebuilding, rehabilitation, and replacement projects occurring in each of the Plant's treatment processes are captured in a 30-year capital improvement program (CIP). Each project is a response to the Plant's need to address aging infrastructure, new regulations, the new biosolids dewatering and drying process, and odor control. Furthermore, five triggers helped determine the projects' priority in the CIP:

- **Critical Condition:** Risk of failure of a vital facility or aging infrastructure requires repairs/rehabilitation.
- **Regulatory Requirements:** Future regulatory requirements require adjustments or new processes.

- **Economic Benefit:** Opportunities to save operating costs, including energy.
- **Improved Performance Benefit:** Process improvements to increase reliability and reduce risks.
- **Policy Decision:** Improvements based on policy direction.

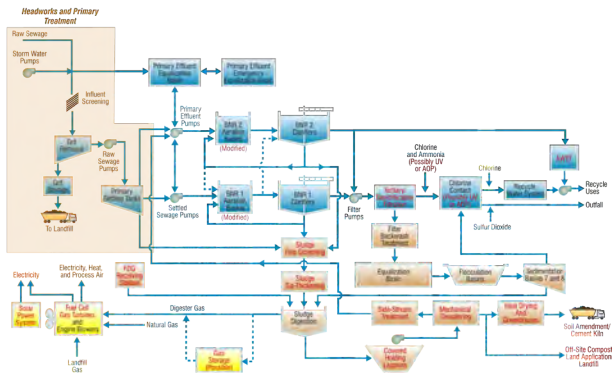
The following sections describe the improvements to each process area. For ease of discussion, the liquids treatment processes have been broken up into four categories: headworks and primary treatment, secondary treatment, filtration, and disinfection (shown below).



The liquids treatment processes are comprised of headworks and primary treatment, secondary treatment, filtration and disinfection.

LIQUIDS TREATMENT

Headworks and Primary Treatment



Improvements to the preliminary treatment system entail modifications to the raw equalization basin, and the headworks complex to address the aging infrastructure driver and to allow the Plant to handle peak-wet weather flows reliably.

Peak wet-weather flows are projected to be 450 mgd. However, the headworks (Headworks 1 and Headworks 2 facilities combined) has a capacity of 400 mgd. Expanding the current flow equaliza-

tion capacity from 8 MG to 10 MG is required to bring the peak flows down to flow rates that can be accommodated in the headworks and the various subsequent treatment steps. In addition, the raw equalization basin (wet weather facility) is currently unlined, and will be an odor source until it is cleaned (in case it is used). By providing a lining and the necessary spraydown system, the cleaning process will be more automated and more efficient.



Flow equalization will provide the peak wet-weather flow management for the treatment train.

Headworks and Primary Treatment

Project	Project Cost Estimate ⁽¹⁾ , \$ million	Project Start Year	Year Complete
Headworks Enhancements Phase 1 and 2	\$6.7±	2010	2014
Miscellaneous Headworks 1 Repairs	\$5.9±	2011	2019
Headworks 2 Modifications	\$62.6±	2011	2018
Headworks Odor Control	\$22.7±	2011	2018
Expand and Line Raw Equalization Basin to 10 MG	\$9.0±	2011	2016
Headworks 1 Demolition	\$11.5±	2036	2041
Refurbish/Demolish P&E Building	\$11.3±	2036	2041
Consolidate Influent Piping	\$21.5±	2036	2041
East Primaries Rehabilitation and Repair	\$50.1±	2012	2020
Primary Treatment Odor Control	\$49.9±	2012	2020
Tunnel Rehabilitation: West Primaries	\$1.8±	2012	2017
Tunnel Rehabilitation: East Primaries	\$2.4±	2012	2020
Iron Salt Facilities (EBOS and Primaries)	\$2.5±	2011	2013
Demolish West Primaries	\$22.1±	2036	2041
Additional 12 MG Primary Effluent Equalization Basin	\$21.6±	2028	2033

Notes:
 1. Escalated to midpoint of construction at 2 percent per annum.



Analysis has shown that expanding Headworks 2 from a capacity of 160 mgd to 400 mgd will be more cost-effective than the extensive rehabilitation work required to maintain Headworks 1. The Headworks 2 expansion will entail constructing a duplication of the existing infrastructure (3 bar screens, 3 vortex grit basins, and 3 pumps, 80 mgd each). Even though this is a duplication of the existing Headworks 2 infrastructure, it would increase the capacity from 160 mgd to 400 mgd because operational redundancy is already included in the existing infrastructure.

Odor control infrastructure over the existing Headworks 2 and various raw sewage junction boxes would likely be installed as part of this expansion project.

Once the buildout of Headworks 2 is complete, Headworks 1 would be decommissioned. Since the Headworks 1 raw sewage pump station is integrated into the P&E building, and since the engines in this building are also to be abandoned, it may be appropriate to decommission this building also. Alternatively, the P&E building could be refurbished for other Plant uses.

Primary treatment improvements entail structural and mechanical rehabilitation of the East Primaries, a detailed hydraulic evaluation to identify improvements to better accommodate peak flows, and odor control.

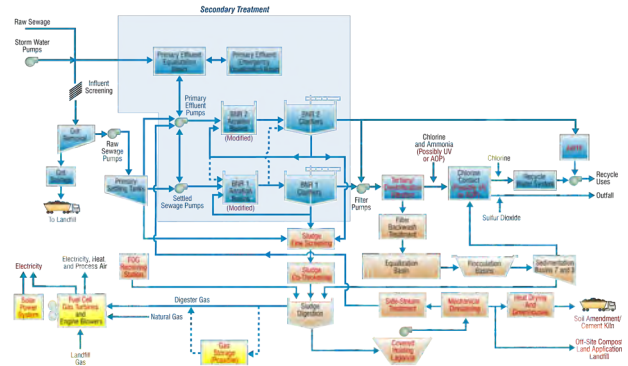
The hydraulic analysis showed how existing infrastructure could be used to bypass a portion of the headworks equalized peak flow around primary treatment directly to the BNR2 secondary treatment system. BNR2 would likely be operational during the wet season and could therefore provide the necessary treatment. If not operational, the basins would provide storage capacity for the bypassed flow. Because of this bypass capability, the primary treatment system could potentially be simplified to consist only of the East Primaries, and the older West Primaries could be decommissioned.

The addition of iron salts to influent wastewater is commonly used in the industry to chemically enhance the precipitation of solids. This increased removal in the primary treatment phase not only decreases the organic load on the secondary treatment process, but also increases the amount of primary settled sludge, which increases the feedstock to the digesters resulting in increased gas production. Iron salts are also very effective in binding and precipitating phosphorus, which prevents the phosphorus from forming struvite depositions, which are a costly

O&M issue in digesters. Additionally, iron salts will reduce the future costs for the plant to draw off and treat foul air as well as to minimize the corrosive impacts of H₂S generation.

Odor control infrastructure will be provided for all the East Primaries.

Secondary Treatment



Secondary treatment improvements entail modifications to improve operational flexibility and efficiency, and process modifications in response to anticipated more stringent discharge regulations.

To increase operational efficiency and reduce costs, two projects were identified to better integrate the two parallel secondary treatment plants, BNR1 and BNR2. The first project connects the aeration headers of the two plants, making it possible to integrate the blowers of both plants and thereby improving the aeration efficiency. The second project enables the secondary clarifiers from the BNR2 plant to be used in the BNR1 plant, thereby enhancing its capacity. During low flow periods of the year, BNR2 is taken out of service, which reduces plant operating costs. By increasing the BNR1 capacity, BNR2 can remain out of service for a greater part of the year.

According to the projected flow and load increases to the Plant, the current step-feed mode of operation in the secondary treatment system will have insufficient capacity around 2026. At that point the Plant would transition to Nitrifying Activated Sludge (NAS) mode, which would have enough treatment capacity through the 30-year planning period. However, if the effluent nitrogen discharge regulations become more stringent, a further denitrification step would need to be added to NAS. Alternatively, the plant could transition to either the modified Ludzack-Ettinger (MLE), or step-feed with internal mixed liquor return (IMLR) processes, both of which would require tertiary filtration.

Secondary Treatment

Project	Project Cost Estimate ⁽¹⁾ , \$ million	Project Start Year	Year Complete
Secondary Air Plenum Filtration	\$1.7±	2010	2011
Connect BNR1 and BNR2 Clarifiers	\$14.6±	2011	2016
Connect Aeration Headers	\$4.7±	2015	2019
Aeration Tank Rehabilitation	\$62.1±	2015	2023
Secondary Clarifier Rehabilitation: BNR2	\$14.4±	2011	2019
Secondary Clarifier Rehabilitation: BNR1	\$28.9±	2014	2024
Conversion to Fine Bubble Diffusers	\$35.4±	2012	2022
Foam and Scum Control (including Field Verification)	\$2.5±	2011	2016
Nocardia Control	\$7.7±	2014	2018
Conversion to NAS (TN<8 mg/L regulation)	\$68.0±	2021	2026

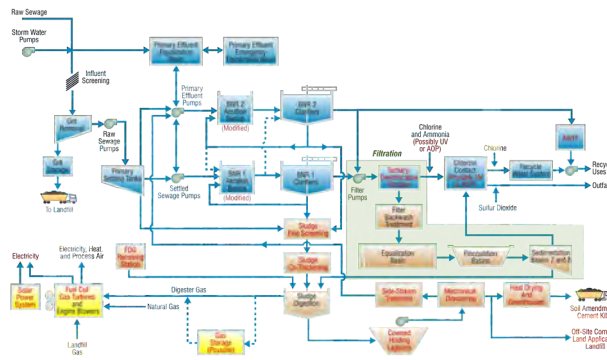
Notes:

- Escalated to midpoint of construction at 2 percent per annum.

Additional projects that would improve operational efficiency, include the following:

- Side-stream water treatment of the ammonia-rich recycle stream once the mechanized solids treatment processes are introduced.
- Constructing a new 12 million gallons (MG) primary effluent equalization basin to lower the ammonia loading peaks to the secondary process.
- Improving the ability of the secondary system to combat nuisance foaming by implementing modifications to allow surface wasting from the aeration basins, or other locations, such as the mixed liquor channels to the secondary clarifiers, or in the RAS tanks prior to return to the aeration basins.
- Conversion of coarse bubble diffusers to fine bubble diffusers in the unconverted aeration basins.
- Rehabilitation of the aeration basins and secondary clarifiers.

Filtration



Improvements to the filtration system will be required to address the aging infrastructure as well as new regulations. The Plant currently filters a portion of the secondary effluent stream to reuse standards, and the remainder to the standards required for discharge to the South Bay. The capability exists to partially bypass the filters and disinfect in the discharge channel, where it would be blended with the filtered and disinfected stream. This is the practice typically used during peak flow events.

While discharge to the South Bay does not necessarily require filtration of the full secondary effluent stream, there are a number of drivers for full filtration, namely:

- Future regulation of contaminants of emerging concern (CECs) may require full filtration.
- The City's collimated beam tests, conducted in 2007, show that transitioning from hypochlorite to



Filtration

Project	Project Cost Estimate ⁽¹⁾ , \$ million	Project Start Year	Year Complete
Underdrain and Media (remaining seven Bank A filters)	\$3.2±	2012	2015
Miscellaneous Filtration Repairs	\$12.2±	2011	2026
Field Verification of Alternative Filter Technology	\$3.2±	2012	2017
Underdrain and Media of one filter (plus field verification)	\$0.4±	2010	2011
New Filters: 128 mgd Denitrification plus 52 mgd Tertiary	\$132.6±	2019	2026

Notes:

- Escalated to midpoint of construction at 2 percent per annum.

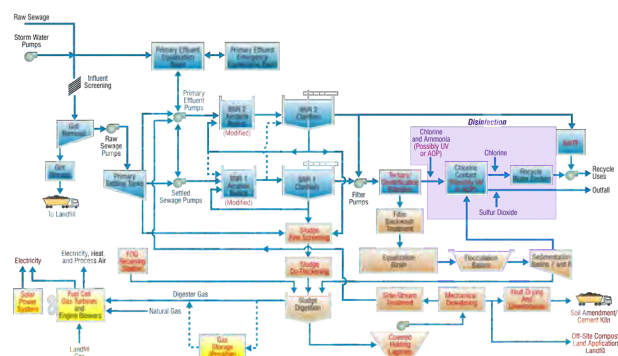
ultra-violet (UV) disinfection would require filtration of the full secondary effluent stream.

- A possible future discharge regulation of total nitrogen (TN) less than 8 mg/L would require full filtration of the effluent streams of all three viable secondary treatment alternatives, namely NAS with denitrification, MLE, and step-feed with IMLR.
- In future, all final effluent may go to reuse, for which full filtration is a Title 22 requirement.

Due to the age and condition of the existing tertiary filters, a significant investment would be required to refurbish and retain the filters for future use. In the interim, the existing filtration facilities will be maintained to allow the continued production of reuse water, and at a minimum, partial filtration of bay discharge. The refurbishment effort that is currently underway on one of the filters will be used to ascertain whether refurbishment and continued use of the filters is feasible. In lieu of (or in combination with limited) refurbishment of the existing filters, new filters could be installed. A wide variety of alternate filter technologies are available, with new technologies continuing to be introduced to the market. The ultimate filtration objective will dictate which technology may be most appropriate for the plant.

Due to the variability in secondary effluent generated at every wastewater treatment plant, filtration characteristics can vary significantly. Therefore, it is appropriate to pilot any potential technology before full-scale implementation, especially in light of the vast amount of research ongoing in this field.

Disinfection



Disinfection processes may also need to be changed in response to new regulations. The Plant currently disinfects filter effluent with hypochlorite up to maximum dry weather flows. Since the disinfection system does not have sufficient chlorine contact basin capacity available for peak flows, these flows bypass both filtration and disinfection and are disinfected in the discharge channel. One of the disinfection projects would be to construct additional chlorine contact basins for better control of peak flow disinfection.

The analyses show a life-cycle benefit to both of the following:

- Maintaining chlorination disinfection but transitioning to onsite hypochlorite generation.
- Transitioning to UV disinfection.

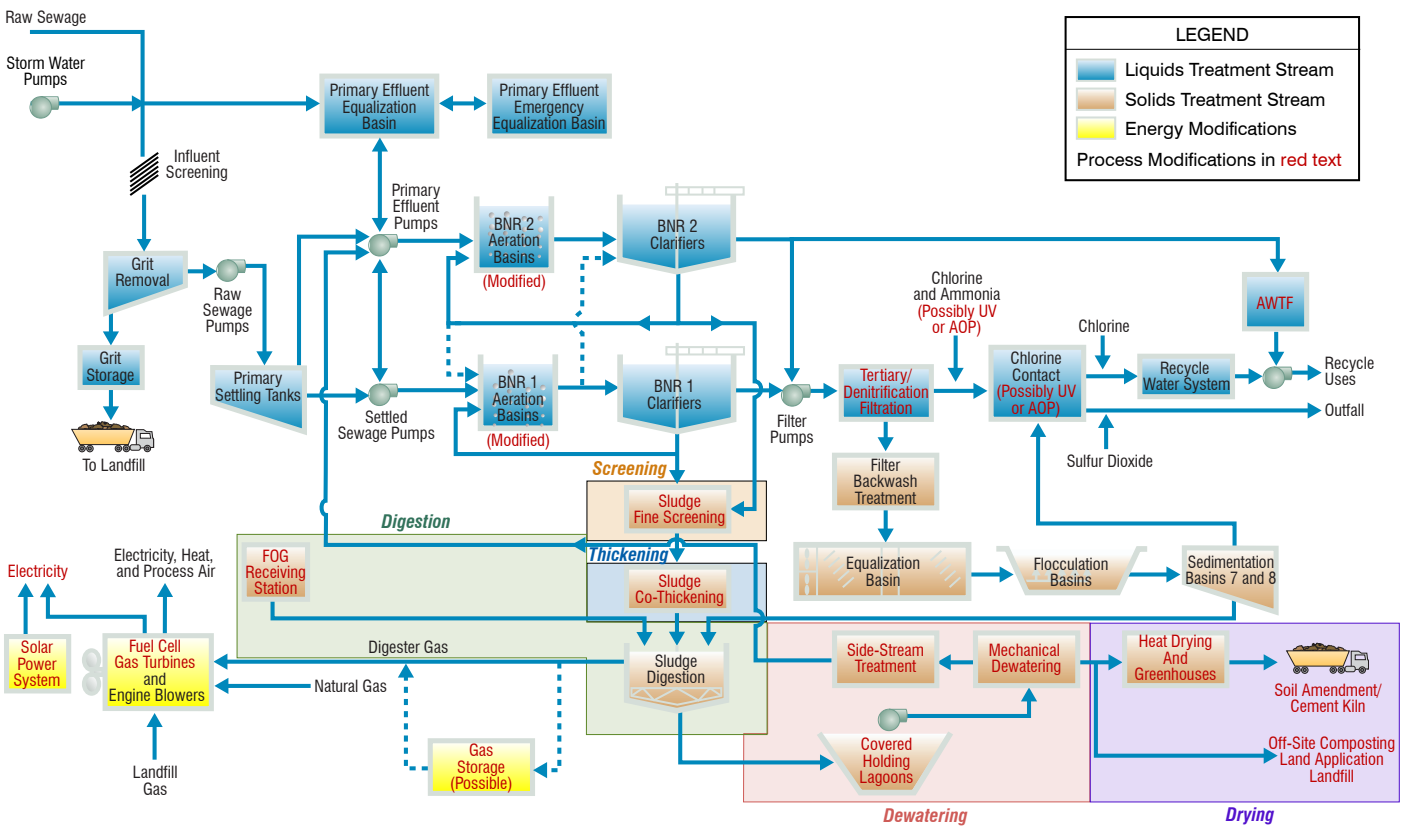
However, this selection should be made in consort with a selection of advanced oxidation process for reducing contaminants of emerging concern (CECs). Since there is much uncertainty around the process best suited to reducing CECs, the current hypochlorite mode of disinfection should continue pending the outcome of further research. The 30-year CIP includes a placeholder for new UV disinfection combined with peroxide treatment as a candidate technology to address CECs.

Disinfection

Project	Project Cost Estimate ⁽¹⁾ , \$million	Project Start Year	Year Complete
New Ultraviolet Disinfection Facilities	\$49.4±	2024	2030

Notes:

- Escalated to midpoint of construction at 2 percent per annum.



The solids treatment processes are comprised of sludge fine screening, sludge thickening, digestion, dewatering, and drying.

BIOSOLIDS TREATMENT

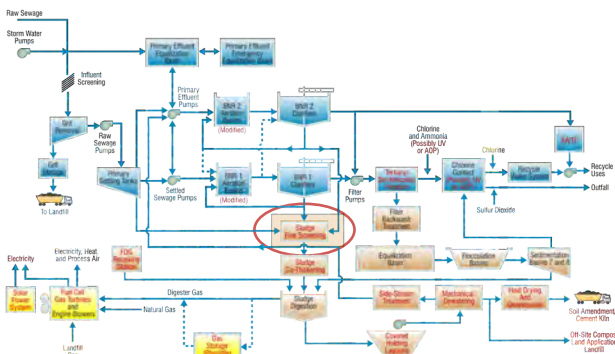
For ease of discussion, the solids treatment processes have been broken up into five categories: sludge fine screening, sludge thickening, digestion, dewatering, and drying (see figure on previous page).

The current biosolids process train, which includes final disposition of the dried biosolids at the Newby Island Landfill, has been very cost-effective for the Plant. Projects included in the Plan's biosolids program address the aging infrastructure of sludge thickening and the digesters. Also included in the biosolids program are changes to the biosolids dewatering and drying processes to address the policy direction to reduce odor impacts to the neighboring communities.

The Plan's recommendation is to expand the biosolids management program to provide more flexibility with at least three options that can accommodate 50 percent of the Plant's biosolids. The possible closure of Newby Island Landfill in 2025, changes in future biosolids regulations, and long-term land use changes for the Plant site are potential triggers that require evaluation of alternatives to the current biosolids management program.

The biosolids program and implementation plan (Biosolids Management Plan) incorporates many of the cost-effective elements of the existing facilities with a phased plan that has the potential to develop multiple and diversified disposition options.

Sludge Fine Screening



The Plant currently has 5/8-inch opening coarse screens at Headworks 1 and Headworks 2. While these screens remove the majority of the coarse material from the influent stream, a significant quantity of material still passes through to the various treatment processes. Fine screening, with 5 to 6 millimeter (mm) (approximately 1/4-inch) openings, is expected to improve materials removal significantly.

Sludge Fine Screening

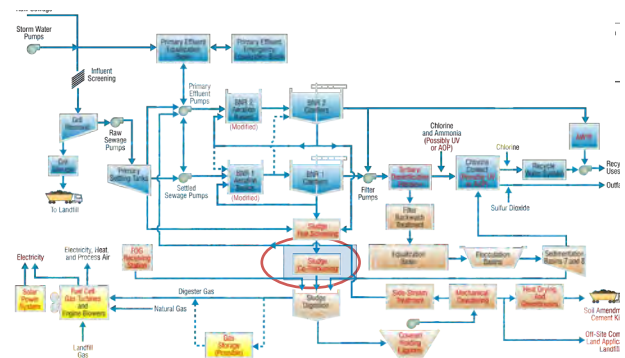
Project	Project Cost Estimate ⁽¹⁾ , \$million	Project Start Year	Year Complete
WAS and Primary Sludge Fine Screening	\$11.8±	2019	2023

Notes:

- Escalated to midpoint of construction at 2 percent per annum.

Fine screening of the primary sludge and WAS streams would reduce the maintenance effort required for all downstream biosolids treatment processes. In addition, the final biosolids product would be of a much higher quality, i.e. essentially free of nuisance materials, which would potentially increase its market value and disposition options.

Sludge Thickening



The current sludge thickening processes entail in-tank thickening in the primary clarifiers, and dissolved air flotation thickening (DAFT) for waste activated sludge (WAS). Transitioning to co-thickening of primary sludge and WAS in the DAFTs will increase the digester feed concentration from under 4 percent to 5 to 6 percent. This reduces the number of digesters needed by four and provides a significant amount of digester volume for imported material. Imported feedstocks can include fats, oils and grease (FOG), food and food processing waste, and/or solids from other wastewater treatment plants.

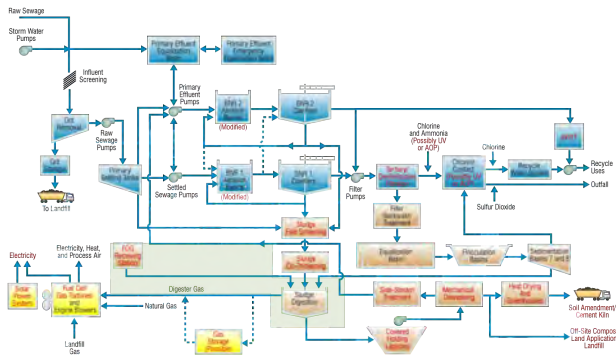
Sludge Thickening

Project	Project Cost Estimate ⁽¹⁾ , \$million	Project Start Year	Year Complete
DAFT Final Upgrades	\$4.6±	2010	2013

Notes:

- Escalated to midpoint of construction at 2 percent per annum.

Digestion



This existing sludge stabilization process utilizes single-stage mesophilic anaerobic digestion, and will be retained as part of the 30-year plan. Due to their age and condition, the digesters will require extensive

rehabilitation and improvements, such as improved mixing capabilities. These improvements will provide the flexibility to incorporate raw sludge pre-processing, thermal processing, dryers, and other future technologies into the biosolids program. The Plan proposes that the digesters be rehabilitated in three phases: first four digesters, then an additional four digesters, and finally two more digesters if needed.

Additional projects will explore and develop opportunities for import materials such as FOG, food and food processing wastes, raw solids from surrounding areas, and other import materials. The implementation of sludge pre-processing technologies would require a field verification phase to test their applicability at the Plant, particularly the impact of the various import materials being considered.

Digestion

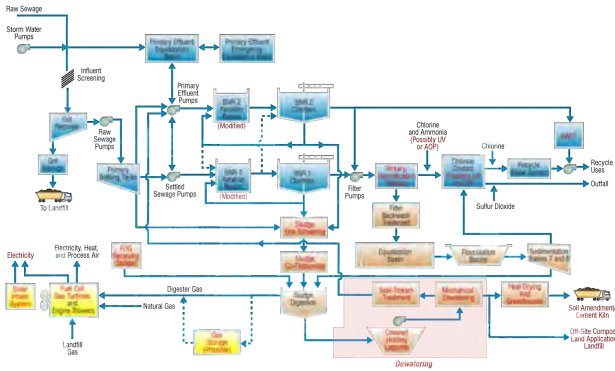
Project	Project Cost Estimate ⁽¹⁾ , \$million	Project Start Year	Year Complete
Digester Gas Manifold and Tunnel Improvements	\$14.7±	2011	2013
Tunnel Rehabilitation	\$6.8±	2012	2022
Digester Cover and Mixing Upgrades (4 digesters)	\$29.0±	2011	2015
Digester Mixing Equipment: Linear Motion Mixer	\$0.4±	2011	2013
Digester Mixing Equipment: Draft Tube Mixer	\$0.7±	2011	2013
Digester Cover and Mixing Upgrades (3 digesters)	\$26.0±	2020	2024
Digester Cover and Mixing Upgrades (3 digesters)	\$27.9±	2024	2027
Digester Heating Upgrades	\$0.7±	2010	2013
Struvite Control Chemical Feed	\$0.2±	2011	2013
Digestion Pre-Treatment Field Verification	\$11.4±	2013	2019
FOG Receiving Station and 1/2-Mile Access Road	\$9.2±	2013	2017
14-Inch Digested Sludge Line	\$12.9±	2019	2023

Notes:

1. Escalated to midpoint of construction at 2 percent per annum.



Dewatering



The existing biosolids process train does not include mechanical dewatering. Digested sludge is stored in lagoons and subsequently dried in open air drying beds, from where it is hauled to the nearby Newby Island Landfill. The addition of mechanical dewatering will diversify and increase the number

of disposition options available to the Plant. A small number of lagoons will be retained, serving to receive digested sludge from the digesters, from where it would be fed to a holding tank, which would then be used as the feed tank for the mechanical dewatering units. Unlike the existing lagoons, these improved lagoons will be lined and covered to prevent odors. The lagoons will provide the dewatering facility with equalization capacity in case of possible operational problems.

Since the number of lagoons will be greatly reduced, large quantities of land for development would become available. Moving the lagoons to the legacy biosolids area re-establishes the Plant buffer on the east side of the Plant.

Piloting of certain candidate dewatering technologies would be required to better facilitate the transition to mechanical dewatering.

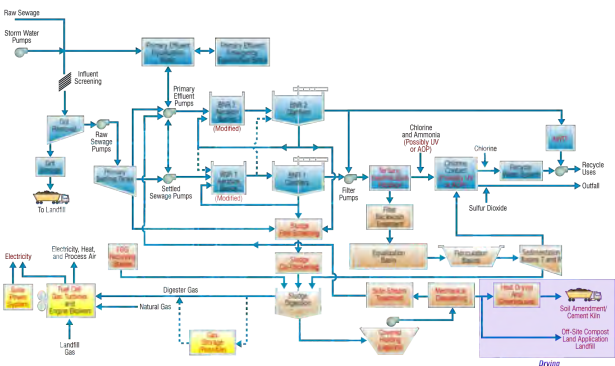
Dewatering

Project	Project Cost Estimate ⁽¹⁾ , \$ million	Project Start Year	Year Complete
Sludge Dewatering Field Verification	\$2.3±	2015	2017
2/3 Full Mechanical Dewatering Plus Feed Storage Tank	\$84.7±	2017	2023
Cake Storage	\$15.1±	2017	2023
1/3 Full Mechanical Dewatering	\$41.9±	2028	2033
Lagoons/Drying Beds Retirement	\$3.0±	2023	2025
2/3 Covered Lagoons	\$32.0±	2017	2022
1/3 Covered Lagoons	\$19.8±	2028	2033

Notes:

- Escalated to midpoint of construction at 2 percent per annum.

Drying



A significant change in the Plant's biosolids treatment process entails decommissioning the solar dry-

ing beds and switching to various other solids drying technologies. Diversification of the solids drying approaches is in keeping with the overall biosolids treatment approach aimed at providing the WPCP with flexibility in its final disposition options.

For a portion of the dewatered cake, drying will entail mechanical heat drying, making use of the excess heat available from the Plant's power and heat generation capabilities. Another portion of dewatered cake could be dried in greenhouse facilities which, similar to the existing solar drying beds, make use of solar energy. However, unlike the solar drying beds, greenhouses are covered to enable year-round drying, and provide odor containment.

Drying

Project	Project Cost Estimate ⁽¹⁾ , \$ million	Project Start Year	Year Complete
Sludge Drying Field Verification	\$1.8±	2018	2020
2/3 Thermal Drying for 20 Percent of Solids Stream	\$68.5±	2020	2025
1/3 Thermal Drying for 20 Percent of Solids Stream	\$27.7±	2028	2033
Biosolids Greenhouse Demonstration Project with BFPs	\$9.0±	2012	2016
2/3 Greenhouse (full scale project)	\$13.3±	2020	2025
1/3 Greenhouse (full scale project)	\$7.8±	2028	2033

Notes:

1. Escalated to midpoint of construction at 2 percent per annum.

Pilot facilities of both these technologies would be constructed to better facilitate the design of the full-scale facilities. An emergency biosolids storage basin would be constructed in the existing legacy lagoons area to provide the WPCP with temporary storage capacity for dewatered cake to accommodate any unforeseen problems dewatering or drying or operations direct off-site hauling.

ODOR CONTROL

With respect to odor control, the City has an overarching goal of being a good neighbor to the surrounding community. The reduction and control of odors can be achieved through on-site (treatment plant) and/or collection system measures. However, in meeting their goal, the City needs to consider also the regional impacts of potential off-site odor generation.

Without a comprehensive data collection effort and modeling of current and future odor impacts, recommendations for odor-related capital improvements cannot be optimized nor their success verified following installation. Therefore, in addition to a preliminary evaluation of plant odor control needs and solutions, the Master Plan presents a conceptual scope of work for completion of a comprehensive regional odor assessment program (ROAP). The ROAP would provide a refinement of the recommended on-site odor control projects through the use of additional odor testing, modeling, and technology analyses.

Regional Odor Assessment Program

The odor control needs at the Plant are based on assumptions regarding the potential development of adjacent, currently uninhabited areas in the planning period. However, final recommendations for odor control improvements at the Plant cannot be made without undertaking additional steps within the confines of an ROAP. Following are recommended actions as part of completing the ROAP:

- Collect odor data (specific compounds and total odor as measured by an odor panel) reflective of current emissions from odorous process units at the Plant, including data indicating approximate sulfide loads from the collection system.
- Conduct liquid-phase treatment sampling, analysis, and potentially pilot testing with the goal of reducing sulfide loads to the Plant to optimal, cost-effective levels.
- Conduct dispersion modeling to assess current and future off-site odor impacts, and use the calibrated baseline model to predict the effectiveness of new odor control technologies and the best means of meeting the City's odor control goals.
- Conduct and update technological analyses for gas-phase treatment of odorous processes and implement optimal solutions.

Odor Control Improvements

While specific odor control projects have been identified for the Plant, these proposed solutions and costs would need to be updated as part of completing the ROAP. These projects include installation of a permanent iron salt feed station at the Emergency Basin Overflow Structure (EBOS), and providing covers,



ventilation, and treatment of the odorous air at the following facilities:

- Headworks 2, including the various inlet junction structures.
- East Primary Clarifier facility.
- Scum and grease room.
- Dissolved Air Flotation (DAFT) facilities.
- Future mechanical dewatering and drying facilities.
- Future, improved covered storage lagoons.

While a number of different technologies are available for treatment of the odorous air, these projects currently recommend a combination of chemical treatment in packed-media towers, followed by adsorption of remaining odorous compounds in carbon scrubbers.

ENERGY MANAGEMENT

As part of the Environmental Services Department (ESD) Vision, the Plant has identified four main goals for their energy management plan. These goals include:

- Preserve energy, recycle, and reduce waste.
- Achieving energy self-sufficiency.
- Optimizing operating costs for the Plant facilities.
- If feasible, look into exporting power.

Each of these main goals represents a commitment to improving the operation and reliability of the Plant, while at the same time becoming more sustainable and reducing overall energy costs. As part of the self-sufficiency goal, the Plant is looking to reduce energy usage by 17 percent by 2012 and achieve self-sufficiency by 2022.

Similarly, the City of San José has developed ten Green Vision goals to achieve environmental, ecological, and economic sustainability through new technology and innovation by the year 2022. While many of these goals are broader reaching, there are several that have a direct correlation with energy management at the Plant including goals to:

- Reduce per capita energy use by 50 percent.
- Receive 100 percent of electrical power from clean renewable sources.
- Build or retrofit 50 million square feet of green buildings.
- Divert 100 percent of the solid waste from landfill and convert waste-to-energy.

- Recycle or beneficially use 100 percent of the incoming wastewater.

The technologies presented in the Energy Management portion of the Master Plan include those commonly used in the wastewater industry (either in North America or Europe), along with technologies that are considered innovative and are undergoing further improvements/development. These more innovative technologies must also exhibit promising features and have examples of full-scale experience at facilities similar to the Plant.

Processes that are at the research stage of development were not considered further. However, many of the projects that comprise the Energy Management Plan are not scheduled for implementation for a number of years. Therefore, an updated technological assessment, which could include pilot testing, should be performed as part of the early implementation stages of each project before final selection of a process or equipment is made. These further evaluations are all a necessary component of developing a detailed energy strategic plan.

The major projects required as part of the Energy Management Plan are the following:

Heat and Power Generation Upgrades

- Digester upgrades.
- Upgrade of the existing engines fuel system to operate without supplemental NG.
- FOG receiving station, and capabilities to distribute to the digesters.
- A 1.4-MW fuel cell Power Purchase Agreement (PPA).
- Higher efficiency cogeneration equipment (gas turbines) or additional fuel cells.

Additional Self-Generation Opportunities

- 1 MW solar photovoltaic (PV) Power Purchase Agreement (PPA).
- Additional solar PV systems.

Process Optimization and Upgrades

- High-pressure DG storage facility.
- Completion of the process optimization, automation, and efficiency improvement efforts that have already been started.

Power and Heat Supply

The Plant currently uses a combination of digester gas (DG), landfill gas (LFG) purchased from the Newby Island Landfill, and natural gas (NG) purchased from PG&E in their existing gas utilization equipment. While the Plant runs several boilers on NG only, the majority of the existing gas utilization equipment uses a blend of the three available gas sources. The gases are blended in certain proportions based on their respective heat content to meet utilization equipment fuel requirements.

Landfill gas quantities typically drop off sharply after a site closes, which in the case of the Newby Island Landfill, is planned for 2025. Based on a similar LFG modeling study completed for another facility, it is likely that the amount of LFG available in 2040 will be roughly half of that currently available and declining every year thereafter.

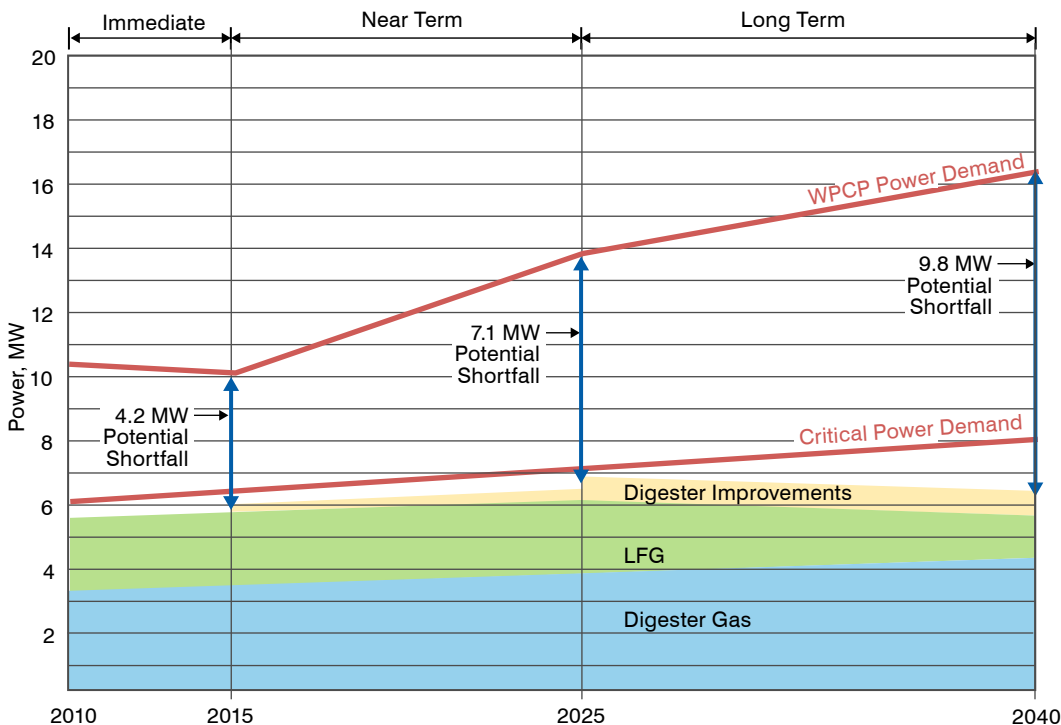
The Plant generates power through a combination of purchased power from PG&E and through onsite generation using the blended gas streams (DG, LFG, and NG). Similarly, aeration air is provided through a combination of electric driven blowers and gas engine driven blowers using the blended gas streams. Heat is provided through onsite heat recovery from the cogeneration equipment and boilers.

Power and Heat Demand

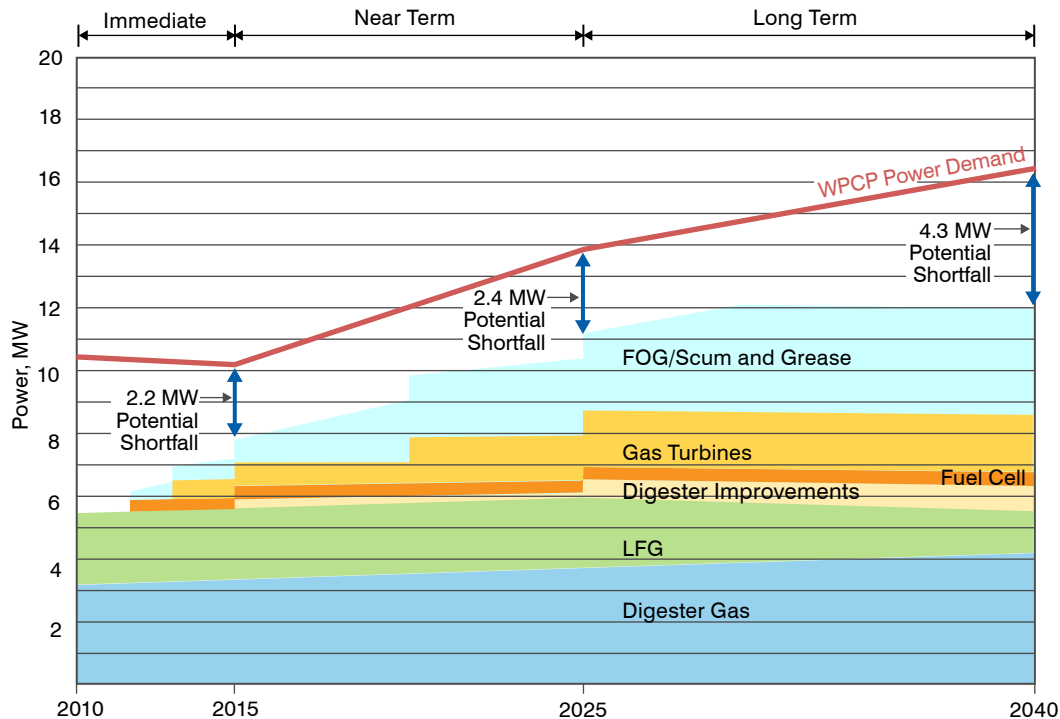
The Plant is required to manage the sewage flow and provide a minimal level of treatment at all times to address public health and safety concerns. In order to protect the City from potential violations and fines from the Regional Water Quality Control Board, the Plant must have sufficient reliable power to allow operation of critical process functions in order to meet permit requirements during a temporary utility power outage. These critical process functions include:

- Wastewater pumping.
- Full preliminary and primary treatment.
- Primary sludge pumping to the digesters and mixing of the digester tanks.
- Nitrification with Anaerobic Selector (NAS) secondary treatment (including RAS/WAS pumping).
- Hypochlorite disinfection.

Under this operational scenario there will be no filtration, no reuse pumping, and no solids processing capabilities with the exception of digester mixing. This assumes a temporary outage of less than one day that is not the result of a “force majeure” event (i.e. earthquake, flood, etc.).



Plant-generated power is close to matching the estimated power demand for critical operation. However, a significant shortfall exists for meeting the power demand for full operation.



The power shortfall can be offset partially through the incorporation of various new technologies at the Plant, and the introduction of outside, high-energy feedstocks.

The power demands for both the critical operation and full operation scenarios were estimated for the 30-year planning period. Compared to the Plant-generated power supply, the power demand for critical operation is close to being met, while a significant shortfall exists for meeting the full operation power demand. This balance takes into consideration the increases in efficiency resulting from improvements to various parts of the treatment process, such as the continued transition from coarse bubble to fine bubble aeration in the secondary treatment system, and improvements to the digesters.

The power shortfall can be offset partially through the incorporation of various new technologies at the Plant, namely a higher-efficiency fuel cell and gas turbines, and the introduction of outside, high-energy feedstocks, such as fats, oils, and grease (FOG). While full power self-sufficiency is still not attainable, in spite of these modifications, the power deficit is greatly reduced.

The heat analysis shows complete self-sufficiency for both critical operation and full operation. With the modifications introduced to improve power supply, excess heat is generated, sufficient for heat-drying approximately 20 percent of the dewatered biosolids.

GREENHOUSE GAS EMISSIONS

A gross evaluation of the City's ability to reduce greenhouse gas (GHG) emissions over the proposed 30-year planning period was made. The development of GHG emissions estimates requires a set of boundary conditions to define the life cycle stages, the unit processes, and the timeframe that is included in the analysis. For this inventory, the annual needs for the operations phase are considered for years 2010 and 2040, and include the following:

- Operation energy (electricity and fuel) consumed by the unit processes.
- Onsite general stationary combustion units.
- Nitrification and denitrification processes.
- Discharged effluent.
- Production and transport of chemicals consumed for the proper treatment of wastewater (i.e., sodium hypochlorite, sodium bisulfite, and polymer).
- Biosolids treatment, transport, and end use/disposal options.

Emissions were converted into carbon dioxide equivalent (CO₂e) emissions based on the capacity of the emission to absorb heat relative to CO₂ over a hundred-year time horizon.



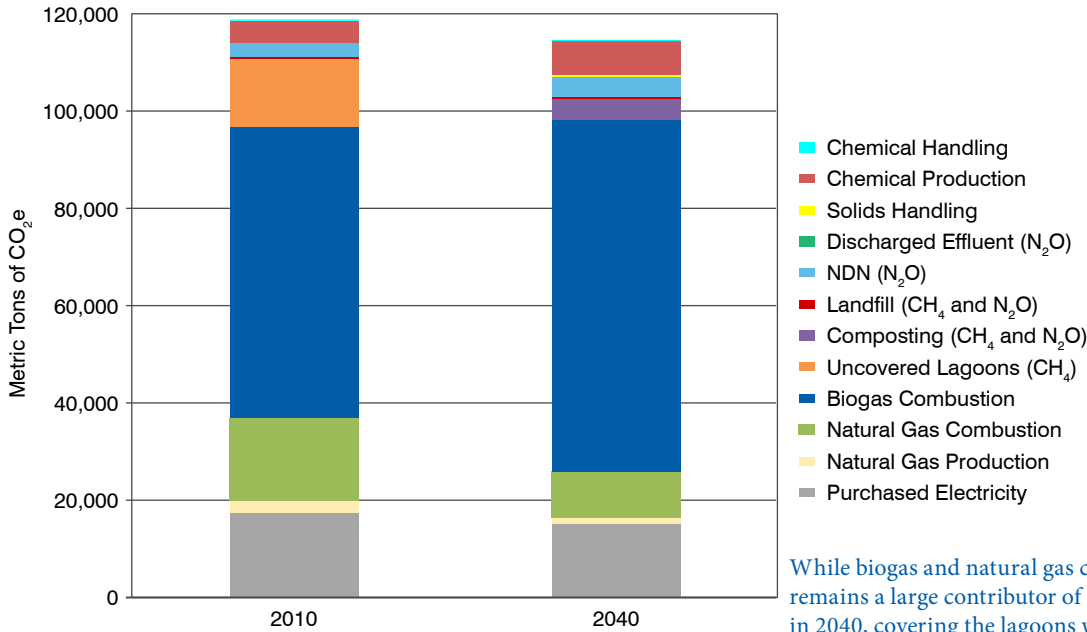
While the total annual emissions for 2010 and 2040 are nearly the same, normalizing the emissions over the annual flows shows that 2040 emissions are approximately 30 percent lower than 2010 emissions per million gallons of treated wastewater.

Summary of Greenhouse Gas Emissions Estimates for 2010 and 2040

	Metric Tons CO ₂ e Emissions per Year	Metric Tons CO ₂ e Emissions per MG
2010	118,705	2.60
2040	114,878	1.82
Percent Decrease	3.2%	29.7%

Notes:

- (1) CO₂e: carbon dioxide equivalent
- (2) MG: million gallons



While biogas and natural gas combustion remains a large contributor of GHG emissions in 2040, covering the lagoons will prevent a significant source of GHG emissions.

SUPPORT FACILITIES

Support facility improvements have been identified based on the proposed process improvements recommended by the Master Plan. These improvements are based on some fundamental decisions that need to be made, and include the following:

- Centralize maintenance support functions to free up critical process and traffic flow areas.
- Consolidate both warehouse and maintenance satellite spaces.
- Consolidate all operations to a centralized location.
- Define storage space needs for the equipment required for proposed future processes.

Support Buildings

The assumptions with regard to future growth and space allocations for maintenance and operational spaces were based on the fact that the existing facilities would be retained as far as possible and repaired and rehabilitated as needed. However, a detailed analysis of each building along with a condition assessment should be incorporated into this decision. Space required for growth would be added on an as-needed basis.

It was assumed that any staff functions that are currently off-site (i.e. accounting), would remain off-site. All of these issues will need to be examined further along with a more detailed analysis of the staffing



requirements for the future operational, maintenance and support staff needs. This requires that a site specific detailed Facilities Plan be conducted.

Proposed upgrades to the various site support buildings can be summarized as follows:

- The new access road, which is currently planned to be upgraded to provide truck access for delivery of fats, oils and grease (FOG) to the digesters, would also serve as the main access point for receiving warehouse deliveries as well as for septic tank haulers.
- Consideration should be given to constructing a new central receiving warehouse and laydown area along this new access road.
- Consideration should be given to consolidating the administration and engineering offices at the Environmental Services Building (ESB) location. This would require that a new public access point be provided at this location. The existing Administration Building could be modified to provide for a consolidated training and/or public education facility.
- As treatment facilities are decommissioned and demolished, e.g. Headworks No. 1 and West Primaries, these sites could be utilized for additional warehousing and storage facilities.
- The WPCP currently employs a staff of 298 on the plant site. A preliminary operations and maintenance staff analysis, combined with some assumptions of staff needs in the laboratory and training functions, estimates a future plant site staff requirement of 321 employees. It should be noted that approximately 100 additional administration support staff are located at an off-site location, which have been excluded from the preliminary staffing requirement analysis.

Support Systems

Proposed upgrades to the various site support systems can be summarized as follows:

- Centralizing the administration facilities, creating a “gateway entrance” to the Plant for approaching traffic, relocating the warehouse and laydown area, and decommissioning of Headworks No. 1 and West Primaries to liberate space on the site for possible storage and workshop space.
- Influent conveyance piping to the plant would be consolidated and routed through the emergency basin overflow structure (EBOS).
- Stormwater facilities would be modified and expanded to accommodate the future site considerations associated with upgrades to the process treatment facilities.
- The plant’s electrical distribution system would be expanded to accommodate future solids handling facilities to the north of the WPCP, as well as for possible future secondary treatment facilities to the east.

CAPITAL COSTS AND PHASING

Capital Costs

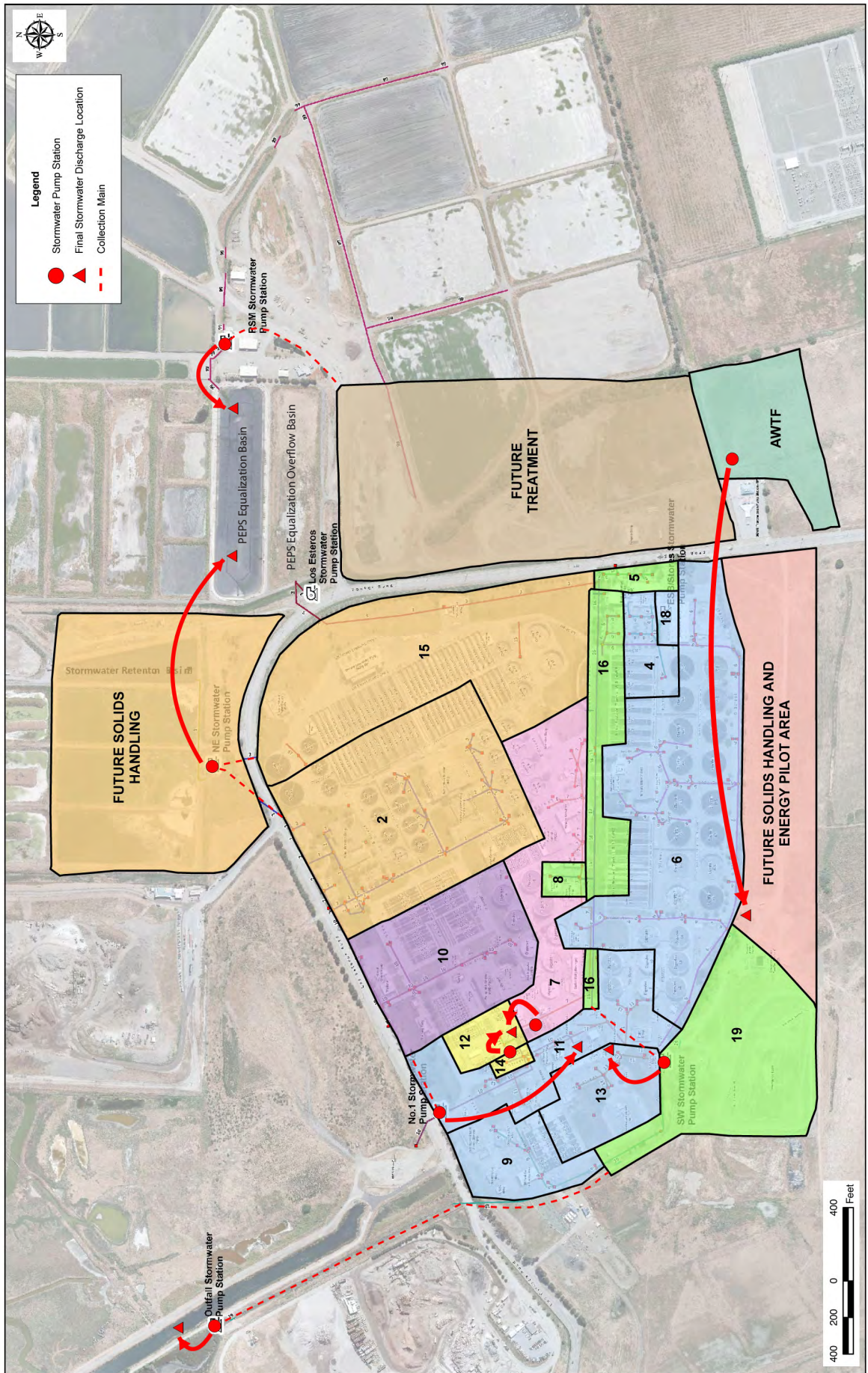
The project cost of implementing the projects ranges from \$1.8 to \$2.2 billion, depending on the assumed escalation of zero (0) through two (2) percent. Project cost estimates are based on preliminary quantity takeoffs or vendor quotes, where available, to which estimating and construction contingencies are added, as well as additional costs to the owner, namely engineering, legal, administrative, environmental, and construction management.

The quantity and quality of the information required to prepare an estimate depends on the end use for that estimate. Typically, as a project progresses from the conceptual phase to the study phase, preliminary design and final design, the quantity and quality of information increases, thereby providing data for development of a progressively more accurate cost estimate. A contingency is often used to compensate for lack of detailed engineering data, oversights, anticipated changes and imperfection in the estimating methods used. As the quantity and quality of data becomes better, smaller contingency allowances are typically utilized.



Proposed modifications will create a “gateway entrance” to the Plant.





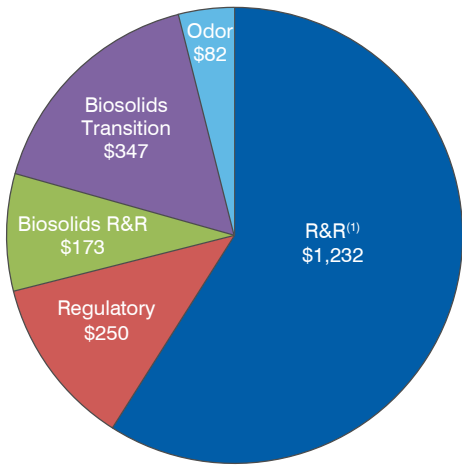
Modifications to the stormwater facilities would be required to accommodate future Plant upgrades.



For the projects developed as a part of the Master Plan, cost estimates are developed following the AACE International Recommended Practice No. 18R-97 estimate classes 5 and 4.

The corresponding program costs are broken down by four categories: Rehabilitation and Repair (R&R), Regulatory, Biosolids Transition, and Odor Control. R&R is comprised of two components, namely that which pertains only to the biosolids handling processes, and the combined R&R for all the remaining treatment processes.

These project costs can be presented on a year-by-year cash flow basis to reflect their combined costs, based on their assumed implementation dates. The \$1,232 million in R&R includes an allowance for unspecified projects the City could expect, especially over the second half of the 30-year planning period.

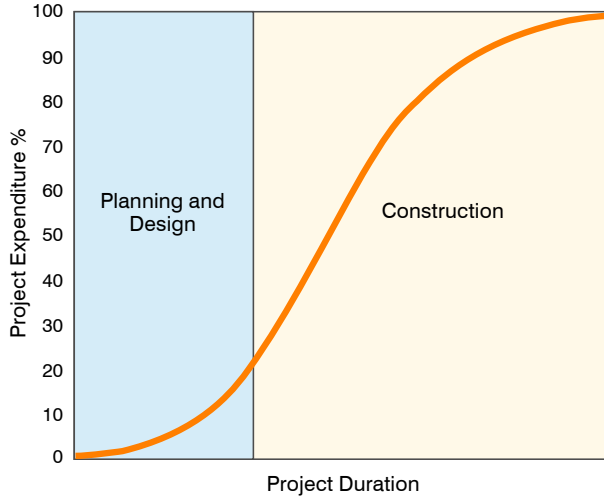


The majority of costs over the 30-year planning period are for Rehabilitation and Repair (R&R).

The project cost estimated for each of the CIP projects will typically not be expended in equal annual amounts over the project duration. Instead, the annual expenditure will typically be lower during the initial planning and design phases of the project, and then ramp up significantly during the construction phase of the project. When presented on a cumulative basis, the cash flow calculations are based on an S-curve graph. This approach was applied to all the CIP projects with durations of up to 15 years.

Special Projects Cost Estimates

The project cost estimates were developed as shown above for all but three (3) of the CIP projects, which required modified cost estimating approaches. These projects are the following:



An S-curve distribution of project costs is typical of cash expenditures over the different phases of a project.

- Unanticipated/Critical Repairs
- Unspecified R&R (2025 through 2040)
- Public Art Reserve

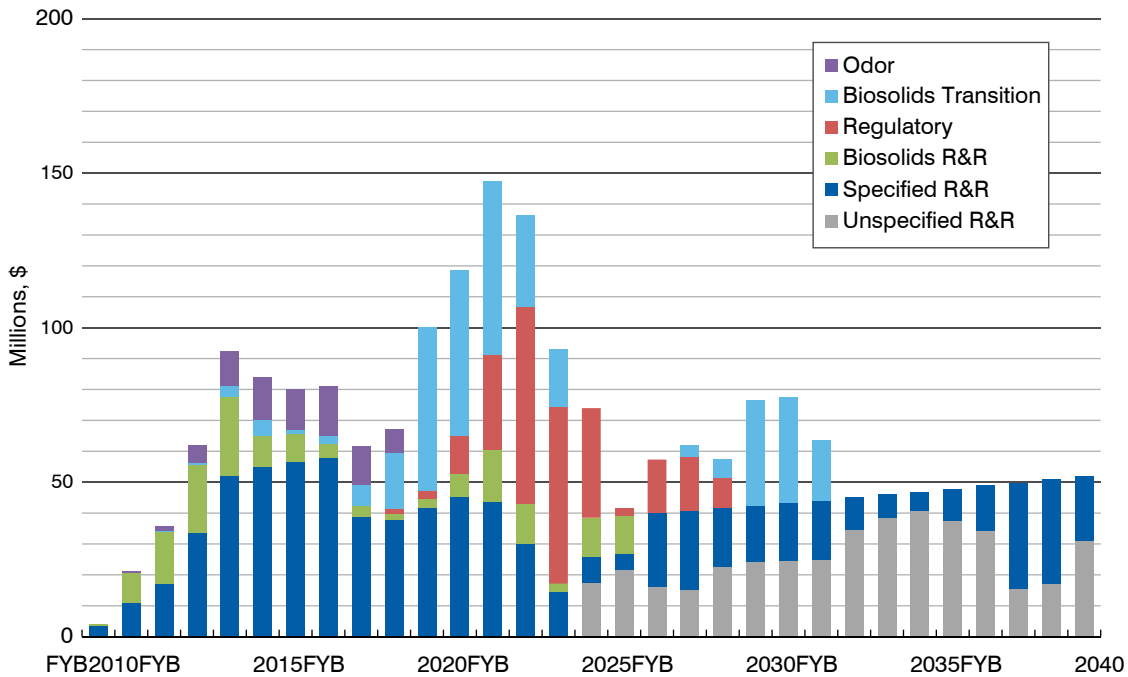
Project Phasing

The project triggers define not only the need for the project, but also implementation timing. The implementation timing, together with the estimated project duration, assigns each project a start and completion date. The implementation schedule for each of the CIP projects is shown schematically as Gantt charts in PM 6.1 CIP Implementation.

Alternative projects have been identified as potential replacements for a number of CIP projects, depending on future circumstances. A project alternative could replace a selected project (timing allocations permitting) for a number of reasons, such as:

- Modification of the objective, e.g. a new requirement to remove constituents of emerging concern (CECs) would require an advanced oxidation process, which could potentially replace the need for a disinfection project.
- Further research developments and/or detailed analysis favors the alternative project over the project originally included in the CIP.

While project alternatives are described in the CIP, the cash flow estimate is reflective only of the selected projects and does not include the project costs for any of the listed potential alternatives.



The estimated project costs (including a two percent inflation rate) show an annual cash flow based on their assumed implementation dates.

IMPACTS TO OPERATIONS AND ROUTINE MAINTENANCE (O&M) COSTS

Operations and maintenance (O&M) costs were developed for the WPCP through the 30-year planning period, taking into consideration the impacts of the CIP on the treatment processes. The O&M cost impacts were developed using a six-step process, as follows:

Step 1: The current O&M costs were delineated by process area to establish baseline costs.

Step 2: From these, baseline unit costs were developed using treated flow and load parameters.

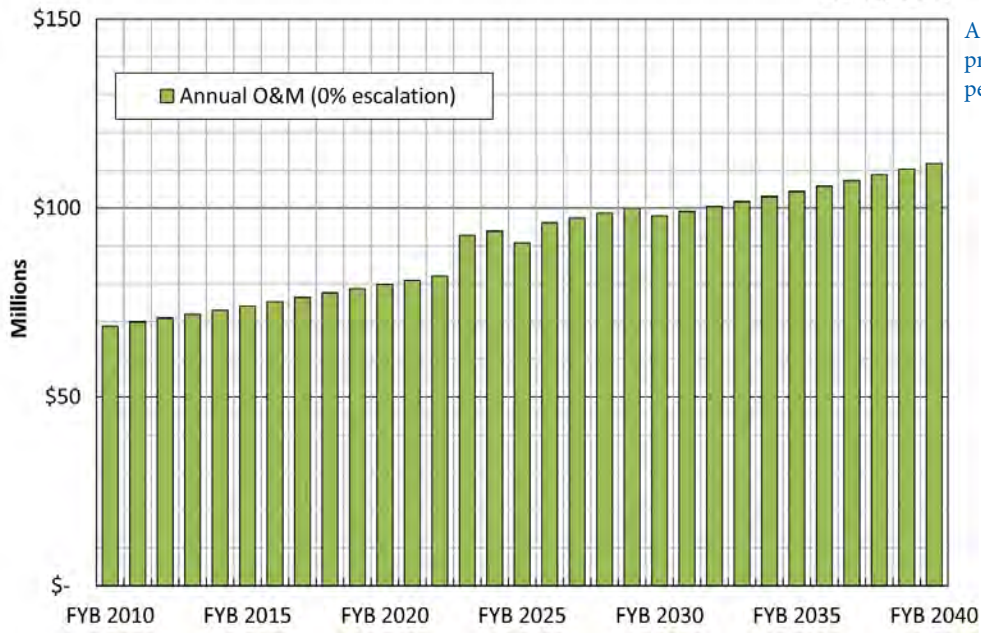
Step 3: Unit costs were developed for new and modified treatment processes.

Step 4: Variable cost components for non-process related O&M costs were identified and projected.

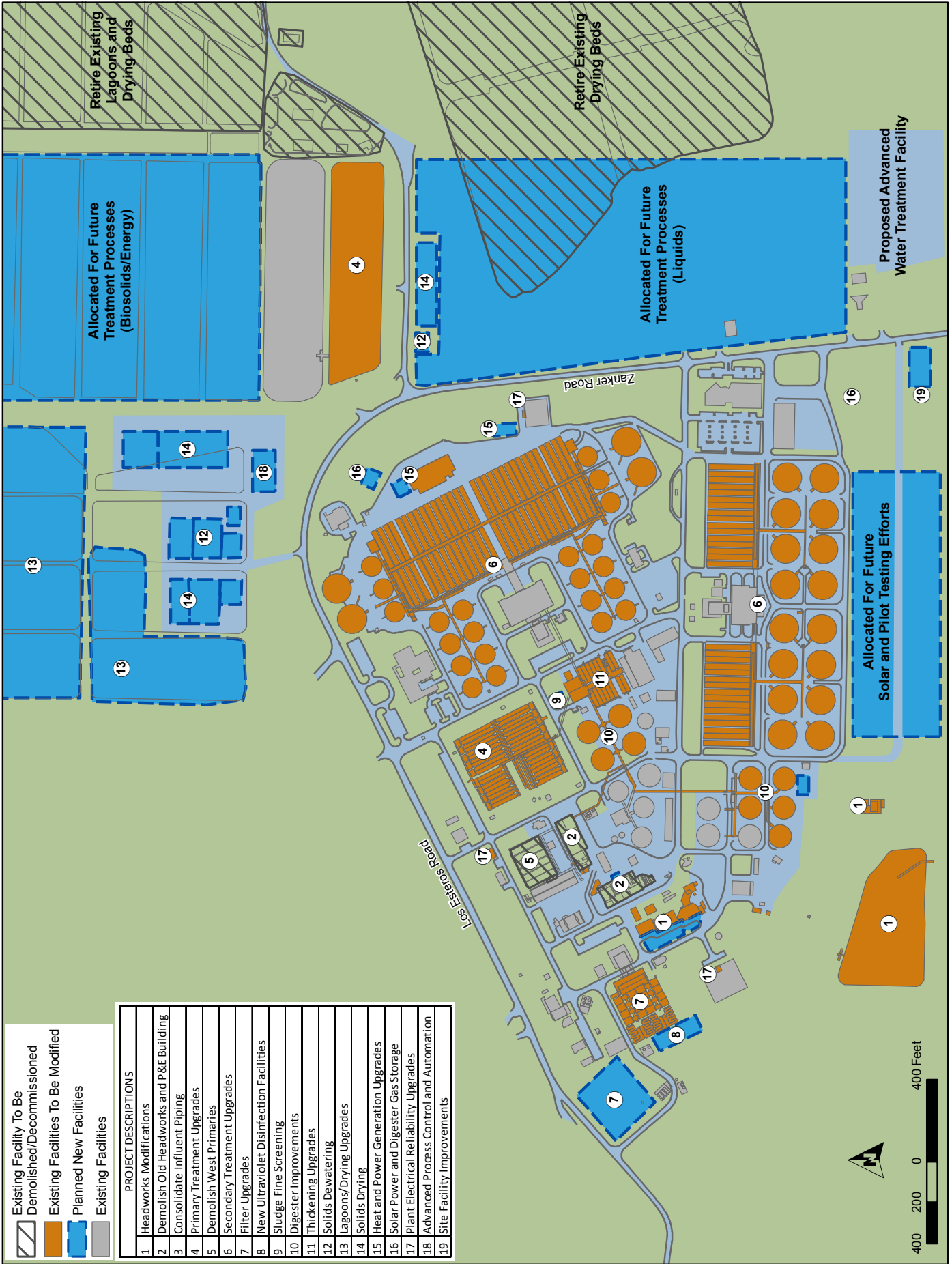
Step 5: Future O&M costs were then projected for all of these cost categories using flow and load parameters as applicable.

Step 6: To account for cost escalation, an O&M escalation factor was applied to the cumulative annual O&M costs.

O&M costs are expected to increase around ten percent to account for the recommended biosolids dewatering, drying, and disposal program due to increased energy consumption and hauling costs. Despite an increase in energy demand, the installation of UV disinfection will provide a slight reduction in O&M costs due to major reductions in chemical usage.

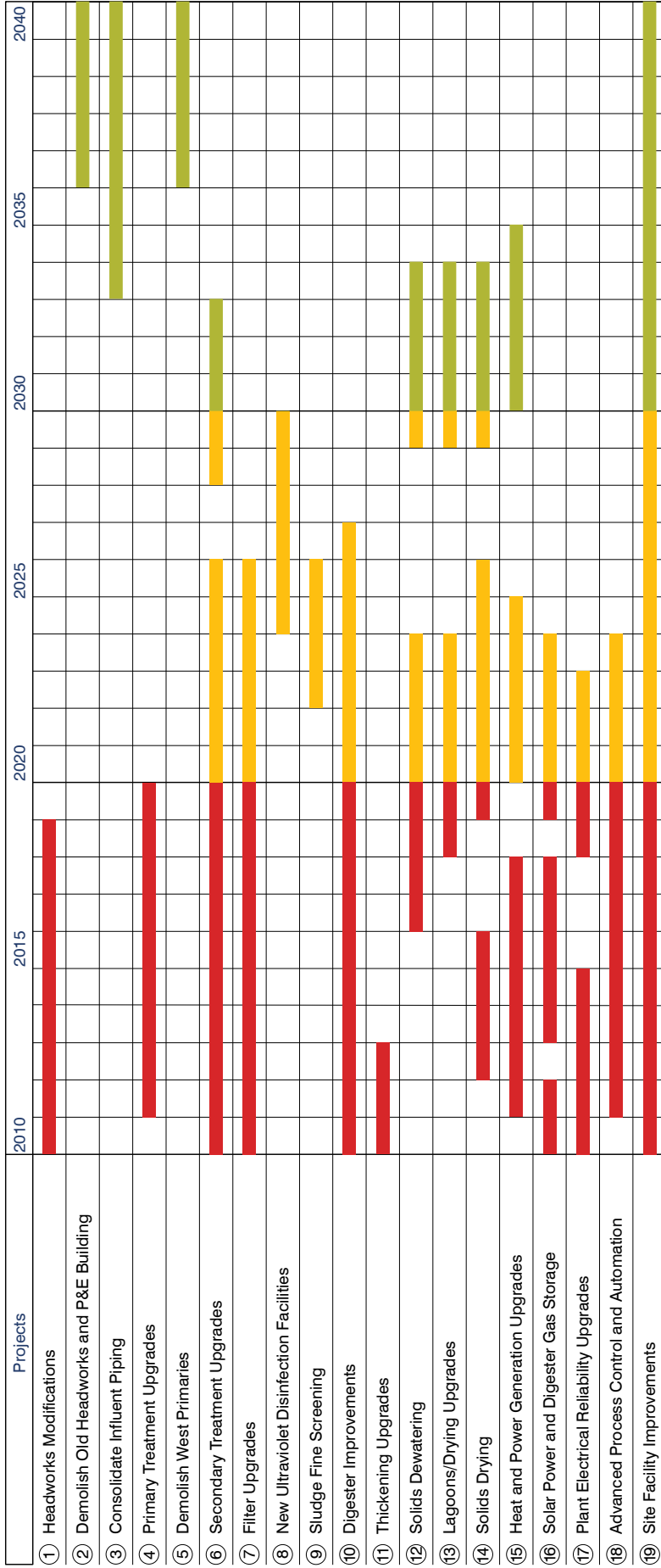


Annual O&M expenditure projected for the 30-year period.



The 30-year Plan requires the modification or demolition of existing facilities, and the addition of new facilities.

PROJECTED IMPLEMENTATION SCHEDULE



The broad categories of projects, each often comprising more than one project, will be implemented at various stages over the 30-year planning period.

6. LAND USE COMPONENT

The Plant occupies a unique 2,600-acre site located at the southern edge of San Francisco Bay in North San José. It is situated at the base of two major Bay Area watersheds: the 170 square mile Guadalupe Watershed, and the 320 square mile Coyote Creek Watershed.





Existing Land Uses

The current Plant site is comprised of the following major elements:

- Operational Area.
- Residual Solids Management (RSM) area, including the biosolids lagoons and biosolids drying beds.
- Legacy biosolids lagoons.
- Pond A18.
- Buffer lands.

The operational area, RSM, and legacy biosolids lagoons comprise approximately 36 percent of the total land area, Pond A18 approximately 32 percent, and the buffer lands approximately 26 percent.

The Plant's existing operations footprint currently includes the operations area, the RSM, and the legacy biosolids lagoons which together comprise a total land area of approximately 950 acres. With the transition to mechanical solids dewatering, and relocation of a major component of the solids handling processes to the legacy biosolids lagoons, the operations footprint will reduce to approximately 440 acres.

Overall, with the implementation of the Plant Master Plan, it is estimated that approximately 1,500 acres will become available for non-operational uses, including habitat and ecological restoration, recreation, and economic development.



Future Operational Area Needs Will Be Reduced

LAND USE PRINCIPLE AND KEY ELEMENTS

Land use principles were established to guide decisions associated with future land uses and facilities in ways that support the goals of the overall Master Plan. These principles seek to capitalize on the Plant’s unique assets: proximity to the Bay, abundant supplies of treated water, large and contiguous land parcels, and access and visibility. The principles involve:

Restore ecological systems

- Establish a broad spectrum of habitats that can support local ecologies, including tidal mud flats, salt marshes, upland habitats, wetlands, and riparian corridors.

- Restore the Artesian Slough, Coyote Creek, and other natural water systems of the site.

Capitalize on available energy resources

- Provide land and infrastructure that capitalizes on viable sources of renewable energy such as photovoltaic (PV) energy fields, roof-mounted PV, wind turbines, and water-based energy crops such as algae.
- Develop energy facilities and systems as visible, attractive, and integrated elements of future land uses and developments.

Capitalize on available water resources

- Utilize treated water in innovative ways that support ecological, social and economic development goals.



- Integrate water as a visible, attractive, and functionally integrated element of future land uses and developments.

Integrate synergistic research and education

- Provide opportunities for clustering development which supports research and education in green technologies and provides regional economic benefits.
- Identify opportunities to establish a world-class institution through partnerships between the private, public and academic sectors.
- Establish a campus-like environment to support R&D and campus development.

Connect regional open space systems

- Provide open space and habitat connections to support the goals and objectives of the South Bay Restoration Plan.
- Respond to the unique condition of the Plant's waterfront setting at the edge of the Bay with quality open space.
- Reflect the local needs and desires of the broader community.

A balanced land use strategy

- Balance economic, social, and open space land uses with the need to develop the Plant as a world-class South Bay asset.
- Reserve land area needed for the Plant's operational future.
- Allow for an appropriate development intensity to establish critical mass and a sense of place.

Promote economic development

- Provide a set of diverse land uses to support a variety of economic development opportunities, including office and R&D, light industrial, institutional, and retail.
- Maximize opportunities for local and regional job creation, and lease and tax revenues.

Protect against sea level rise

- Protect the Plant, habitats, and areas of economic development from the threat of sea level rise.
- Utilize "soft" techniques to provide a barrier to sea level rise, such as stepped ecological wetlands.

The land use framework is organized around three key land use elements: Economic Development, Social Uses, and Environment. Together, these elements reflect the type and range of non-operational land use and developments anticipated at the plant. Some of the key aspects of these elements are the following:

Economic development

- Create new jobs in existing and emerging economic sectors.
- Generate lease revenue.
- Generate property, sales, and income tax revenue.
- Promote synergy with the Plant and available assets, such as treated water and energy.
- Promote City's Green Vision by implementing renewable energy systems, green buildings, reuse of recycled water, and green infrastructure.

Social uses

- Establish a wildlife museum that focuses on local ecosystems and opportunities to restore the connection of people to nature.
- Establish parkland to support diverse community needs for passive recreation and outdoor social activity.
- Incorporate recreation-oriented open space resources.
- Provide new trails that connect to the Bay Trail, San José waterfront, and local destinations.

Environment

- Support larger natural systems of the San Francisco Bay through elements such as tidal mud flats, salt marshes, upland habitats, wetlands, and riparian corridors.
- Preserve and enhance special status species located on Plant lands, such as Congdon's tarplant, burrowing owls, and the salt marsh harvest mouse.
- Assist in the management and control of flood mitigation challenges, including new levees to protect against the threat of sea level rise.
- Incorporate water-based programs within the open space network.



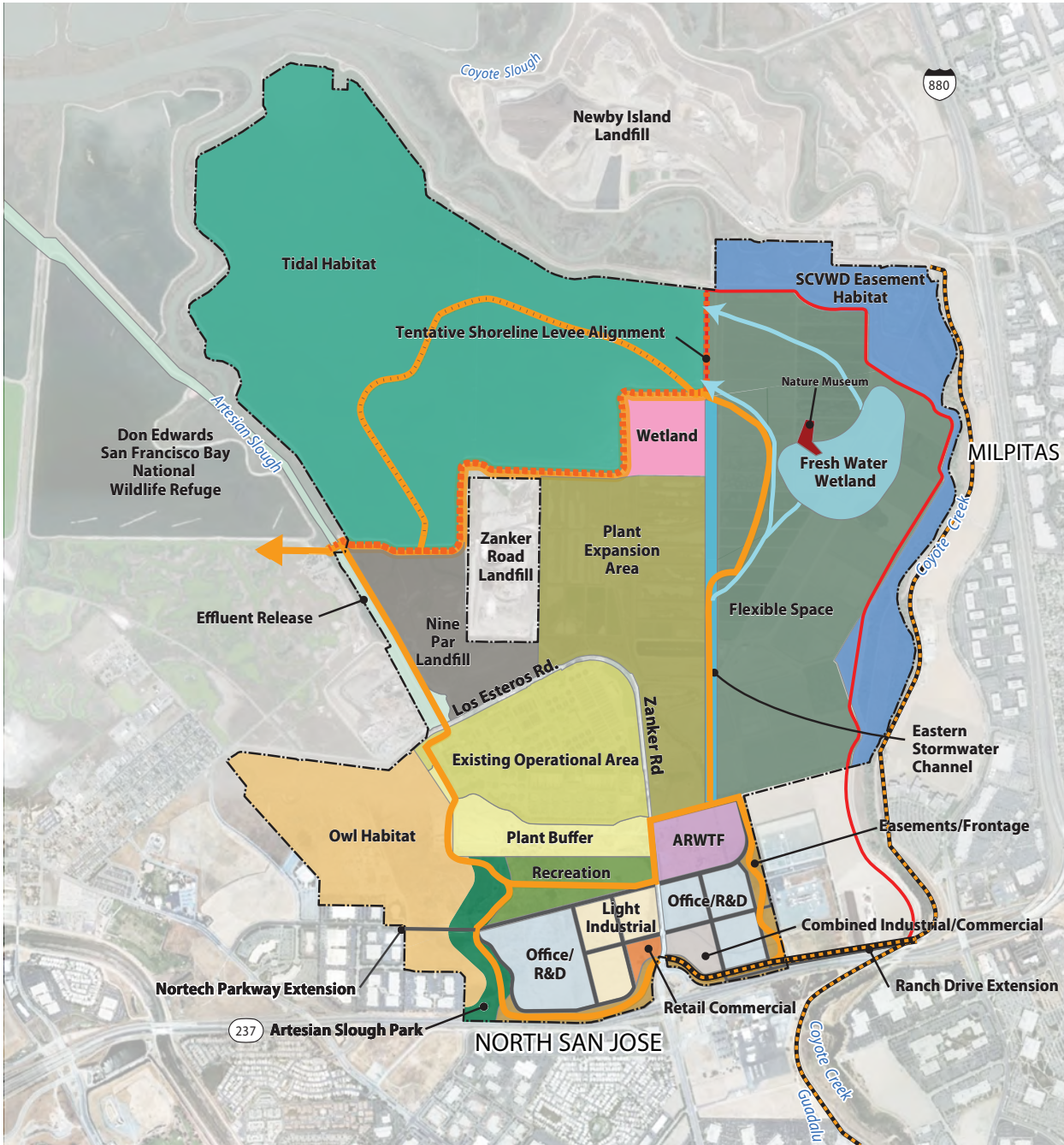
LAND USE PLAN

The land use plan provides a comprehensive framework for the long-term development of Plant lands that is consistent and compatible with policies established by the City, the aspirations of the local community, and the vision and goals of the Plant Master Plan. Each land use type, including commercial,

industrial, office, recreational, and open space/habitat has been optimized in terms of location and size in order to achieve maximum economic, environmental, and social benefit for the City and the entire South Bay region. All of these non-wastewater uses would be financed by sources other than the Plant's wastewater funds.



Illustrative Land Use Plan



Land Use Plan

Legend

- Project Boundary
- Existing Levee
- - - Tentative Shoreline Levee
- - - Existing Trail
- Proposed Trail
- - - Proposed Boardwalk Trail

Economic Development Areas

- Retail, Office/R&D, and light industrial uses would be clustered into a compact footprint located adjacent to Hwy 237 to take advantage of the site’s visibility and accessibility.
- Retail would anchor the intersection of Hwy 237 and Zanker Road.
- If a suitable area is determined to be available, a solar power facility area will be located on the plant lands which will provide for a variety of energy systems, such as photovoltaic solar panels.
- In addition to possible dedicated sites for renewable energy facilities, building-mounted photovoltaic solar panels are proposed for all future economic development.



Summary of the Land Use Plan Area

Use		Area (acres)
Facilities	Proposed Operational Area, Effluent Release, Plant Buffer Area with Solar Power Facility	558
	Recycled Water Facilities (ARWTF)	60
	Sub Total	618
Recreation	Recreation (Community Park and Athletic Facility)	40
	Education Center/Nature Museum	2
	Trails	9 miles
	Sub Total	42
Economic Development	Light Industrial	31
	Office/R&D	81
	Retail Commercial	5
	Combined Industrial/Commercial	11
	Road	31
	Sub Total	159
Habitat and Flood Protection	Levee and Marsh/Mudflat/Shallow Bay/Upland Habitat	847
	Preserved Wetland Habitat	35
	Artesian Slough Riparian Corridor	32
	Proposed Freshwater Wetland	61
	Owl Habitat	180
	Eastern Stormwater Channel	18
	Sub Total	1173
Other Uses	Flexible Space	389
	Easements/Frontage	37
	Santa Clara Valley Water District (SCVWD) Easement	165
	Nine Par Landfill	90
	Sub Total	681
Total		2,673

Flexible Space

- Land area totaling approximately 389 acres, currently occupied by the RSM area, would become available for other uses, once those operations are phased out during the next decade. This space could have many potential uses. Any use that would result in the generation of more vehicle trips than what was analyzed in the Master Plan EIR will require additional environmental review prior to implementation.

Social Uses

- A 40-acre park with sports fields for active and passive recreation would be located south of the Plant operations area. The park will interface with the Artesian Slough.

- 9 miles of trails are proposed to connect with existing and planned segments of the Bay Trail and other proposed recreational/educational uses including the nature museum, community park and sports fields, energy field information center, as well as the Don Edwards National Wildlife Refuge Education Center.
- A nature museum would be situated within the proposed freshwater wetland area. The museum would occupy approximately two acres that feature native habitat gardens and viewing platforms of nearby upland and wetland areas.

Habitat Areas

- **Freshwater Wetlands:** 61 acres of freshwater wetlands would be created to polish fully treated effluent. During heavy rain events, these wetlands would offer added capacity for holding water prior to release into the San Francisco Bay.

Effluent Release Strategy: Wetlands located north of the future Plant operations area would be intended primarily for storage of effluent. The wetlands would also provide benefits to water quality (polishing of the effluent), much needed freshwater wetland habitat (very rare near the Bay), and recreational opportunities. This wetland would discharge into the tidal marsh located downstream of the Water District flood control and conservation easement. An overflow channel, which would be designed as a seasonal riparian corridor common to this region, would bypass the freshwater wetland in case of major wet-weather events. This channel would also serve as the stormwater drainage for the development east of Zanker Road.

The restored Artesian Slough would be designed as an aesthetic feature to re-create a historic slough and rare riparian habitat. This area would serve as a boundary between the developed area to the east and the burrowing owl/grassland habitat to the west.

- **Marsh/Mudflats/Upland Habitat:** Situated on the site in the location of the existing Pond A18, nearly 800 acres of salt marsh habitat and tidal areas adjacent to the bay would be constructed to help provide flood protection and to restore a transition from the salt marsh habitat through brackish to perched freshwater wetlands and upland grasslands. Additional upland habitat would be established in the northern area of the decommissioned drying bed operations hosting a range of dry and moist grasslands as well as vernal pools and vegetation would include ryegrasses, rushes, and sedges.



- **Burrowing Owl Habitat:** 180 acres of grassland habitat would be restored to support burrowing owls, a California species of special concern.
- **Riparian Habitat:** 170 acres of land that contain riparian habitat, including the Coyote Creek Riparian Habitat and the Artesian Slough corridor, would be restored or maintained. Some will redistribute the Plant’s discharge of fully treated effluent in a manner that reduces potential adverse effects to salt marsh habitat while regenerating important historic regional freshwater ecologies.
- **Wetland Habitat:** 35 acres of wetland habitat will be preserved in the northern portion of the existing inactive biosolids lagoons, which is habitat to the Federally endangered salt marsh harvest mouse.
- **Levee Concept:** As part of the Plan, the City would work with the South Bay Shoreline Study who are developing a feasibility study to construct a levee, or levees, along the northern portion of the Plant site to provide adequate protection from future sea-level rise and flooding.

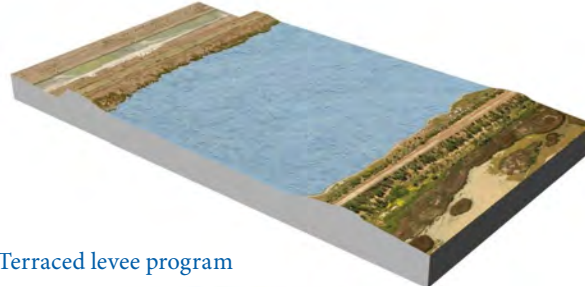
A terraced levee is proposed to mimic natural landscapes at the edge of the San Francisco Bay with each terrace representing a different ecotone appropriate for the terraces’ elevation and exposure to tidal flows. Marsh and mudflats would be integrated below the levee design within the area of the existing Pond A18 so that the entire system would work together to provide flood control, habitat, and water quality benefits.

The terraced levee would include an inboard levee that would conform to standards of the Army Corps of Engineers (USACE). The levee would be designed and constructed through the San Francisco Bay Shoreline Study (USACE, Santa Clara Valley Water District, and State Coastal Conservancy partners) coordinated with the Don Edwards San Francisco Bay National Wildlife Refuge. A final levee alignment would be developed through this process.

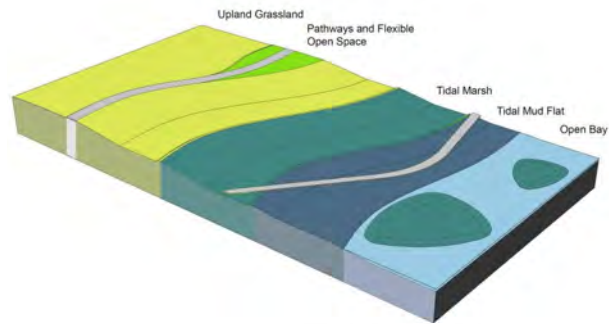
Water Systems

- Restored Artesian Slough would be designed as an aesthetic feature to recreate a historic slough and rare riparian habitat. This area would serve as a boundary between the developed area to the east and the burrowing owl/grassland habitat to the west.
- Freshwater wetlands would be intended primarily for storage of effluent to maximize the cost effectiveness of pump operations. The wetlands could

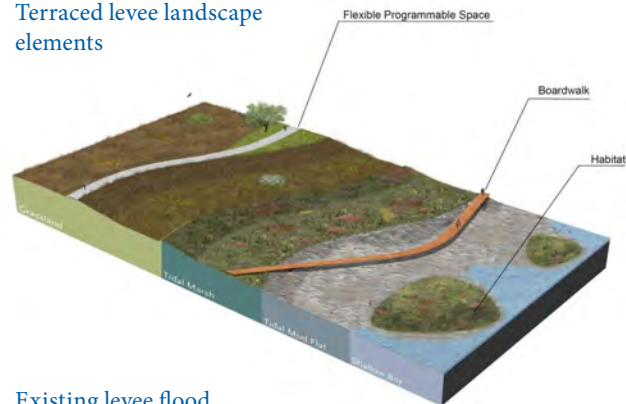
Existing levee condition



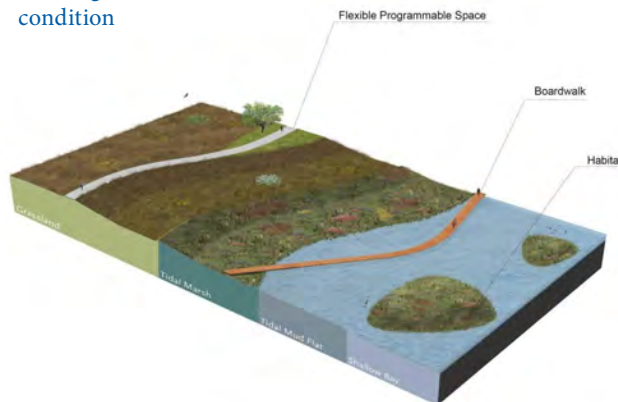
Terraced levee program



Terraced levee landscape elements



Existing levee flood condition





also provide benefits to water quality (polishing of the effluent), much needed freshwater wetland habitat (very rare near the Bay), and recreational opportunities. This wetland would discharge into the marsh downstream of the Water District flood control and conservation easement. An overflow channel, which would be designed as a seasonal riparian corridor common to this region, would bypass the freshwater wetland in case of major wet weather events. This channel would also serve as the stormwater drainage for the development east of Zanker Road.

Transportation and Road Network

- Primary vehicular access to the Plant would be via State Route 237. An interchange at Zanker Road would provide access to the Plant operations area.

Santa Clara Valley Transportation Authority (VTA) is planning to extend the San Francisco Bay Area Rapid Transit (BART) system to Silicon Valley. The 16-mile BART extension would be located east of the Plant and Interstate Highway 880. The proposed South Calaveras station would be located approximately two miles east of the Plant.

- **Zanker Road/Nortech:** Given the potential for development located on the Hwy 237 corridor, the key opportunity for creating an improved road network would involve establishing a new Collector Street that connects Zanker Road to Nortech Parkway. This new street would become the primary transportation element and access route for future development, and it would provide convenient and direct access from the Plant to North First Street.

- It is expected that future development would generate additional traffic to the extent that improvements to the existing Zanker Road / Hwy 237 interchange could be required. The nature of improvements would be determined following traffic analysis that is conducted as part of subsequent phases of the Plant Master Plan project.

No new road connections to Alviso neighborhood are proposed. However, it is possible that increased traffic generated by future development on Plant lands could impact Alviso neighborhood streets. Before the streets are designed and constructed, any impacts to the Alviso neighborhood would be analyzed and mitigated.

Phasing

- Future economic development would be contingent on ensuring that the infrastructure development at the Plant can adequately mitigate the effect of potential odors on sensitive receptors and that development would not interfere with Plant Operations.

Development Standards

- In keeping with the character of the area, the development intensity at the Plant Master Plan Site has been envisioned to be lower than that which occurs in other parts of the City. The development standards for the Plant Master Plan Site is shown in the table below.

Development Standards Table

Land Uses	Net Developable Acres	Max Floor Area Ratio Permitted	Height of Buildings (feet)	Stories
Light Industrial	31	0.55	Up to 45	Up to 2
Office/R&D	81	1.2	Up to 115	Up to 8
Retail	5	0.26	About 45	1 - 2
Combined Industrial/Commercial	11	1.2	Up to 115	Up to 8
Roads	31			
Total	159			

LAND USE POLICIES AND GUIDELINES FOR DEVELOPMENT

Development under the Plant Master Plan shall be subject to relevant codes, policies and guidelines including, but not limited to, Envision San José 2040 General Plan, Alviso Mater Plan, Residential, Commercial and Industrial Design Guidelines, Landscape Design Guidelines, Riparian Corridor Policy, the Municipal Code and various Council policies. A selected list of policies and guidelines that are of specific interest to best meet the goals and objectives of this Plan is provided here. For issues not addressed here, refer to the relevant Citywide policy or guidelines documents.

- **Attractive Public Realm:** Create a well-designed, unique, and vibrant public realm with appropriate uses and facilities to maximize pedestrian activity; support community interaction; and attract residents, business, and visitors to the area. Specifically implement Policies CD-1.1, -1.5, -1.7, -1.10, -1.13, -1.17, -1.22, -1.25, -1.29; CD-3.3, -3.5, CD-4.12, CD-10.2, CD-10.3 in GP2040 for all PMP projects.
- **Gateway:** Provide architectural elements, landscapes and water feature at the intersection of Zanker Road and HWY 237 to help create a gateway and reinforce the sense of arrival to WPCP. Also implement GP2040 Policy CD-10.3.
- **Enhance Views:** Orient taller buildings on individual sites to maximize views of the bay, hills and the City of San José.
- **Garage Access:** Distribute garages to minimize their impact on streetscape and to distribute traffic to the greatest extent practicable.
- **Subdivision:** Development parcels are the “building block”s of the economic development area. Future subdivision should allow for incremental development of parcels, typically bounded by public streets or public open spaces. Large parcels are desirable for Clean Tech industry, which is the focus of employment within the PMP area.
- **Open Spaces:** Establish open spaces within development parcels such that they connect outwards to the larger system of public open space and habitat areas. Also implement GP Policy CD1.5, CD 1.25.

- **Streetscape:** Streetscapes should be designed to indicate they are part of the same neighborhood. Use special landscape and streetscape elements to enhance the overall character and identity of the development. Also implement GP2040 Policy CD-10.3.
- **General Aesthetic Quality:** Developments should reflect a high level or aesthetic quality. Also implement GP2040 Policies CD-10.2, CD 1.13

Landscaping Policies

- Landscaping should incorporate plant materials suited to the area’s environmental conditions. Use of native plants, and landscaping that promote habitat should be prioritized.
- Landscaping should incorporate the open, bayside character of the site and should be simple and minimal. Landscaping should not block views of natural features like river, riparian areas or marshlands.
- Landscaping should make a strong connection between the natural and the built environment
- Landscaping shall be irrigated with reclaimed water from the WPCP. Also implement GP2040 Policy MS-19.4
- Also implement GP 2040 Policy CD1.22

Sustainability Policies

- **Solar Energy:** All buildings shall incorporate solar power facility, to the extent practicable. Also implement GP2040 Policies MS 2.2 and MS 2.3.
- **Green Buildings:** Promote design and construction standards to achieve the highest level of sustainable building design and construction benchmarks available at the time of construction. Benchmarks that will be used to evaluate include, but are not limited to, LEED, Sustainable Sites Initiative, EPA Energy Star etc. Also implement GP2040 Policy MS1.1,MS-14.4.
- **Net Energy Benefit:** Promote building operation that provides a net energy benefit, and target to meet highest energy conservation standards of the day. Require evaluation of operational energy efficiency and inclusion of operational design measures as part of development review consistent with benchmarks such as those in EPA’s EnergyStar Program. Also implement GP2040 Policy MS -2.8, MS-14.5, MS-15.5.



- **Green Streets:** Promote street design that minimizes impervious surface and incorporates stormwater features to protect water quality. Also refer to GP2040 Goal ER-8.

Circulation Policies

- **Safe Streets:** Separate truck traffic from cars, bicycles, and pedestrians wherever feasible. Also implement GP2040 Policies TR 6-1 and TR6-3 of GP2040.
- **Off-Street Trails:** Provide gateway elements and trailheads for water and land trails. Gateways elements should use common design theme to reinforce travel through the Bay Trail System. The trail system should provide continuous off-street travel, logical linkage to on-street bikeways, standard width paved trail with gravel shoulders, and signage, striping and mileage markers consistent with PRNS policies and guidelines. The Trail system should be highly visible and convey a uniform appearance through the deployment of architectural gateways to be installed at roadway and community entry points. In addition, trail design shall meet goals TN1, TN2 and TN3 in GP2040 and associated, relevant, policies related to those goals in GP2040, and other applicable trail design guidelines.
- **Smart Transportation:** Road infrastructure should support the needs of vehicular access along with the needs of pedestrians, cyclists and other modes of travel. Ensure wide sidewalks and striped bike lanes to provide travel options. Develop programs with building owners and transit partners to enable travel via all modes including public transportation, bicycle, and pedestrian access to the new uses. Require large employers to develop and maintain strategies that minimize vehicle trips and vehicle miles traveled. Also implement GP2040 Policies TR 1.2, TR1.5, TR7.1 , CD1.7.

- **Circulation Planning:** Roads should be organized into an interconnected movement system. A clear road hierarchy should be established, including publicly accessible roads, restricted access roads, service roads, etc.

- **Sustainable Roads:** Opportunities to enhance the environmental performance of all streets should be integrated into their design, through the use of systems that minimize storm water runoff; the coordination of utility infrastructure; and the incorporation of materials with extended life-cycles, high efficiency street lighting, native landscape materials, and extensive pedestrian and bicycle amenities.
- **Views:** Roads should take advantage of the scenic qualities of the Plant lands. Views towards habitat or other natural features can be enhanced by alignment of roadways.

Economic Development Policy

- **Clean Tech Industries:** Promote the development of Clean Tech industries by maintaining large parcels, and opportunities for green infrastructure, pure water and renewable energy.



ECONOMIC BENEFITS

The development of the Plant lands under the Recommended Plan would be contingent on market demand. In addition to market demand, phasing of the development and availability of land would depend on the infrastructure improvements at the Plant to control odors and change the solids processing technologies.

At build-out estimated ground lease revenue is projected to be between \$10 million to \$12.5 million annually. It is estimated that an additional \$4 million to \$5.5 million will be generated annually from associated property tax, sales tax, utility users tax, franchise tax, amongst other revenues. There will be

substantial additional benefits to Santa Clara County and local School Districts. The timing of infrastructure capital investment precedes the development of the land and potential resulting revenues. Therefore, revenues at build out have the potential to offset future operating and maintenance costs for the Plant but do not offset the capital investment for the Plant.

The economic analysis using the IMPLAN economic assessment model for Santa Clara County showed that the total economic impact of this development, considering construction and permanent economic activity, would be approximately \$16.5 billion - a substantial benefit to the region.

Summary of Economic Development Benefits at Build Out

	At Build Out 2040+
Developed Acres	159 ac
Light Industrial/Cleantech Area	742,000 sq ft
Office Research and Development Area	4.2 million sq ft
Retail Area	56,000 sq ft
Combined Industrial/Commercial Area	574,992 sq ft
Jobs (Total Permanent)	15,000

