City of San José

San José/Santa Clara Water Pollution Control Plant Master Plan

TASK NO. 1
PROJECT MEMORANDUM NO. 1
MASTER PLANNING GOALS, OBJECTIVES, GUIDING PRINCIPLES, AND ALTERNATIVE EVALUATION PROCESS

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in association with

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CITY OF SAN JOSÉ

SAN JOSÉ/SANTA CLARA WATER POLLUTION CONTROL PLANT MASTER PLAN

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1.0 INTRODUCTION

The purpose of this Project Memorandum (PM) is to:

- Introduce and describe the overall master planning process,
- Discuss the importance of sustainability concepts to the City of San José (City) and its tributary agencies and how they will be integrated into the San José/Santa Clara Water Pollution Control Plant (WPCP) Master Plan (Master Plan),
- Summarize the WPCP vision, goals, objectives, planning principles, and overall decision framework,
- Summarize the alternative development and evaluation process for assessing the ability of the recommended Master Plan to attain the WPCP vision and goals.

A glossary of terms can be found in Appendix A.

2.0 MASTER PLAN PURPOSE AND USES

2.1 Purpose of Master Plan

The purpose of the Master Plan is to provide a central planning document to guide improvements to the WPCP's facilities, operations, and land use over the next 30 years (through the year 2040). The Master Plan covers the facilities, processes, and land uses within the 2,684-acre boundary of the WPCP, including the former Salt Pond A18.

The Master Plan does not address the sanitary sewer collection system, stormwater collection, water efficiency programs, or any area outside of the WPCP's property. It does, however, consider several external factors potentially impacting planned wastewater treatment capacity, level of treatment, and selected technologies. These factors include: community concerns regarding adjacent land uses; potential impacts of upstream stormwater diversion; recycled water demand; water conservation; upstream source reductions; and climate change, among others.

The Master Plan is a comprehensive planning document that incorporates the values of the broader community and the public, and includes:

- An overall vision for the future, and the goals and objectives to achieve that vision.

- Estimated costs and an explanation of the need for and timing of the following projects:
  - Repair/replacement of aging infrastructure
  - New facilities to accommodate planned growth
  - New facilities to meet existing and future regulatory requirements
- An Implementation Plan, including a Capital Improvement Plan (CIP), schedule, and cash flow analysis.
- A long-range Land Use Plan.

2.2 Master Planning Process

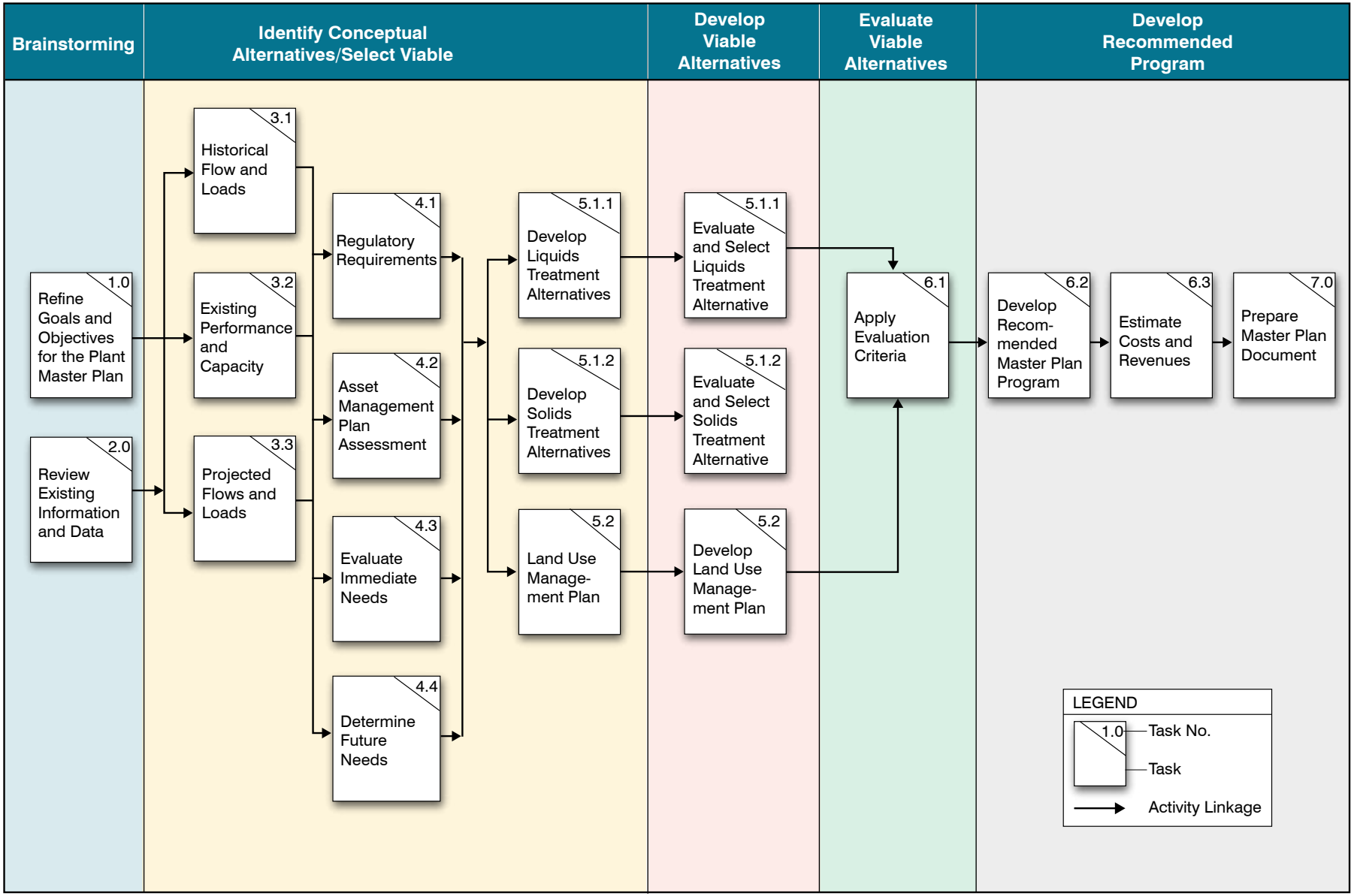
The Master Plan process generally consists of five phases: 1) initial project definition which includes identification of the major goals and objectives, and master planning requirements including existing background setting and anticipated future needs; 2) brainstorming a wide range of solutions, and identifying conceptual alternatives, with screening to select viable alternatives; 3) developing viable alternatives; 4) evaluating viable alternatives as to their ability to meet the overall goals and needs; and 5) developing the recommended program. Each phase consists of various tasks. The Master Plan phases and tasks are shown in Figure 1.

Stakeholder input was integral in shaping the direction of the Master Plan and its outcomes throughout the planning process. Following the initial brainstorming workshop, the stakeholder process included a series of workshops, and feedback helped define the Master Plan's goals and objectives, timing of Plant improvements related to community values, and land use elements. In general terms, the stakeholders included the San José City Council, the City of Santa Clara and the tributary agencies, the Treatment Plant Advisory Committee (TPAC), nearby communities, participating agencies, business and environmental organizations, an independent Technical Advisory Group (TAG), and a Community Advisory Group (CAG).

2.3 Master Plan Information

The Master Plan provides the following information:

- A description of existing facilities and site conditions
- Historical and projected service area population
- Historical and projected wastewater flows and loads
- Historical and projected wastewater reuse
- Existing and anticipated WPCP treatment performance and capacity



Updated: December 6, 2011

Figure 1
WORK FLOW DIAGRAM
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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- An overview of asset management needs and recommendations
- Current and anticipated future regulatory requirements
- Treatment process alternatives and a recommended alternative
- Land use scenarios, and a recommended scenario
- Current and planned major capital improvements projects and implementation schedule
- A CIP including a cash flow analysis

2.4 Master Plan Uses

The Master Plan will be used to identify, screen, select, and evaluate recommended alternatives to be combined to develop a recommended scenario. The recommended scenario will be phased for implementation of capital improvement projects and ongoing programs and policies to achieve the WPCP vision and goals. The Master Plan will be used in future documentation and implementation steps, such as the environmental impact review, design, and implementation of planned projects, and financial planning.

3.0 MASTER PLANNING DRIVERS FOR CAPITAL PROJECTS

In general, the need for and timing of capital projects and programs can be attributed to certain drivers, or *triggers*. The triggers for the recommended master planning projects and programs are as follows:

1. **Rehabilitation/Replacement (Condition)** – A *condition trigger* is assigned if the process or facility has reached the end of its economic useful life. This trigger is established based on the need to maintain that facility as operationally sufficient to meet mission critical reliability and performance requirements related to existing NPDES permit compliance, worker, and public safety, and other existing requirements.
2. **Regulatory Requirement** – A *regulatory trigger* is assigned when the need is driven by local, state, or national regulatory requirements. The date of implementation is based upon providing adequate time to meet the new regulatory requirements.
3. **Economic Benefit** – An economic benefit trigger is assigned when a positive reduction in life-cycle costs (considering capital and operations and maintenance) can be achieved. Typically, these kinds of projects trade-off an increase in initial capital investment to achieve a reduction in labor, energy, or chemical usage.
4. **Improved Performance Benefit** – An improved *performance benefit trigger* is assigned when there is a benefit in improved operations and maintenance

performance related to reliability and/or to reduced operational and safety-related risks. These kinds of projects typically involve improved process control, automation or addressing an operational concern (i.e., flexibility, reliability, less complexity).

5. **Increased Flows/Loads** – An *increased flow and load trigger* is assigned when the need is based on an increase in capacity to accommodate increases in influent flows or loads into the WPCP. This could be the result of population growth, changes in wet weather operation, annexation, regionalization, or industrial discharges.

6. **Policy Decision** – The *policy trigger* is assigned when the reason is based on a management and/or political decision from the policy-makers.

4.0 SUSTAINABILITY AND THE MASTER PLAN

Sustainability is the overarching theme of the Master Plan. It is of great importance to the City of San José and the WPCP's co-owner (City of Santa Clara) and tributary agencies (West Valley Sanitation District, Cupertino Sanitary District, City of Milpitas, County Sanitation District 2-3, and Burbank Sanitary District).

The City of San José, the City of Santa Clara, and their tributary agencies have a long history of leadership in sustainability. Through several initiatives and policies described in Appendix B, the communities have defined sustainability and charted a course toward greater sustainability for residents and businesses. These initiatives and policies provide a definition of a sustainable WPCP and were used to integrate sustainability into the decision framework for the Master Plan.

In August of 1994, San José's City Council adopted the San José 2020 General Plan (General Plan). Included within the plan was a new strategy entitled the "Sustainable City Major Strategy." This major strategy is an overarching policy statement regarding the City's planning efforts to create a more sustainable city (City of San José, 2007). The City of San José is currently updating its 2020 General Plan with the Envision 2040 General Plan Update, which has a greater emphasis on sustainability with measurable performance indicators.

To help achieve the Sustainable City Major Strategy, the San José City Council adopted the City of San José Green Vision (Green Vision), a fifteen-year roadmap for sustainability in San José (City of San José, 2008). The Green Vision shares common goals with the City's Climate Protection Agreement, as well as the U.N. Urban Environmental Accords.

The U.N. Urban Environmental Accords, signed in 2005, are a declaration of participating city governments to build ecologically sustainable, economically dynamic, and socially equitable futures for their citizens. The resolution is comprised of 21 actions related to energy, waste reduction, urban design, transportation, environmental health, and water. These actions are set to be complete by 2012 (City of San José, 2008).

The Green Vision plan aims to transform the City into a world center of "clean technology" innovation, promote cutting-edge sustainable practices, and demonstrate that the goals of economic growth, environmental stewardship, and fiscal responsibility are inextricably linked. This vision includes 10 goals that will serve as a roadmap to reduce the City's carbon footprint by more than half within the next 15 years.

Table 1 lists each Green Vision goal and suggests opportunities to advance those goals that are specific to the WPCP.

Table 1 City of San José Green Vision Goals[(1)] and Opportunities at the WPCP San José/Santa Clara Water Pollution Control Plant Master Plan City of San José

Green Vision Goal	Opportunities at the WPCP
Create 25,000 clean tech jobs.	• WPCP lands have State Route 237 frontage and land that could possibly be used to house clean tech industries.
Reduce per capita energy use by 50%.	• The WPCP is the largest energy user in the City, with the goal of becoming energy self-sufficient.
Use 100% clean renewable energy.	• WPCP currently uses 70% renewable energy and its goal is 100%; opportunities for constructing solar facilities and collect fats, oils, grease (FOG). FOG can be fed to digestion for the creation of more methane and thus more energy generation.
Build or retrofit 50 million sq. ft. of green buildings.	• Environmental Services Department (ESD) rebuilt the Environmental Services building housing the WPCP laboratory as a green building. Opportunity to incorporate green building into new and retrofit facilities.
Divert 100% of waste from landfill.	• WPCP can contribute to this goal through waste to energy and food waste digestion projects; WPCP lands are one of the last large industrial plots that can be used to site waste processing facilities.
Recycle or beneficially reuse 100% of wastewater (100 mgd).	• WPCP currently recycles 10 percent of its final effluent; WPCP goal is to recycle 50 percent or more.
Use alternative fuels in 100% of public fleet vehicles.	• WPCP may be able to produce biodiesel for fleet.
Plant 100,000 trees.	• The WPCP bufferlands are areas where tree planting and ecological restoration opportunities can occur.
Create 100 miles of interconnected trails.	• The WPCP lands can provide a connection to the many trails near the WPCP (San Francisco Bay Trail, Coyote, Guadalupe).

Source: City of San José (2008).

Note:

(1) On October 30, 2007, the San José City Council adopted the Green Vision, a 15-year roadmap toward sustainability.

5.0 SUSTAINABILITY AND THE DECISION FRAMEWORK

The sustainability concepts that guide the Master Plan were stated in the Request for Proposals - Consultant Services to Develop a Master Plan for the San José/Santa Clara Water Pollution Control Plant Master Plan (RFP). The RFP states that:

"…the link to sustainability and minimizing the environmental footprint of the Plant [WPCP] is a key goal. The Plant Master Plan [Master Plan] will meet the City's 2020 General Plan [General Plan] "Sustainable City Major Strategy" by creating a plan that will enable the Plant [WPCP] to be "designed, constructed, and operated to efficiently use its natural resources, minimize waste, and to manage and conserve them for the use of present and future generations". The Plant Master Plan [Master Plan] will also be linked to the update of the City of San José General Plan, Envision 2040 [General Plan Update]."

This definition formed the basis for the development of the Plant Master Plan goals and objectives.

5.1 Triple Bottom Line – Plus

In order to integrate the concept of sustainability into the Master Plan, the needs of the community, environment, and economy must be balanced. Grouped together, these are commonly referred to as the "triple bottom line."

Technical feasibility is an additional requirement. Solutions must be technically sound and must meet minimum industry standards in terms of performance, ability to implement, and reliability or risk. Therefore, the "triple bottom line - plus" definition of sustainability is used to determine the technical, economic, social, and environmental factors necessary to achieve the goals identified by the Master Plan.

The organization of these considerations into the "triple bottom line - plus" categories is based on the definition of sustainable development, as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission Report - UN Commission on Environment and Development, 1987).

The "triple bottom line - plus" resulted in these four goals:

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

5.2 Decision Framework

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. Once these are established, evaluation criteria for each objective are developed consistent with specific planning parameters identified for the master plan to be completed. Finally, appropriate metrics are then matched with each planning parameter to allow for a comparison of quantitative or qualitative data. For example, if there was an objective to maximize system reliability at the WPCP, one of the evaluation criteria to meet this objective would be to dictate that only "proven technology" be used. The planning parameter for identifying a proven technology would be to obtain an operating history in similar applications for the particular process or technology being considered. The metric for this parameter would typically be measured in "years of operation."

Once the initial set of objectives (see Table C-3) were developed and the associated planning parameters/metrics were identified, two approaches were identified for performing a detailed evaluation of viable technical and land use alternatives. The first approach involved using a structured, formal decision-making process called "pairwise." The pairwise process utilizes a comparison methodology which requires that the evaluation criteria be ranked in order of importance (which is performed on an individual basis by selected City management and WPCP plant staff). Using a normalized ranking of the evaluation criteria and data input for each metric, a relative ranking is determined for each alternative being considered. It was determined that this ranking process required development of a "weighting factor" that was difficult to use because: (1) there is difficulty in monetizing non-economic benefits; (2) it is difficult to develop weighting factors that represent all stakeholder values, and (3) it is difficult to know with certainty the future of regulations, sea level rise, etc.

Therefore, a second approach was utilized which involved a more facilitated, consensus-building process, which was considered more consistent with the current methodology used by the City staff. This 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.

5.3 Public Outreach and Advisory Groups

The initial goals of the plan were refined through: a Brainstorming Workshop, the initial TAG meeting, a Land Use workshop, early CAG meetings, and consultation with various staff committees.

The process for developing the revised goals and objectives is discussed in more detail in Appendix C. More information on the Brainstorming, TAG, and Land Use workshops is provided in Appendix D. The City's Communication Division has also conducted public outreach activities for the Cities of San José and Santa Clara, as well as the tributary agencies.

Direct engagement with the public and the Plant's many stakeholder groups has been an essential component to developing the Plant Master Plan. The communications strategy for the Plant Master Plan was developed by City staff with input from the Plant Master Plan Steering Committee, and implemented using a variety of media, advertising, and community engagement tactics. The tributary-wide Public Outreach Working Group, composed of staff from the cities and sanitation districts, has been providing input on the public outreach plan since December 2007. The CAG met 20 times, and three public meetings provided members of the community opportunities to provide input. The May 2009 meeting addressed Plan concepts and values. The May 2010 meeting covered viable alternatives. The January 2011 meetings focused on gathering comments on the draft recommended alternative. Notes from the public meetings and correspondence related to the Plan can be viewed in the two Plant Master Plan Public Opinion Summaries included in the full planning document.

6.0 OVERVIEW OF DEVELOPMENT AND EVALUATION OF ALTERNATIVES

Using the decision framework described earlier, the technical alternatives for the liquids treatment, biosolids treatment, and energy management facilities were developed in parallel with the land use alternatives. The integration of the technical with the land use alternatives involved continuous coordination between the two parallel planning efforts.

The focus of the technical alternatives was in meeting planned growth, aging infrastructure, worker, and community safety, and anticipated regulatory requirements with innovative solutions that could also fit well with the land use planning opportunities. Planning considerations included the size of the footprint that had to be reserved for future treatment processes, as well as the recycle and "waste" streams that could be incorporated into planned land uses adjacent to the WPCP. These "waste" streams include recycled water and biosolids, electricity produced by digester gas, and excess waste heat streams.

The evaluation of the treatment alternatives followed a two-tier evaluation process. Tier 1 was a "fatal flaw" assessment to select viable alternatives, and Tier 2 was the ranking of viable alternatives, and selection of the recommended alternative. The Tier 1 "fatal flaw" assessment identified technical alternatives that were technically sound and were capable of meeting minimum industry performance standards, implementable, and capable of being operated and maintained with the Plant's current facilities. In the Tier 2 assessment, the technical alternatives were compared based on a more detailed comparison of costs and benefits to the "triple-bottom line – plus" goals. The TAG met on three separate occasions

during the development, evaluation and selection of recommended alternatives: (1) the first session provided “big-picture” input into potential technologies and/or alternatives to be considered; (2) the second session focused on providing feedback for the identified viable technologies and alternatives; and (3) the third session included a peer review of the recommended draft implementation plan.

Land use alternatives were developed through a process that included obtaining input from stakeholders, the local community, and others, to determine their values and priorities. Then, the land use planning team developed three conceptual themes for the land use scenarios to capture the range of potential future opportunities. These themes were again reviewed internally and externally through a public outreach process to solicit feedback. Finally, a merged land use plan consisting of the common features of the three conceptual scenarios was developed.

Overall, the evaluation of alternatives for the technical and land use alternatives followed a five-phase process:

- Phase 1: Identify the stakeholders and internal decision makers, and their preferences
- Phase 2: Identify viable technical and land use alternatives
- Phase 3: Develop the best technical treatment alternative using the two-tier methodology
- Phase 4: Develop multiple land use scenarios compatible with the technical alternative
- Phase 5: Develop an integrated technical and land use scenario into the recommended master plan

A detailed description of the process used to develop the recommended alternatives and prepare various recommended planning scenarios is presented in Figure 2.

6.1 Identify Stakeholders and Key Decision-Makers

At the outset of the Master Plan planning process, major external and internal stakeholders and decision makers were identified. Staff met with these stakeholders to develop and screen a wide range of conceptual technical and land use alternatives to determine if they met the minimum level technical and land use requirements of the Master Plan. The technical requirements included meeting future growth needs, addressing the need for replacement and repair of existing facilities, and meeting existing and anticipated regulatory requirements.

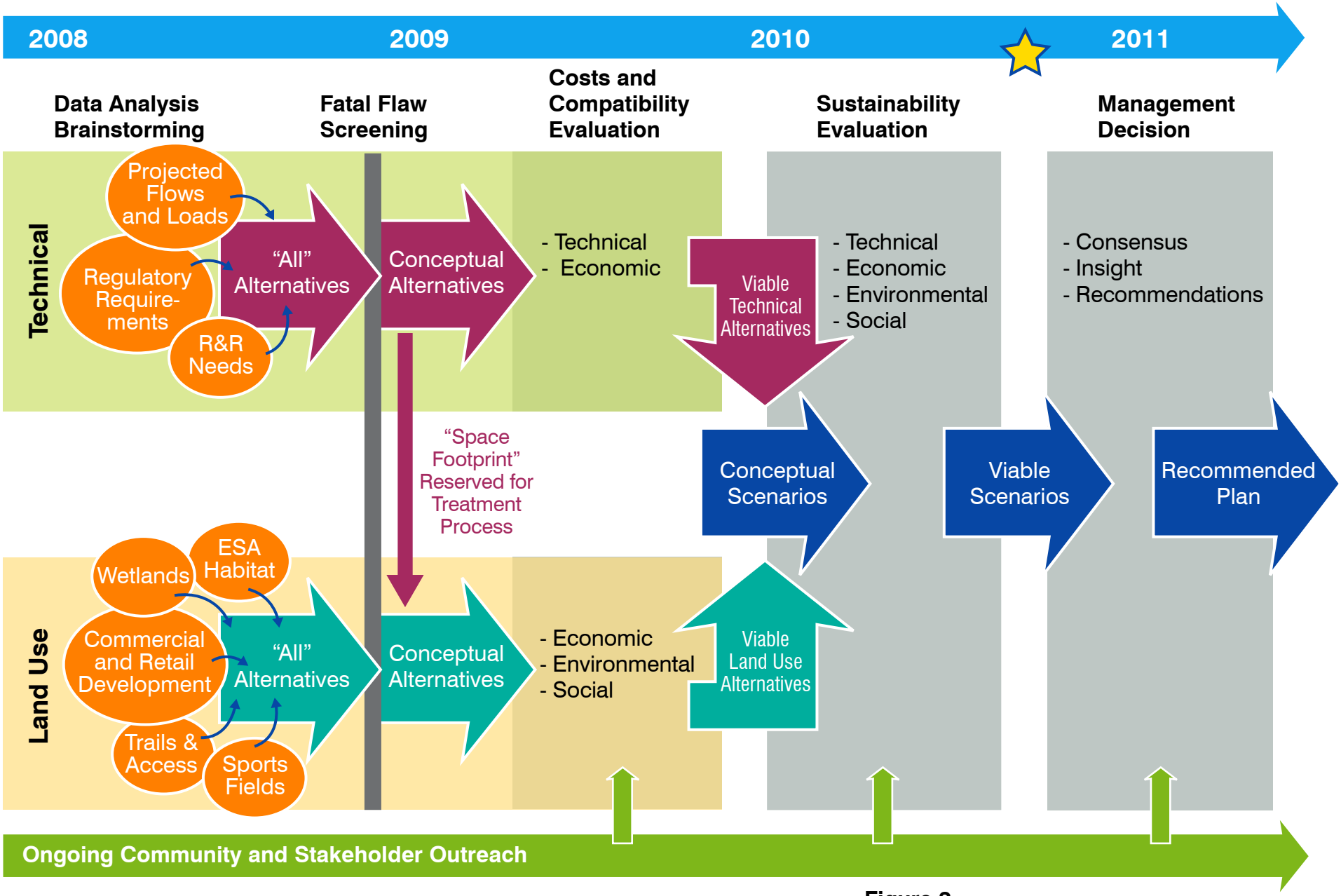

Figure 2
PROCESS FOR DEVELOPING ALTERNATIVES/RECOMMENDED PLAN
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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The evaluation of technical alternatives for the WPCP process area was developed in the following categories: (1) liquids treatment; (2) solids treatment; (3) energy evaluation; (4) odor evaluation and (5) support facilities.

Conceptual land uses included economic development, owl habitat, recreation, recycled water treatment facility, solar farm, fresh water effluent pond where the Plant's treated wastewater can be discharged prior to entering the South San Francisco Bay, polishing wetlands, and a nature museum (see Figure 3).

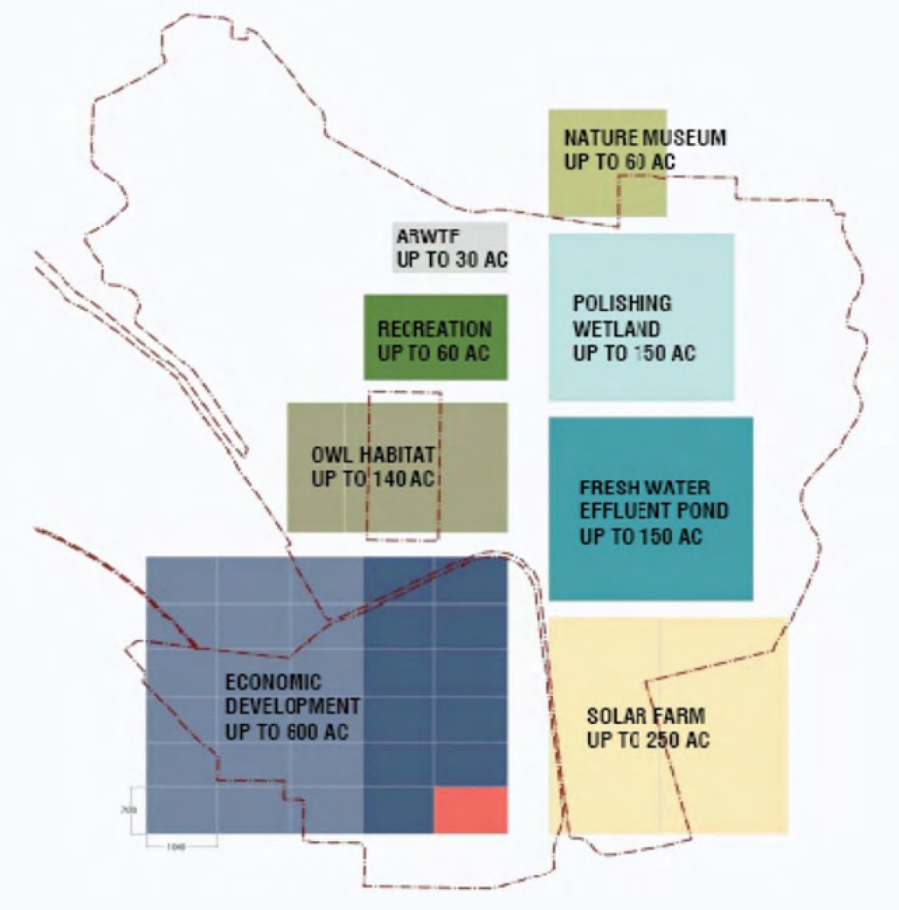

Figure 3 Land Use Planning Elements

6.2 Develop Viable Alternatives

The conceptual alternatives were evaluated against results from a preference survey completed by members of the public at a Master Plan public workshop held in May 2009.

The information gathered from the public led to the creation of a single technical alternative and three viable land use alternatives that would meet the “triple bottom line – plus” goals. The viable alternatives were presented to the public at five community meetings in May 2010, where participants provided feedback through hard-copy and on-line workbooks. This information reflected the community priorities regarding the timing of odor related technical improvements as well as the size and location of different land uses.

6.3 Develop and Select Technical Alternatives

The technical alternatives were developed through the two-tiered evaluation process discussed earlier, with the assistance of Plant staff, Plant partner agencies, and the TAG. Details of this process can be found in section 7.2 “Evaluation Process for Development of Treatment Alternatives.”

6.4 Develop Land Use Alternatives

The three land use alternatives were further refined through the consultation of the CAG members and stakeholders. The land use elements and locations favored by the community members - either in one of the three alternatives or common to all three alternatives - were prioritized in creating the recommended plan presented in January 2011. This recommended alternative achieved the “triple bottom line – plus” goals and reflected the priorities and values of the community and stakeholders.

6.5 Develop Recommended Master Plan

The recommended Master Plan was developed to meet the “triple bottom line – plus” goals and achieve the Plan’s objectives. The objectives listed in Table 2 are a refinement of many of the principles, values, and guidelines presented to the public and stakeholders throughout the process and outlined in the next section.

The recommended Master Plan has developed an implementation plan for each of the technical improvements. These technical improvements will be built when the planning “triggers” (e.g. new regulations and/or policy decisions) occur. Land use options that are linked to these technical “triggers” have correspondingly dictated the timing of the proposed land-use development. This is to prevent the proposed land uses changes from being started until the technical improvements addressing the technical “triggers” have been completed.

Table 2	Plant Master Plan Objectives San José/Santa Clara Water Pollution Control Plant Master Plan City of San José
1.	Protect the environment, public health, and safety through reliable wastewater treatment that can accommodate population growth and meet foreseeable future regulations.
2.	Pursue energy self-sufficiency and reduced greenhouse gas emissions by promoting renewable energy generation, increased energy efficiency, and enclosed biosolids processing.
3.	Allow for complementary recreational uses, including interconnected trails to the Bay, environmental education, and addressing regional recreational needs.
4.	Maximize the long-range efficient use of the Plant's existing facilities and reduce the footprint of the existing biosolids treatment area.
5.	Allow for the beneficial use of Plant effluent through multiple effluent release points and creation of freshwater habitats.
6.	In partnership with other agencies, protect, enhance, and/or restore habitat, including upland areas, wetlands, and riparian vegetation near creeks.
7.	Maintain cost-effective Plant operations and competitive sewer rates through enhanced operations, flexibility, and rigorous evaluation of new technologies.
8.	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.
9.	Allow for Pond A18 to provide water quality, ecosystem benefits, and flood control benefits.
10.	Reduce visual, noise, and odor impacts from Plant operations to neighboring land uses to the extent practicable.
11.	Locate economic development on Plant lands to maximize viability and visibility.
12.	Promote access to recreational, educational, and economic development uses by improving transportation connections through the Plant lands.
13.	Promote additional resource recovery from Plant operations by supporting recycled water production, increasing biogas production, and diversifying biosolids reuse options.
14.	Protect the small-town character of the Alviso Village.
15.	In partnership with other agencies, protect the Plant from flooding and risks associated with sea level rise.

7.0 GUIDING PRINCIPLES FOR DEVELOPMENT OF TREATMENT ALTERNATIVES

7.1 General Guiding Principles

The general guiding principles for development of treatment alternatives (liquids, biosolids, energy, odor) were as follows:

- Ability to be phased in to reduce the risk of unused capacity and technological obsolescence and to allow innovative technologies to be pilot tested and demonstrated to be viable.
- Ability to be integrated into a broader land use vision that maximizes benefits to the community of the large amount of land on the site.
- Need to focus on facilities in the near term (next 15 years) while considering the long-range (30-year) planning needs.

7.1.1 Guiding Principles for Liquids Treatment Alternatives

- Maximizes use of existing facilities:
  - Process capacity need to accommodate growth is based on loading (to allow for upstream water conservation, and potential loading reductions). Peak loads are equalized through storage.
  - Hydraulic capacity need is based on handling the full flow capacity of the interceptors through an optimized combination of storage vs. treatment for peak flows.
- Adapt to future regulatory requirements (primarily total nitrogen reduction).
- Maximizes water reuse in the future.
- Minimizes greenhouse gases.

7.1.2 Guiding Principles for Developing Biosolids Alternatives

- Increase flexibility:
  - Maintain plant buffer.
  - Provide multiple disposal options.
  - Incorporate new and innovative approaches.
- Increase bio-energy (optimize digestion, and use of alternative feedstocks).
- Reduce odors (alternates to lagoons/beds).
- Maximize biosolids reuse.
- Minimize disposal volume.
- Minimize greenhouse gases.

7.1.3 Guiding Principles for Developing Energy Alternatives

- Achieve energy self-sufficiency (critical power demand) by 2022.
- Meet WPCP Goals: 17 percent more efficient by 2012.

7.1.4 Guiding Principles for Developing Odor Alternatives

- Identify and mitigate all offsite odor sources.
- Implement odor improvements as part of each proposed process area upgrade.

7.2 Evaluation Process for Development of Recommended Treatment Alternative

7.2.1 Overview

The evaluation of the treatment alternatives followed a two-tier evaluation process. Tier 1 entailed a “fatal flaw” assessment to select viable alternatives. Tier 2 resulted in the evaluation of viable alternatives and the selection of the recommended alternative. Tier 1 and Tier 2 evaluations are included PMs 5.1 Liquids, 5.2 Solids, 5.3 Energy, and 5.5 Odor. The recommended alternative is described in detail in PM 6.1.

7.2.2 Tier 1: Fatal Flaw Evaluation

The fatal flaw evaluation was used to screen conceptual alternatives to select for viable alternatives that could perform in “real world” conditions. These Tier 1 screening criteria included:

- Proven performance and feasibility at large-scale treatment plants.
- No significant increase of the Plant’s footprint (keep footprint to a minimum).
- No reduction in existing mechanical and process reliability, including the ability to filter for discharge to the Bay.
- Flexibility to deal with future regulations.
- Mitigating aesthetic impacts (visual, odor, noise).

7.2.3 Tier 2: Selection of Recommended Alternative

Tier 2 criteria were applied to the liquids, biosolids, and energy alternatives to evaluate the viable alternatives and select the recommended alternative.

- Maximize use of existing facilities.
- Reduce estimated costs versus benefits.

- Maintain level of treatment.

7.2.4 Sensitivity analysis

A sensitivity analysis was performed to assess the impact of changes to the major planning assumptions and external conditions through a reasonable range on the outcome of the alternative ranking and selection process. These assumptions included:

- Cost assumptions (accuracy, escalation, cost of utilities).
- Future regulatory requirement assumptions (nutrients, contaminants of emerging concern).
- Energy demands/supply assumptions (demand for plant produced power).
- Greenhouse gases (GHGs)/environmental impacts (high, low estimates).

7.2.5 The Implementation Plan is an Integral Part of the Recommended Treatment Alternative

- Recommended technical treatment alternative is adaptive, phased, and maximizes existing facilities while moving towards innovative liquids and biosolids treatment alternatives.
- The timing and need of future treatment processes additions and/or modifications are driven by agreed to planning “triggers” such as repair/replacement of aging infrastructure, regulations, etc.

8.0 DOCUMENTED DEVELOPMENT AND EVALUATION OF LAND USE ALTERNATIVES

The process of developing and evaluating the land use alternatives is as follows:

8.1 Guiding Principles for Development of Land Use Alternatives

The level of detail of the Land Use Plan is based on a “General Plan” perspective where land uses are defined through zoning and policy recommendations. The Land Use Plan does not include specific development plans or proposals. This is driven, in part, by the uncertainty in future opportunities that may present themselves for the use of the land, as well as by the relatively long period required for the development of land use types.

The general guiding principles for the development of the land use scenarios are as follows:

- Conform to the existing hydro-geophysical characteristics of the land that existed before development by man (i.e. the “natural” setting).
- Promote “Water” as a major theme for each scenario.

- Recognize the Plant lands as a “unique transitional area” where the South Bay meets the land in the Silicon Valley.
- Recognize that the development of the proposed land uses may occur beyond the planning horizon of 2040.
- Meet the minimum land use area requirements for different land uses.
- Assess the financial and economic impacts of each scenario.
- Obtain input from the public through local neighborhood workshops.

8.2 Evaluation Process for Development of Recommended Land Use Plan

The three land use scenarios were developed to highlight different land use choices in order to facilitate public feedback on potential trade-offs related to land-use priorities. The public feedback allowed the three land use scenarios to accomplish the following:

- Establish a clear vision for integrated land uses, and hold to a vision that is internally consistent in terms of adjacent land uses, social benefits, natural habitat goals, and energy utilization.
- Match the implementation of the recommended treatment alternative (e.g., odor improvements, energy availability, etc.) through a coordinated and phased implementation schedule.
- Allow development to proceed in several different configurations depending on the opportunities that may arise in the future.
- Merge the three scenarios based on observations of the common elements that were received favorably by the various City Departments, and through the public outreach process. These common features include:
    - Highlight a water theme, with the arrival into the site, showcasing water.
    - Allow development along California Highway 237 is common to all alternatives.
    - Promote the future water recycling facility as a key feature.
    - Highlight the importance of the restoration of Artesian Slough.
    - Expand water corridors through the center of the site, different than salt marsh, with it being released into Coyote Creek to expand the riparian watershed (e.g. development of a seasonal riparian corridor splitting off from the new fresh water effluent creek).

- Allow flexible upland areas for future uses.
- Preserve line-of-sight and views from Hwy 237 to the Bay.
- Provide an opportunity to widen the Coyote Creek channel and riparian habitat providing an upland connection between the Creek and the Bay.

- Expand financial and economic analysis to consider the monetary benefits for green infrastructure (i.e. natural habitat preservation/creation, park lands, and public access).

9.0 CONCLUSION

By adopting sustainability as a central theme, the Master Plan will continue the area's long history of environmental stewardship and innovation. The definition of a sustainable WPCP for the Master Plan is based on community values expressed in the City's and tributary agencies' sustainability initiatives, along with input from the WPCP Steering Committee, the Brainstorming Workshop, the CAG, TAG, various committees, and the Master Plan team.

The WPCP Steering Committee and Master Plan team have developed the goals and objectives for the WPCP, which form a framework for developing long-range planning recommendations that utilize sustainability principles at its core.

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REFERENCES

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APPENDIX A - GLOSSARY OF TERMS

APPENDIX A - GLOSSARY OF TERMS

Some of following terms were excerpted from the City of San José website: http://www.sanjoseca.gov/esd/greenbuilding/policies.asp

Alternatives – Alternatives are mutually exclusive options or solutions (structural and/or nonstructural) to a given problem. Can be combined to form scenarios.

Approach – A planning term used to describe the overall goals, objectives, team, and technical steps to be taken in solving a particular water and/or infrastructure problem.

Biomimetics - The application of biological methods and systems found in nature to the study and design of engineering systems and modern technology.

Charrette – A collaborative session in which a group of designers drafts a solution to a design problem.

Concept – An abstract idea that contains a broad vision without detail. Concepts can be further detailed to develop options.

Criterium DecisionPlus (CDP) – A decision management tool that runs as a Windows application and organizes, completes, and communicates complex decision-making tasks. It enables the alternatives to be prioritized based on quantifiable criteria that are tied to goals and objectives.

Driver – A requirement or need that pushes certain actions to take place.

Evaluation Criteria – The quantifiable indicators applied to the project alternatives developed for the purpose of evaluating how an alternative performs relative to the desired goals. Evaluation criteria answer the question: “How well does an alternative meet the desired goals?”

Goals – The overarching achievements and/or initiatives that will allow the vision to be achieved. A goal is best when quantified in terms of measurable outcome, and time period.

Green Building – An integrated framework of design, construction, operations, and demolition practices that encompasses the environmental, economic, and social impacts of buildings. Green building practices recognize the interdependence of the natural and built environments and seek to minimize the use of energy, water, and other natural resources and provide a healthy, productive indoor environment.

Green Vision – The San José City Council adopted the City of San José Green Vision (Green Vision) on October 30, 2007. It is a 15-year roadmap for sustainability in San José.

The Green Vision is composed of ten goals that are shared by the City's Climate Protection Agreement, as well as the U.N. Urban Environmental Accords.

Indicator – A measure of performance, either qualitative or quantitative.

Integrated Design – A holistic process that considers the many disparate parts of a building project, and examines the interaction between design, construction, operations, and demolition to optimize the energy and environmental performance of the project.

LEED™ – Leadership in Energy and Environmental Design rating system is a third party certification system designed for rating new and existing commercial, institutional, and high-rise residential buildings developed by the US Green Building Council.

LEED™ Certification – Different levels of green building certification - certified, silver, gold, and platinum - are awarded based on the total credits earned in each of several categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality.

Level of Service – A term used by municipalities (and private industry) to describe the minimum expected performance of an agency in meeting its mission.

Life Cycle – The consecutive, inter-linked stages of a product - beginning with raw materials acquisition and manufacture, the product's fabrication, construction, use, and ultimate waste management (recovery, recycle, or disposal).

Life Cycle Analysis – An evaluation tool that assesses the net present value of the design, construction, operation, maintenance, and disassembly of a facility as well as the health and productivity of its occupants, the costs of measurable external environmental impacts, and the cost of measurable and relevant social impacts.

Mission – The fundamental purpose of an organization or enterprise.

Objectives – An intended outcome, which results in the attainment of a goal. Objectives are made measurable and specific through associated evaluation criteria, planning parameters, and metrics. There may be multiple objectives for each goal.

Operations and Maintenance – Costs directly related to the operation, maintenance, repair, and management of a property and the utilities that service it. These include insurance, property taxes, utilities, maintenance, and management expenses.

Options – Options are typically actions that are available to solve a given problem, in a given time frame. They are not necessarily mutually exclusive. Options can be combined to form alternatives.

Planning Parameters and Metrics – Planning parameters are used to quantify the evaluation criteria. Planning parameters, when matched with the appropriate unit of

measure (metric), allow for comparison of quantitative and qualitative data. For example, the planning parameter of “ecological footprint” is combined with the unit of measure of “acres,” in order to help quantify the evaluation criteria for sustainability for each alternative.

Planning Element – One component in the planning process.

Programs – Programs are an integrated set of policies and actions undertaken to accomplish a specific objective to support the agencies mission. For example, a *pollutant source control program* is a common element of a Master Plan consisting of a combination of institutional actions: new codes, incentive programs, and requirements to reduce toxic pollutants from getting into the wastewater system.

Project – A project (typically “capital project”) is a series of actions resulting in the construction of an asset. Projects and programs are planned and implemented throughout a planning horizon to help meet the overall mission of the enterprise.

Riparian Habitat – This habitat type is the interface between the land and a river, creek, or stream. It is the habitat along the river bank.

“Stretch” Target – The overarching achievements and/or initiatives that will allow the vision to be achieved. A “stretch” target does not necessarily require an associated time period.

Scenarios – Scenarios are a collection of integrated and compatible alternatives to address the many objectives making up the overall mission of an agency. Scenarios are based on a given set of planning assumptions.

Steering Committee – A committee to arrange the order of business for a larger (legislative) body.

Strategy – Strategy is a term applied to an integrated plan of projects and programs that includes consideration of unknowns and built-in decision rules for maintaining the success of the mission despite anticipated obstacles and challenges. Strategic planning is sometimes known as “contingency” planning.

Sustainable Development – "Meeting the needs of the present without compromising the ability of future generations to meet their own needs" - The World Commission on Environment and Development, The Brundtland Commission, 1987. Sustainable development seeks to balance human development, growth, and equity with ecological stewardship.

Values – A quality or characteristic considered intrinsically worthwhile or desirable. In planning, values provide a basis for direction of both how an action is implemented, and the desired outcome (For example: “We will strive for excellence in our performance”). Values become more meaningful when some measurable criteria are associated with them.

Vision – Superordinate objective or goal of an organization or enterprise.

Whole-Systems Thinking – A process through which the interconnections of systems are actively considered, and solutions are sought to address multiple problems at the same time.

APPENDIX B - SAN JOSÉ AND TRIBUTARY AGENCIES SUSTAINABILITY INITIATIVES

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CITY OF SAN JOSÉ

San José 2020 General Plan - Sustainable City Major Strategy

In August of 1994, the San José City Council adopted the San José 2020 General Plan (General Plan). Included within the plan was a new strategy entitled the "Sustainable City Major Strategy." The Sustainable City Major Strategy is a statement of San José's desire to become an environmentally and economically sustainable city. This major strategy is an overarching policy statement regarding the City's planning efforts to create a more sustainable city and it identifies the major policy sections of the General Plan that support the sustainable city concept (City of San José, 2007).

A "sustainable city" is a city designed, constructed, and operated to efficiently use its natural resources, minimize waste, and to manage and conserve them for the use of present and future generations. By planning for urban sustainability, the City aims to promote resource efficient land use, transportation, energy and water use, and resource conservation. The goal of long-term sustainability is to develop a prosperous and healthy urban system, which can provide for the physical, social, economic, and psychological needs of its population, and, at the same time, reverse the trends of increasing pollution and environmental degradation now threatening the quality of life.

The key goals of the Sustainable City Major Strategy include the following:

- Reduce traffic congestion, pollution, wastefulness, and environmental degradation.
- Use the concept of sustainability as a means to encourage and support a stronger economy and improve the quality of life for those that live and work in San José.
- Create a more sustainable urban form to help ensure that the City can adequately maintain urban infrastructure and services.

The following General Plan policies support the City's commitment to becoming a sustainable city:

- Green building and site design policies improve energy, water efficiency, and reduce consumption and waste.
- Water resources policies address the need for the conservation and protection of watershed and groundwater recharge areas.

- Air quality policies require the City to regulate the sources of air pollution and monitor the cumulative impacts of development on air quality.
- The Greenline/Urban Growth Boundary, the Urban Service Area, and the Natural Resource policies promote the efficient use of land and prevent urban sprawl, conserve open spaces, and preserve pristine natural habitats.
- The General Plan's emphasis on land-use related issues such as achieving a relative job/housing balance and orienting development around transit facilities contributes to sustainability by shortening trip lengths and helping to increase the availability and convenience of transit, biking, and walking. This conserves energy and improves water and air quality.

Envision San José 2040 General Plan Update

In June 2007, the City Council approved the following principles for Envision San José 2040 General Plan Update (General Plan Update) (City of San José, 2007):

- Economic Development - Maximize the economic and revenue generation potential of the City's land resources and employment opportunities for San José residents.
- Growth Management - Balance the urban services and facilities demands of new development with the need to address the City's fiscal stability through the operating and capital budget process.
- Downtown Revitalization - Invigorate downtown as San José's cultural center with a mix of housing, employment, convention and visitor amenities, museums, parks, linkages to San José State University, etc.
- Urban Conservation/Preservation - Protect and enhance San José's neighborhoods and historic resources to promote community identity and pride.
- Greenline/Urban Growth Boundary - Preserve land that protects water, habitat, and agricultural resources and/or offers recreational opportunities, as well as to preserve the scenic backdrop of the hillsides surrounding San José.
- Housing - Provide a wide variety of housing opportunities to meet the needs of all economic segments of the community in stable neighborhoods.
- Sustainability - Manage, conserve, and preserve natural resources for present and future generations. Identify opportunities to enhance the City's sustainability policies through the implementation of the Urban Environmental Accords.
- Social Equity - Cultivate ethnic, cultural, and socio-economic diversity and equity in the planning for all public facilities and services to protect and enhance the quality of life for all San José residents.

Climate Initiatives

In March 2007, the San José City Council adopted the US Conference of Mayors' Climate Protection Agreement (Agreement). Under the Agreement, participating cities commit to take the following three actions (U.S. Conference of Mayors, 2005):

- Strive to meet or beat the 2005 United Nations Framework Convention on Climate Change Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land use policies to urban forest restoration projects to public information campaigns;
- Urge their state governments, and the federal government, to enact policies and programs to meet or beat the greenhouse gas (GHG) emission reduction target suggested for the United States in the Kyoto Protocol - 7 percent reduction from 1990 levels by 2012; and
- Urge the US Congress to pass the bipartisan GHG reduction legislation, which would establish a national emission trading system.

In June of 2007, the City went a step further by adopting an aggressive reduction goal for municipal GHG emissions. The specific targets are as follows (City of San José, 2007):

- 2012: GHG emissions 25 percent below 1990 levels.
- 2015: GHG emissions 30 percent below 1990 levels.
- 2020: GHG emissions 35 percent below 1990 levels.
- 2030: GHG emissions 50 percent below 1990 levels.
- 2045: GHG emissions 80 percent below 1990 levels.

The City's GHG reduction goals go beyond those set by the State of California. California Assembly Bill 32 (AB32), also known as the California Global Warming Solutions Act of 2006, established a statewide program of regulatory and market mechanisms to achieve reductions in GHG emissions. The law requires the California Air Resources Board (CARB) to establish a cap on statewide GHG emissions in 2020 at 1990 levels as compared to a goal of 35 percent below 1990 levels set by the City.

Green Building Policies

The City first adopted its Green Building Program in 2001. In March 2007, the City Council adopted an updated Green Building Policy that states: The City will require all new municipal buildings over 10,000 square feet to be constructed to achieve Leadership in Energy and Environmental Design (LEED™) Silver level certification at a minimum, with a goal of reaching LEED™ Gold or Platinum certification (City of San José, 2008).

The specific policies are as follows:

- Policy No. 1: The City of San José shall adopt Green Building Policy goals and incorporate green building principles and practices into the planning, design, construction, management, renovation, operations, and demolition of all City facilities that are constructed, owned, managed or financed by the City.

- Policy No. 2: The City of San José will require all new municipal buildings over 10,000 square feet to be constructed to achieve LEED™ Silver level certification at a minimum, with a goal of reaching LEED™ Gold or Platinum certification.

- Policy No. 3: The City of San José shall provide leadership and guidance to encourage the application of green building practices in private sector planning, design, construction, management, renovation, operations, and demolition of buildings by promoting the voluntary application of the San José Green Building Policy goals.

CITY OF SANTA CLARA

The City of Santa Clara has also been extremely active implementing sustainability initiatives. Some of their many activities and awards include:

- An award from Sustainable Silicon Valley to the City of Santa Clara/Silicon Valley Power (SVP) "for its commitment during 2007 to a sustainable future by pledging to reduce its CO_2 emissions and helping the region achieve a 20 percent reduction by 2010, based on 1990 levels." In addition, the City signed the U.S. Mayor's Climate Protection Agreement and the Novellus Action Pledge to reduce dependency on oil and to promote alternative energy technologies.

- City of Santa Clara is a Green Power Community by the US Environmental Protection Agency (EPA). They meet the EPA's Green Power Partnerships renewable energy supply requirements by committing 57 million kilowatt-hours annually.

- California Integrated Waste Management Board presented the WRAP Award (Waste Reduction Awards Program) to the Santa Clara Convention Center for conserving resources and reducing waste.

- Santa Clara residents and businesses have the opportunity to use Santa Clara Green Power, the voluntary renewable energy program, which comes from wind and solar, from SVP that offers the option of one hundred percent renewable energy for an additional 1.5 per kilowatt hour. The additional monthly cost is only about $7.50 for the average Santa Clara household and will prevent 7,674 pounds of carbon dioxide being released each year. Santa Clara committed to more than a million kilowatt-hours of renewable energy annually for all municipal facilities.

- The Santa Clara County Green Business Program is a regional joint venture program for certifying businesses throughout Santa Clara County that operate using environmentally sound practices.
- The Electric Department/SVP offer rebates for a variety of appliances, insulation, lighting, cooling, and process efficiency changes.
- The Santa Clara City Council approved a rebate of residential Solar Electric System Permit Fees. In addition, the municipal Electric Utility/SVP, recently increased its solar electric rebate levels, and also set a goal to have 30 MW (megawatt) of solar power installed in Santa Clara by 2017. The Permit Center already offers a reduced permit fee for customers installing solar electric systems.
- Santa Clara is undertaking the inventory of their greenhouse gas emissions from operations. In addition, they are working to model the greenhouse gas emission profile of the entire community.
- There are plans to install a large-scale photovoltaic system (100kW) over an existing City-owned public parking area that will double as a sunscreen for parked cars at the Great America Train Station and renewable energy generation for the Santa Clara electric system.
- The residential recycling program includes plastics #1 through #7, aluminum and tin cans, glass bottles and jars, mixed paper and cardboard, Styrofoam blocks, used motor oil, and more.
- All new building and/or demolition projects which exceed 5,000 square feet in size, including municipal construction, are required to demonstrate, document, and report that at least 50 percent of the materials generated for discard from the project get recycled.
- Santa Clara has contracted the recovery and conversion of landfill gas from the closed landfill, into electric energy.
- The Street Tree Program, which has placed and maintains thousands of trees throughout the community.
- The City of Santa Clara has a significant number of ultra low and zero emission vehicles, primarily electric-hybrid vehicles, and is increasing the fuel efficiency of the Santa Clara City vehicle fleet, with the goal not to increase total fleet fuel usage going forward.
- Santa Clara participates in the South Bay Water Recycling program, and uses recycled water at the golf course, landscaping at Fire Station 6 and at other

municipal facilities, local parks, and in some landscape medians, as well as providing businesses in Santa Clara with recycled water for non-potable uses.

- Climate protection and sustainability are key initiatives in the City's General Plan update (2010-2025) process, wherein policies and programs addressing the breadth of "green" actions will be incorporated.

- Santa Clara adopted a Green Building Policy that includes recognizing and adopting the LEED™ Rating System, and Build It Green's GreenPoint Rating System (residential), requiring the submittal of a completed LEED™ or GreenPoint Rating checklist; and achieving LEED™ Silver certification or better for new City construction and renovation projects over 5,000 square feet.

- The City of Santa Clara completed an extensive retrofitting of traffic signals and replaced incandescent bulbs with light-emitting diode (LED) lenses.

- 40 acres of open space was set aside that showcases seven distinctive natural habitats - including grasslands, woodlands, wetlands, and savannah – called Ulistac Natural Area.

- The City of Santa Clara and SVP support the National Action Plan for Energy Efficiency. (http://santaclaraca.gov)

WEST VALLEY SANITATION DISTRICT

City of Campbell

The City of Campbell is instituting numerous sustainability initiatives, including:

- Adopting the LEED™ & GreenPoint Rating Systems as standards of measure.

- Requiring the completion of a "Green Checklist" as part of all development applications for new residential and commercial construction over 500 square feet.

- Requiring LEED™ Silver certification for all new or renovated municipal buildings over 5,000 square feet.

- Establishing an ordinance that maintains a waste diversion level of 50 percent in accordance with the mandate of the California Waste Management Act adopted in 1989. Under the ordinance, contractors are required to recycle or reuse at least 50 percent of the construction and demolition debris waste tonnage from demolition projects greater than 500 square feet, and all renovations or additions to an existing structure or construction of a new structure, greater than 2,000 feet or where construction of the work exceeds $250,000. (http://www.ci.campbell.ca.us.htm)

Town of Los Gatos

Los Gatos has been very proactive in implementing sustainability and green initiatives. These programs include:

- Establishing a Sustainability Committee.
- Undertaking a greenhouse gas emissions inventory.
- Launching a Green Business Campaign, known as, “Los Gatos: Growing Greener Together.” This educational campaign encourages Town employees to practice Green Business Certification commitments and reach out to community members.
- In July of 2007 Los Gatos signed the Mayors Climate Protection Agreement.
- Los Gatos has been certified as a Green Business. This program is a partnership of environmental agencies that assists, recognizes, and promotes business and government agencies that operate in a more environmentally responsible way. The key goals of the program are to promote resources conservation and pollution prevention.
- Member of the Silicon Valley Energy Program that offers rebates, classes, energy audits, and technical assistance to businesses and city organizations.
- Using LEDs in traffic lights and high-pressure sodium lamps in street light fixtures which are significantly more efficient than traditional lights.
- Offsetting greenhouse gas emissions from both electricity and gas usage at all municipal facilities by enrolling in PG&E's ClimateSmart program.
- Adopting voluntary green building standards for new construction.
- Requiring that all new homes be pre-plumbed for solar water heaters and that solar be used as the primary means of heating swimming pools.
- Adopting the Water Efficiency Landscape Ordinance to promote conservation and efficient use of water. All new commercial developments and residential developments of five or more units are subject to this ordinance, which requires developers to calculate the water allowance permitted for the site and estimated water usage. The ordinance encourages the use of recycled water irrigation.
- Sponsoring computer recycling events.
- Receiving the distinguished Tree City USA award for the 27th consecutive year. In order to receive the award, a community must have the following: a tree board or

department, a tree care ordinance, a comprehensive community forestry program, and an Arbor Day observance.

- Implementing a code that requires developers to provide an opportunity for the public to salvage building materials from demolished structures. Developers must advertise in a newspaper when the structure is available for salvaging. All wood, metal, glass, and aluminum materials generated from a demolished structure must be recycled.

- Diverting solid waste from landfill disposal.

- Approving a resolution that supported Extender Producer Responsibility, a strategy designed to promote the integration of environmental costs associated with products throughout their life cycles into the market price of the products. This means that firms that manufacture, import and/or sell products and packaging are required to be financially or physically responsible for such products after their useful life.

- Switching heavy-duty diesel-fueled trucks and equipment to run on biodiesel, adding a hybrid vehicle to its fleet, and maintaining a large fleet of compressed natural gas (CNG) vehicles. (http://www.town.los-gatos.ca.us)

City of Monte Sereno

City of Monte Sereno requires LEED™ Silver certification for all new or renovated municipal facilities over 5,000 square feet and a “Green checklist” for all residential and commercial development proposals over 500 square feet. (http://www.montesereno.org)

City of Saratoga

Saratoga also has a very extensive sustainability program that includes:

- Funding a Household Hazardous Waste Collection Program.

- Pursuing the potential for updating the Construction & Demolition Debris Recycling Program.

- Achieving over 60 percent waste diversion.

- Implementing an Integrated Pest Management Program, providing for reduction or elimination of chemicals to the maximum extent practicable

- Retrofitting exit lights and replacing lighting ballasts and light bulbs with more energy efficient models.

- Performing an energy audit of all City buildings and facilities.

- Converting all traffic lights to LED.

- City fleet currently includes Natural Gas-fueled vehicles.
- Providing a Residential Design Handbook that includes policies and techniques to "integrate structures with the environment" and to "design for energy efficiency."
- Requiring numerous conditions for projects concerning pest reduction and drought tolerant plants, plus numerous storm water-related requirements.
- Providing lowest priced permits for solar panels in Santa Clara County.
- Installing weather-station irrigation controllers on City medians, parks and property (expected to result in a 30 percent savings in water use).
- Using paints with low Volatile Organic Compounds (VOCs).
- Investigating a photovoltaic system on a City building roof within the near future.
- Investigating using more recycled content and environmentally friendly chemicals and paper products City-wide and evaluating copier replacement including "most environmentally friendly" criteria.
- Working with Joint Venture Silicon Valley and International Council for Local Environmental Initiatives (ICLEI) to prepare a baseline Greenhouse Gas Emissions Inventory for City operations.
- Encouraging water conservation. (http://www.saratoga.ca.us/cmo/green)

CUPERTINO SANITARY DISTRICT

City of Cupertino

The City of Cupertino has been very active in initiating sustainability activities that include:

- An Environmental Resources/Sustainability section in the General Plan that lists ten goals: a sustainable future for the City of Cupertino; reduced use of non-renewable energy resources; energy conserving and efficient buildings; healthy air quality levels for the citizens of Cupertino utilizing local planning efforts; protection of special areas of natural vegetation and wildlife habitation as integral parts of the sustainable environment; mineral resource areas that minimize community impacts and identify future uses; protection and efficient use of water resources; improved quality of stormwater runoff; a solid waste stream reduction program that meets or exceeds state requirements; and adequate sewer capacity.
- Signing the Mayors Climate Protection Agreement.
- Initiating a computer take-back recycling program.

- Offering a home energy-auditing program for local residents, and an energy-reduction challenge for local community groups.
- Certifying five municipal facilities through the Bay Area Green Business Program.
- Being an active member of Joint Venture Silicon Valley's Climate Protection Task Force and Sustainable Silicon Valley.
- Working with ICLEI to benchmark both municipal and citywide greenhouse gas emissions and implement reductions over time.
- Reducing solar fees to $200 for residents and procuring discounts for Cupertino residents for the installation of photovoltaic panels.
- Negotiating with PG&E to obtain a more favorable rate for improved streetlight efficiency and working to provide valuable rebates to residents and businesses.
- Offering up to $1,000 for new residences to reimburse a portion of the cost of having a GreenPoint Rater or LEED™ Accredited Professional certification.
- Prioritizing the creation of Green Building Standards and a Zero Waste Policy.
- Applying green building standards to all development projects.
- Adopting a construction and debris (C&D) recycling program ordinance to require applicants seeking building or demolition permits for projects greater than 3,000 square feet to recycle at least 60 percent of project discards.
- Installing low-flow toilets and flush valves.
- Using computer programmed lighting control systems for both internal and external lights.
- Hosting the first Community Congress focused on sustainability on Saturday, December 13, 2008.
- Implementing an Integrated Pest Management Policy to use less pesticides and using drought tolerant plants and mulch.
- Switching traffic signals to LEDs.
- Hiring a fulltime environmental affairs coordinator.
- Purchasing paper products made with recycled content, converting paper forms to electronic forms, purchasing recycled/remanufactured toner and ink jet cartridges, Energy Star appliances and copiers, and printing with soy or low VOC inks.

- Retrofitting all diesel trucks with particulate filters. (http://www.cupertino.org)

City of Milpitas

The City of Milpitas is a member of the Bay Area Green Business Program and encourages integration of Green Building measures into new and remodel construction projects. The Milpitas Unified School District Board of Education president has implemented a solar project installed in cooperation with Chevron Energy Solutions and Bank of America. Milpitas received the 2009 Clean Air Award for Green Buildings/Smart Growth from Breathe California.. (http://www.ci.milpitas.ca.gov) (https://www.musd.org/)

COUNTY SANITATION DISTRICT 2-3

County Sanitation District 2-3 is involved in the South Bay Water Recycling program that delivers recycled water for landscaping, playing fields, golf courses, cemeteries, industrial processing, dual plumbing, agriculture, and other nondrinking water purposes. (http://santaclaraca.gov)

BURBANK SANITARY DISTRICT

The Burbank Sanitary District participates in the South Bay Water Recycling program as well, which delivers recycled water for landscaping, playing fields, golf courses, cemeteries, industrial processing, dual plumbing, agriculture, and other nondrinking water purposes. (http://santaclaraca.gov)

SUNOL SANITARY DISTRICT

The Sunol Sanitary District also participates in the South Bay Water Recycling program that delivers recycled water for landscaping, playing fields, golf courses, cemeteries, industrial processing, dual plumbing, agriculture, and other nondrinking water purposes. (http://santaclaraca.gov)

APPENDIX C - VISION, GOALS, AND OBJECTIVES

APPENDIX C - VISION, GOALS, AND OBJECTIVES

Vision

The vision for the WPCP guiding the Master Plan process is

> "…to serve to protect public health, the environment, and the community's quality of life, while maintaining the ability to grow sustainably."

This vision responds to the increasing demands for responsible management of natural resources, for reducing human impacts on fragile ecosystems, and for new ideas to sustain and promote a lifestyle in harmony with the natural environment. The vision states that it is a priority to integrate the WPCP into the surrounding community by providing, for example, public amenities to access the coastal environment of the South San Francisco Bay ecosystem as well as investigating local business and financial opportunities including companies and industries in the Golden Triangle, north of San José.

In line with this vision, the Master Plan will develop innovative, creative, and optimized "state-of-the-art" solutions with the potential to create a new "sustainable" standard for the municipal wastewater treatment industry. The vision will require the Master Plan to optimize environmental, economic, and community benefits, as well as looking at opportunities to integrate a wide variety of compatible land uses: wastewater treatment and non-potable water supply, energy production, wildlife habitat, community farming, educational opportunities, recreation, industrial and/or commercial development, etc. In addition, overall aesthetics, attractiveness, and beauty will be incorporated into the future of the WPCP, both in terms of new facilities that are constructed and "green" space.

Goals

This vision for the WPCP is supported by specific goals for the WPCP. The development of the WPCP goals through the Master Plan is an interactive process, where initial goals were established to help begin the planning process. The goals integrate the concept of sustainability, in order to support the vision, and therefore, balancing the needs of the community, the environment, and economics. The community or social category relates to non-economic benefits and considerations associated with the alternatives and scenarios. The environmental category addresses impacts on the environment associated with implementation of the alternatives and scenarios. The economic category relates to the costs and cost/benefit of the alternatives and scenarios. These are grouped together and are commonly referred to as the "triple bottom line."

Technical feasibility is an additional requirement in that all alternatives must be technically sound, and must meet minimum industry standards in terms of performance, ability to implement, and reliability or risk. Therefore, the "triple bottom line - plus" definition of

sustainability is used to consider the technical, community, environmental, and economic considerations to achieve the recommended alternatives and scenarios. The organization of objectives into the “triple bottom line - plus” categories is based on the definition of sustainable development, as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission Report - UN Commission on Environment and Development, 1987).

Initial Goals

The initial goals identified as part of the Master Plan process for the WPCP were those developed by the WPCP Steering Committee (consisting of staff from the City and the tributary agencies) as part of the RFP development, those in the proposal process, and these from the City’s Green Vision. The WPCP Steering Committee developed the initial master planning goals as presented in Table C-1, as part of the RFP development. The “stretch” targets, as presented in Table C-2, were developed during the proposal process by the Master Plan team. The Green Vision goals were previously discussed and shown in Table 1 in the PM.

These goals and targets together formed the initial goals that were reviewed and revised during the two-day “charrette-style” Brainstorming Workshop held May 29-30, 2008, and were further reviewed and revised in subsequent meetings with comments from various committees, the Technical Advisory Group (TAG), and the Community Advisory Group (CAG). The revised goals are presented below.

Objectives

Objectives are defined as outcomes that result in the attainment of the goal. Objectives were defined through the Master Plan process stemming from the WPCP goals following the SMART objectives format (specific, measurable, achievable, realistic, and time).

Initial Objectives

The initial WPCP objectives that were developed are shown in Table C-3. Like the goals, the initial objectives were then revised during the two-day “charrette-style” Brainstorming Workshop held May 29-30, 2008, and were further reviewed and revised in subsequent meetings with based on various committees, TAG, and CAG input. The revised objectives are presented below.

Table C-1	**WPCP Steering Committee Goals[1]** **San José/Santa Clara Water Pollution Control Plant Master Plan** **City of San José**

- **Sustainability:** Ensure that the WPCP operates more cost-effectively and anticipates future WPCP needs for capacity, treatment, and reliability improvements
- **Regulatory Compliance:** Meeting and exceeding current federal, state, and regional regulatory requirements while providing new opportunities for recycled water utilization
- **Worker and Community Safety:** Minimize toxic hazards and replace them with less hazardous alternatives
- **Habitat Protection and Restoration:** Particularly related to former Salt Pond A18 and other on-site habitat: encourage environmentally positive outcomes consistent with the South Bay Salt Pond restoration effort that will increase wildlife habitat, reduce flood risk, and conserve energy
- **Good Neighbor/Public Value:** Improve integration and acceptance with the local community by becoming an ecological asset of natural beauty and free of odor
- **Economic Opportunities:** Allow complementary, sustainable land uses that either generate revenue or reduce costs while providing flexibility for future growth

Note:
(1) Master Plan goals defined by the WPCP Steering Committee, comprised of staff from the City of San José and the tributary agencies.

Table C-2	**Stretch Targets** **San José/Santa Clara Water Pollution Control Plant Master Plan** **City of San José**

"Stretch" Targets[1]

- To improve energy self-sufficiency
- To improve economic "self-sufficiency"
- To be carbon neutral in 20 years
- To integrate ecological design and human sustainability
- To optimize use of resources

Note:
(1) "Stretch" targets were defined by Master Plan team.

Table C-3 Initial Objectives[(1)] San José/Santa Clara Water Pollution Control Plant Master Plan City of San José
• Maximize system reliability and redundancy • Maximize system flexibility to changing conditions • Maximize economic benefits relative to costs • Minimize neighborhood impacts • Maximize community benefits • Protect public health and safety • Maximize conservation, on-site habitat, and resource recovery and minimize impacts to the environment
Note: (1) Objectives as defined by the Master Plan Team.

Refining the Goals and Objectives

The initial goals and objectives presented above have been reviewed and revised, to date, by the WPCP Steering Committee and Master Plan team after obtaining input from the Brainstorming Workshop, the CAG, and the Master Plan TAG, as well as various committees.

The City's Communication Division is pursuing outreach activities for the Cities of San José and Santa Clara, as well as the tributary agencies.

Brainstorming Workshop

The Brainstorming Workshop was a two-day "charrette-style" workshop held May 29 through 30, 2008. Brainstorming Workshop participants toured the WPCP site, listened to presentations by international leaders in sustainable planning and design to help stimulate creative thinking about what "could be," and developed a "world of ideas" to support future technical and land use analyses. Presentations addressed the fields of alternative energy; green planning and design; land development and economic self-sufficiency; biomimicry; climate change; habitat protection and restoration; and ecological machines.

The Brainstorming Workshop developed concepts that fed into both the land use and technical workshops, as shown in Figure C-1, as planning for these two elements occurs concurrently. The CAG engages interested parties throughout the Master Plan process through a number of forums and communications methods and provides input and feedback that are coordinated with major milestones on the technical track and with the "charrette-style" technical workshops.

Figure C-1
SJ/SC WPCP WORKSHOP TASK FLOW
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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From the presentations and ensuing discussions, a set of planning guidance principles and specific concepts were generated, as well as a list of the most compelling ideas. Table C-4 lists planning guidance principles extracted from the thought-leader presentations, and Table C-5 presents the concepts that were most compelling to workshop participants.

During the workshop, WPCP staff presented the initial WPCP goals developed by the WPCP Steering Committee, the Green Vision goals, and the "stretch" targets, as well as the initial objectives. Based on input from the Brainstorming Workshop, the initial goals and objectives were refined. Guiding themes are shown in Table C-6.

CAG, TAG, Land Use, and Others

Initial CAG workshops, various committee meetings, TAG and land use workshops, and other meetings with City staff, the WPCP Steering Committee, and the Master Plan team, also provided feedback and input on the initial goals and objectives. This feedback was used to develop revised goals and objectives for the WPCP.

Revised Goals and Objectives

Based on the Brainstorming Workshop and the CAG, TAG, various committees, and the Master Plan team input, the initial goals were revised. These goals have been simplified and organized into the four categories of the "triple bottom line - plus" definition of sustainability: 1) technical feasibility, 2) community, 3) environment, and 4) economic. The revised goals are shown in Figure C-2, the revised objectives are shown in Table C-7, and the revised goals and objectives will be used throughout the development of the Master Plan recommendations.

Table C-4 Planning Guidance Principles Discussed at Brainstorming Workshop
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

Alternative Energy

- Optimize existing energy use.
- Increase energy production: become net power producer (steam, hot water, electricity).

Green Planning and Design

- "Zero Energy" building approach.
- "Green" must be new building design mentality (consider biomimetic solutions).
- "Build it and they will come" - green designs command higher lease rates/value (Xihu Tiandi, Singapore).
- Integrated planning/design is key to success.

Land Development and Economic Self-Sufficiency

- Start with understanding fundamental unique site characteristics: habitat, climate, traffic, etc.
- Need to identify a unifying theme for the project ("branding").
- Sustainable and "green" design concepts for all improvements on the site.
- Assess buffer requirements: odors, visual, noise, other buffer areas and compatible land uses.
- Transportation considerations are critical.

Climate Change

- Climate change is a reality: adapt and mitigate.
- Three major impacts: air temperature rise; sea level rise; and changing intensity, duration, and frequency (IDF) curves.
- Use regional-scale climate models, scenario planning and sensitivity analyses to assess impacts.
- Fresh water increasingly scarce: reuse should be maximized.

Biomimicry

- Use existing biomimetic technologies.
- Recognize the "genius of place."
- Consider the whole system and engage life's principles (e.g., resilience, recycle everything, multi-functional design, cooperative relations, locally attuned, feedback loops, water-based chemistry, and use free energy).
- Develop "green" metrics: tons of carbon dioxide (CO2) fixed, gallons of freshwater filtered, kilograms of biomass produced, inches of rich topsoil created, number of species supported, etc.

Table C-4 Planning Guidance Principles Discussed at Brainstorming Workshop San José/Santa Clara Water Pollution Control Plant Master Plan City of San José
Habitat Preservation and Restoration • Maintain a "whole systems" watershed perspective, including upstream elements. • Start by reviewing the US Geological Survey (USGS) historical site map. • Build "smart" ecostructures/systems. • Be cognizant of difference between reconstruction, rehabilitation, and restoration.
Ecological Machines • Need to go upstream and look at "smart" changes (e.g., water conservation, small-scale treatment, targeted reuse, low impact development). • Create functioning ecosystems.

Table C-5 Most Compelling Concepts from Brainstorming Workshop San José/Santa Clara Water Pollution Control Plant Master Plan City of San José
Opportunities to Expand the Job/Services of the WPCP
• Revenue generation. • Treatment/reuse/beneficial use. • Research/education. • Recreation. • Business. • Habitat rehabilitation.
Living Museum
• Natural history museum.
Alternative Energy Production
• Food waste/fat-oil-grease (FOG). • Algae farming. • Solar, wind, micro-hydroelectric power.
Promote Water Focus
Rename the WPCP

Table C-6	Guiding Themes San José/Santa Clara Water Pollution Control Plant Master Plan City of San José

- Weave major themes of “water” and “integration” throughout the project.
- Maintain a whole system, watershed perspective and consider “upstream” solutions.
- Build on the opportunity to connect humans to nature, and ecology with economy, by merging contrasting elements on the WPCP site: South San Francisco Bay and the Golden Triangle; industrial and natural systems; seawater and fresh water; wet and dry.
- Integrate a wide variety of compatible land uses: wastewater treatment and water supply, energy production, wildlife habitat, community farming, educational opportunities, recreation, industrial and/or commercial development, etc.
- Promote education about the commonalities and differences in how the WPCP and nature clean water.
- Implement zero energy facility - Generate more renewable energy than the annual operating energy to account for embodied energy and transport of facility construction and operations and maintenance (O&M) materials.
- Increase energy production and utilization efficiency.
- Plan for zero waste, using industrial ecology techniques that co-locate organizations that use one another’s waste products.
- Maximize use of sustainable and biophilic/biomimetic planning and design concepts: optimize use of existing facilities; create multiple benefits from improvements; optimize resource use and recovery; create functioning ecosystems.
- Develop “green” metrics - Tons of carbon dioxide fixed; gallons of freshwater filtered, kilograms of biomass produced, etc.

Figure C-2
PLANT MASTER PLAN REVISED GOALS
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Table C-7	Plant Master Plan Objectives San José/Santa Clara Water Pollution Control Plant Master Plan City of San José

1. Protect the environment, public health, and safety through reliable wastewater treatment that can accommodate population growth and meet foreseeable future regulations.
2. Pursue energy self-sufficiency and reduced greenhouse gas emissions by promoting renewable energy generation, increased energy efficiency, and enclosed biosolids processing.
3. Allow for complementary recreational uses, including interconnected trails to the Bay, environmental education, and addressing regional recreational needs.
4. Maximize the long-range efficient use of the Plant's existing facilities and reduce the footprint of the existing biosolids treatment area.
5. Allow for the beneficial use of Plant effluent through multiple effluent release points and creation of freshwater habitats.
6. In partnership with other agencies, protect, enhance, and/or restore habitat, including upland areas, wetlands, and riparian vegetation near creeks.
7. Maintain cost-effective Plant operations and competitive sewer rates through enhanced operations, flexibility, and rigorous evaluation of new technologies.
8. 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.
9. Allow for Pond A18 to provide water quality, ecosystem benefits, and flood control benefits.
10. Reduce visual, noise, and odor impacts from Plant operations to neighboring land uses to the extent practicable.
11. Locate economic development on Plant lands to maximize viability and visibility.
12. Promote access to recreational, educational, and economic development uses by improving transportation connections through the Plant lands.
13. Promote additional resource recovery from Plant operations by supporting recycled water production, increasing biogas production, and diversifying biosolids reuse options.
14. Protect the small-town character of the Alviso Village.
15. In partnership with other agencies, protect the Plant from flooding and risks associated with sea level rise.

APPENDIX D - BRAINSTORMING, TAG, AND LAND USE WORKSHOP BROCHURES

WHO USES THE PLANT

The cities of San José and Santa Clara co-own the Plant. Either directly or through sanitation districts, six other cities contract for the Plant's services. These cities and districts collectively fund Plant operations and include:

1. San José, co-owner
2. Santa Clara, co-owner
3. Milpitas
4. Cupertino/Cupertino Sanitary District
5. Los Gatos/West Valley Sanitation District
6. Monte Sereno/West Valley Sanitation District
7. Campbell/West Valley Sanitation District
8. Saratoga/West Valley Sanitation District
9. County Sanitation Districts 2-3 (unincorporated)
10. Burbank Sanitary District (unincorporated)

PROJECT MANAGEMENT AND CONTACTS

City of San José Environmental Services Department operates the Plant and is overseeing the Plant Master Plan. For more information, contact:

(area code for all numbers: 408)

John Stufflebean, *Director* — 535-8560

Dale Ihrke, *Plant Manager* — 945-5198

Bhavani Yerrapotu, *Technical Services Manager* — 945-5321

Kirsten Struve, *Project Manager* — 945-5180

Matt Krupp, *Planner* — 945-5182

Jennifer Garnett, *Media Contact* — 535-8554

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e-mail: matt.krupp@sanjoseca.gov
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San José, CA 95113-1905

www.sanjoseca.gov/esd/plantmasterplan

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT
700 Los Esteros Road, San José, CA 95134

Master Plan Approach

Planning Principles

The Plant Master Plan will chart a course for the next 30 years that continues the Plant's success in protecting public health and the environment and in supporting the region's economy. The intent is to achieve the four master plan goals (below) in coordination with other key planning efforts, such as the South Bay Salt Pond Restoration Project, the Watershed Management Initiative, the City of San José's Envision 2040 General Plan, and the City of San José's Green Vision — including initiatives pertaining to energy, water recycling, and zero waste.

Plant Master Plan Goals

- Operational — Result in a reliable, flexible Plant that can respond to regulations and changing conditions.
- Environmental — Improve habitat and minimize impacts to the local and global environment.
- Economical — Develop cost effective technical and land use options to benefit customers.
- Social — Maximize community benefits through improved aesthetics and recreational uses.

Plant Master Plan

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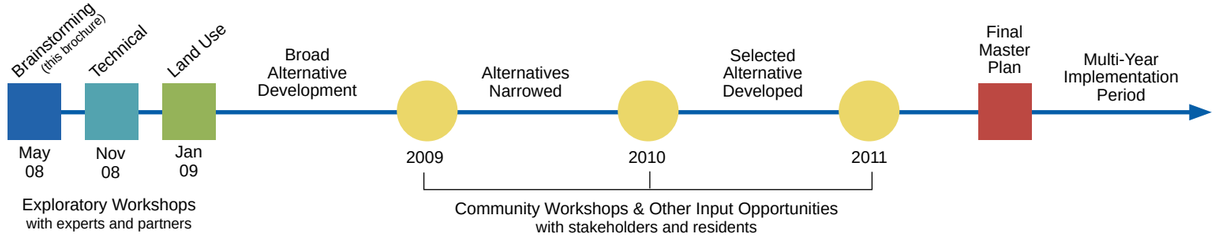
NEXT STEPS

The Plant Master Plan involves a three-year process that begins with a series of exploratory workshops that lead to development of a set of alternatives for the Plant and site. The public will be engaged through community meetings and other ways to give input for the process of narrowing alternatives and selecting the course that culminates in the final Plant Master Plan.



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Take the West Coast's largest advanced wastewater treatment plant, now more than 50 years old and in need of rebuilding …

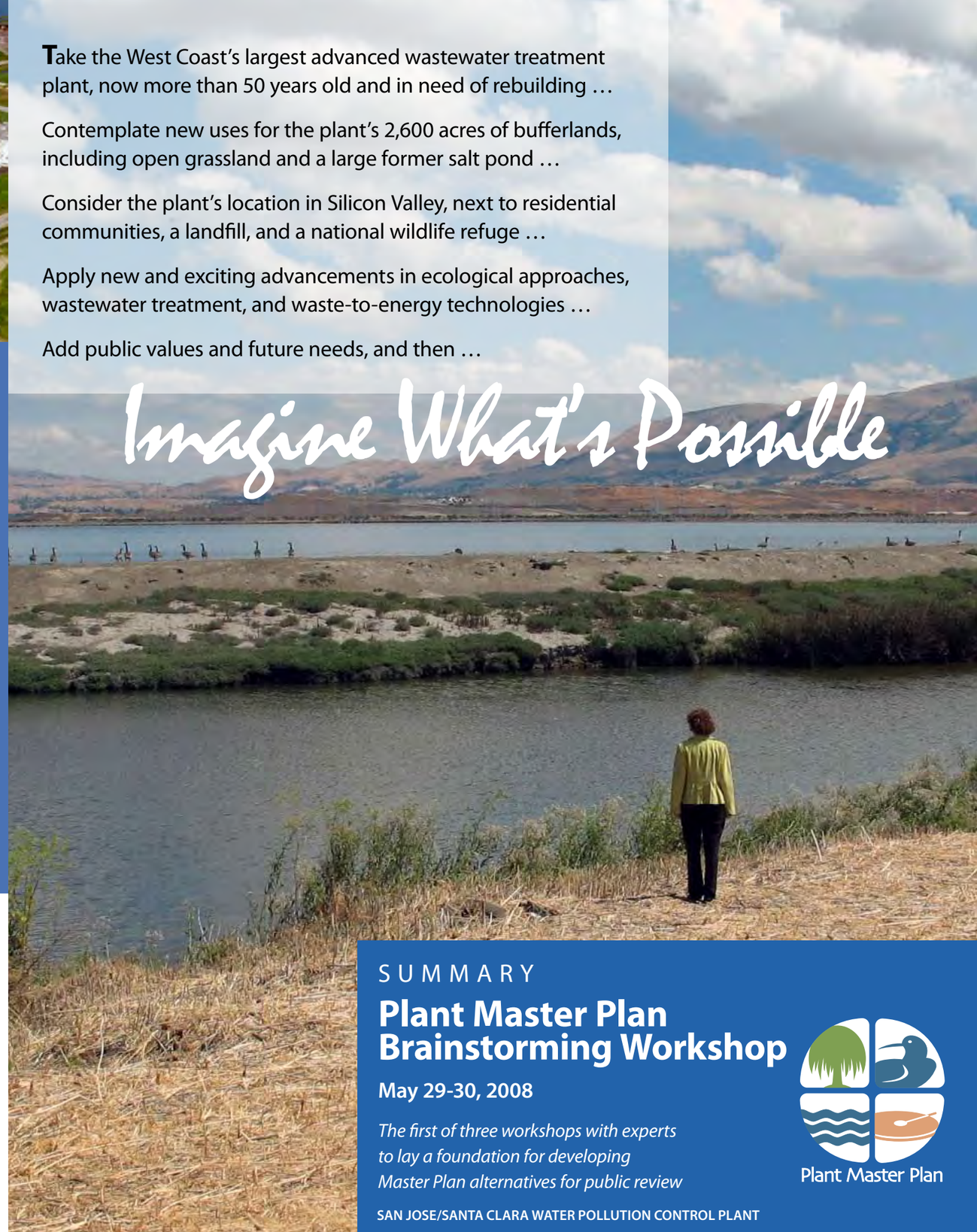
Contemplate new uses for the plant's 2,600 acres of bufferlands, including open grassland and a large former salt pond …

Consider the plant's location in Silicon Valley, next to residential communities, a landfill, and a national wildlife refuge …

Apply new and exciting advancements in ecological approaches, wastewater treatment, and waste-to-energy technologies …

Add public values and future needs, and then …

Imagine What's Possible



SUMMARY

Plant Master Plan Brainstorming Workshop

May 29-30, 2008

The first of three workshops with experts to lay a foundation for developing Master Plan alternatives for public review

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT

Plant Master Plan


Bill Browning
green design


Carrie Byles
architecture/land use


Dayna Baumeister
biomimicry


Jonathan Todd
ecological machines


Perry Schafer
alternative energy


Peter Gleick
climatology


Peter Warshall
habitat restoration


Rudy Killian
alternative energy

THE EXPERTS ...

"This site has tremendous and unique potential — you have land, water, and resources to work with."

— Peter Warshall, habitat expert, Warshall & Associates

"This site is rich with opportunities for integrated solutions."

— Jonathan Todd, John Todd Ecological Design

"The Plant can meet its own large energy needs and become a green power supplier as well—using solar, wind, waste conversion, and more."

— Perry Schafer, energy expert, Brown & Caldwell

"We can apply the genius of nature here."

— Dayna Baumeister, biomimicry expert, Biomimicry Guild

"Ecological solutions and design considerations are critical as sea rise is a given part of your future."

— Peter Gleick, climate change expert, Pacific Institute

"Integrating a green approach at the outset of structure design will not only increase energy savings but may cut your capital costs as well."

— Bill Browning, green design expert, Terrapin

Who Attended and What They Did

About 40 representatives from the cities and sanitary districts served by the Plant engaged in a creative two-day process with the experts. They brainstormed a range of ideas unfettered at this point by technical analysis and cost evaluation (those come later). These ideas provide a launching point for developing Plant Master Plan alternatives that will be presented to the public for consideration and input.






A World of Ideas

Leading architects, engineers, ecologists, and planners with global experience led an exploration of innovative concepts for improving the Plant and transforming the site. Ideas included:

Economic and Energy Self-Sufficiency

The San Jose/Santa Clara Water Pollution Control Plant is energy intensive—using more energy in its operations than all other facilities owned by the City of San José combined. However, clean biogas (methane) is a byproduct of both the Plant's wastewater operations and the adjacent landfill operations, and the biogas from these two sources meets two-thirds of the Plant's energy needs. Through process improvements, enough energy can be produced to meet 100 percent of the Plant's needs. More clean energy can be developed by tapping fats, oils, grease, discarded food, and other wastes streams. The Plant site also offers significant opportunity for solar and wind installations, and the discharge flow offers an opportunity to tap hydropower. The Plant can become an energy supplier.

By offering fee-for-service programs to the region—such as collecting grease from the area's restaurants—the Plant literally turns the area's waste streams into revenue streams while providing an environmental value to customers given the shortage of landfill space. Other ideas for revenue generation include:

- Develop algae farming for biodiesel and butanol
- Draw compatible businesses that use the Plant's byproducts to the site
- Consider farming, cash crops, food production, and plant nurseries
- Expand recycled water use (saves drinking water and helps recover treatment costs)
- Explore revenue potential from carbon credits and wetlands banking
- Establish a research institute focusing on renewable energy, clean technologies, and more

Community Amenities and Benefits

The site offers much opportunity to connect people to nature, and stands as a gateway from San José's Innovation Triangle to the southern Bay's beautiful marshlands. Integrating the area's contrasts—industrial and natural; seawater and fresh water; wet and dry—can offer a fascinating, educational examination of environmental dynamics. Workshop ideas for amenities for community benefit and enjoyment include:

- Recreational uses such as trails and a recycled water course for boating
- A "living museum" where animals are seen in their natural habitat
- An innovative "wow factor" such as a large water sculpture that attracts public interest

Ecological Vibrancy

Adjacent to the Don Edwards National Wildlife Refuge, some of the bufferlands already support wildlife. Habitat can be restored or enhanced for greater abundance, benefiting species while also providing enjoyment and educational enrichment for visitors. Ideas to encourage a vibrant, healthy local ecosystem include:

- Consider the whole watershed (upstream activities and effects) in design approach
- Include the flood protection benefits of restored marshlands and creeks
- Plan for habitat restoration at higher elevations to account for sea level rise
- Build smart ecostructures (operational structures that account for ecological dynamics)

Concept of integrated uses, watercourse, and habitat restoration in Shanghai

WHO USES THE PLANT

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2. Santa Clara, co-owner
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CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

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Master Plan Approach

PLANNING PRINCIPLES

The Plant Master Plan will chart a course for the next 30 years that continues the Plant's success in protecting public health and the environment and in supporting the region's economy. The intent is to achieve the four master plan goals (below) in coordination with other key planning efforts, such as the South Bay Salt Pond Restoraton Project, the Watershed Management Initiative, the City of San José's Envision 2040 General Plan, and the City of San José's Green Vision — including initiatives pertaining to energy, water recycling, and zero waste.

PLANT MASTER PLAN GOALS

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

Plant Master Plan

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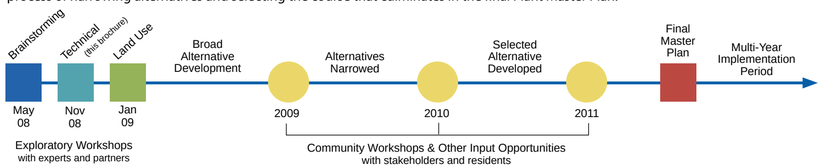
NEXT STEPS

The Plant Master Plan involves a three-year process that begins with a series of exploratory workshops that lead to development of a set of alternatives for the Plant and site. The public will be engaged through community meetings and other ways to give input for the process of narrowing alternatives and selecting the course that culminates in the final Plant Master Plan.



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THE PLANT'S 24/7 JOB IS TO MANAGE WASTEWATER. Every day it sends about 100 million gallons of treated effluent into the Bay and recycles another 10 million gallons. Every year roughly 45,000 tons of dried biosolids are "harvested" from an 800-acre drying area; this gets used as a daily cover at the adjacent landfill. Enough methane is captured in the treatment process and landfill to power about two-thirds of the Plant's energy needs. Can this process be improved to … ■ *Use less land?* ■ *Extract more energy from waste and produce less carbon?* ■ *Become more cost-effective?* ■ *Contribute to the overall sustainability of Silicon Valley?* To answer such questions, a panel of renowned wastewater experts convened with local officials to …

Explore Technologies & Approaches

SUMMARY

Plant Master Plan Technology Workshop

November 13-14, 2008

The second of three workshops with experts to lay a foundation for developing Master Plan alternatives for public review

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT

Plant Master Plan

THE TECHNICAL ADVISORY GROUP . . .

The eight-member Technical Advisory Group (TAG) toured the Plant property with staff from the City of San José and the Carollo consulting team. From left to right are: Jon Newby (City, Plant staff), Glen Daigger (TAG), Alex Ekster (City, Senior Engineer), B. Narayanan (Carollo team), Bhavani Yerrapotu (City, Technical Services Manager), Dale Ihrke (City, Plant Manager), Cecil Lue-Hing (TAG), Perry Schafer (Carollo team) David Jenkins (TAG), George Tchobanoglous (TAG), John Stufflebean (City, Environmental Services Director), Bruce Wolfe (TAG), Walter Niessen (TAG), and John Rosenblum (TAG). Not pictured: Bob Gearheart (TAG) and David Jenkins (TAG).

Technical Advisory Group (TAG) Members ~ Areas of Expertise

George Tchobanoglous, Ph.D., P.E., NAE (TAG Chair) — Professor Emeritus, UC-Davis.
George holds many honors for his contributions to the wastewater management field, and he consults around the world.

David Jenkins, Ph.D., NAE (TAG Vice Chair) — Professor Emeritus, UC-Berkeley.
Much of David's honor-laden research has focused on sludge treatment; he is often tapped for troubleshooting process problems at treatment facilities.

Bob Gearheart, Ph.D. — Professor Emeritus, Humboldt State University.
Bob is an expert on constructed wetlands used for wastewater treatment; among many projects, he helped design the City of Arcata's wetland treatment system.

Bruce Wolfe, P.E. — Executive Officer, San Francisco Bay Regional Water Quality Control Board.
Bruce is an expert on the programs and regulations that work to protect the quality of Bay waters.

Cecil Lue-Hing, D.Sc, P.E., DEE, NAE — Principal, Cecil Lue-Hing & Associates, Inc.
Cecil is nationally recognized for his expertise in biosolids management.

Glen Daigger, Ph.D., P.E., BCEE, NAE — Senior Vice President and Chief Technology Officer, CH2M HILL. Glen is widely recognized as an expert in biological treatment processes.

John Rosenblum, Ph.D., P.E., BCEE, NAE — Principal, Rosenblum Environmental Engineering.
John's expertise is evaluating energy efficiency as it relates to water use and wastewater treatment.

Walter Niessen, P.E., BCEE — President, Niessen Consultants and Senior Consultant, CDM, Inc.
Walter is an honor-winning expert on applied thermal processes in waste management.

The 2-Day Workshop

On Day One (November 13, 2008), TAG toured the Plant for a first-hand look at its facilities and operations; they also were supplied with the Plant's operational data. On Day Two, the group discussed their ideas with an audience that included the Plant's operation managers and staff from the Plant's tributary agencies.

"The value of what your Plant accomplishes — protecting public health and the environment — is well beyond the costs anticipated in rebuilding the Plant. By focusing on a mix of new technologies, process improvements, upstream considerations, and site enhancements, your Plant will evolve into a cutting edge, world-class facility." ~ George Tchobanoglous, TAG Chair

Pond A18

Don Edwards National Wildlife Refuge

Discharge channel

"The site has outstanding beauty ... to the exent possible, the [land] should be returned to its natural state."
~ TAG Summary Report

A palette of options...

The Technical Advisory Group discussed the Plant's operations and future within four key areas:

Managing Wastewater Upstream

Managing wastewater closer to its source is necessary for a sustainable urban water system, resulting in both resource and cost savings. The Master Plan should consider the role of the Plant and its site in the regional watershed. The panel pointed to:

- *Using less water.* Conservation is the key to stabilizing the drinking water supply, reducing energy use and treatment costs, and reducing effluent into the Bay. California's trend of promoting water-saving devices (low-flow toilets, flow-regulating showerheads, etc.) needs to continue and expand—with, for example, the promotion and institution of dual-plumbed buildings that can accomodate use of recycled water for flushing toilets.
- *Consider satellite systems.* Some large cities, such as Los Angeles, have built upstream satellite treatment plants to reduce pumping costs and operational demands at the downstream "mother" plant. Our Plant has relatively low pumping costs and adequate capacity, but small satellite facilities could have merit for cost-effective delivery of recycled water. Satellite facilities could be built to treat liquid only and, with little conveyance costs, return high quality recycled water into irrigation systems and dual-plumbed buildings—making it an option worth investigating.


Modern architectural design as applied to Munich's digesters


Greenhouse system used in Miltenberg, Germany.

The Future of Liquid Treatment

Handling 110 million gallons of wastewater daily is a lot. The panel pointed to options that could improve liquid treatment:

- *Upfront screening.* Currently only objects larger than 5/8-inch are screened out of incoming wastewater. A finer screening system installed at the Plant's headworks could improve the entire process chain: The activated sludge (the microbial mix that "digests" organics) would work better; sludge solids would dry faster; and less energy would be used. The final biosolids product would also have greater marketability with the elimination of trash components, such as bits of plastic.
- *UV disinfection.* The Plant is already piloting studies with ultraviolet (UV) radiation, which is safer than chlorine to work with and as effective at destroying pathogens. UV treatment would also avoid the generation of undesireable chlorine byproducts.
- *Rehabilitate primary tanks.* The panel recognized and supported the need to rehabilitate the 24 primary tanks (each with a half million gallon capacity) that have been subject to the corrosive influence of raw sewage for fifty years. Fixing these tanks may also reduce odors.

For more information on TAG's recommendations, their workshop report can be found at:
www.sanjoseca.gov/esd/plantmasterplan

The Future of Solids Treatment

At our Plant, the solids that are separated from wastewater are sent through large digester tanks that produce a thick sludge. This sludge is transferred to an 800-acre area where it first stabilizes for three years in lagoons, and then is spread to dry over the course of one more year. While the operation is low-cost, there is a question of whether this land could be used for greater benefit to the environment and community. Open-air drying also has the potential to create odors at downwind properties. And, dirt unavoidably mixes with the sludge to result in roughly 45,000 tons annually (about 35% dirt) of a material that needs reuse or diposal. Currently, the dried solids get used as daily cover at the adjacent landfill, which will likely close in 12-15 years. For the future management of solids, the panel recommended utilizing a combination of these options:

- *Rebuild Digesters.* Continuing the use of anaerobic digester tanks is appropriate for the future, but they need rebuilding and can incorporate process adjustments that will deliver greater energy capture.
- *Greenhouses.* Some treatment plants have built greenhouses to solar dry their sludge while enclosing odors. At our Plant, greenhouses could reduce the drying area footprint to under 100 acres.
- *Thermal options.* Some treatment plants use heat to treat their sludge. These systems also have small footprints and enclose odors. The end product of some thermal treatment systems is inert sand, which can be used in concrete and masonry products.

More Energy, Less Carbon

Our Plant uses a significant amount of energy, mostly for pumping wastewater through the facility and for injecting air into secondary treatment tanks to provide aerobic bacteria with oxygen. The Plant produces a large amount of the energy it needs from the very waste it is treating — the separated biosolids produce methane gas as they break down in the digester tanks. It's possible to enhance this methane production and meet all of the Plant's energy needs — perhaps even enabling the Plant to become an energy supplier. There are also improvements that would reduce the Plant's carbon production. Altogether, these include:

- *Adding grease and food waste.* The Plant is already piloting a Fats-Oils-Grease (FOG) program with the dual goals of keeping sewers unclogged while tapping the energy value of FOG content. Grease and food waste could be combined with solids in thermal processing systems for high energy production. This latter idea links with San José's zero waste goals and is currently under study.
- *Algae cultivation.* The powerful filtration capacity of algae makes it an ally for cleaning wastewater and sequestering carbon. If grown in Pond A18 or the lagoons, it could potentially sequester all of the Plant's carbon emissions and also produce biofuels.
- *Carbon market revenue.* If the Plant becomes carbon neutral, it could develop revenue by selling its carbon credits to companies that are challenged to meet their carbon emission caps. This could contribute to keeping down ratepayer fees.

Making Technology Decisions

How do we wisely rebuild the Plant? TAG is helping our team develop a decision framework that includes:

➢ **Plan for increased pollutant and biosolids concentration.** Population forecasts for Silicon Valley point to significant growth, but panelists predicted that — due to ramped-up water conservation — the liquid flow to the Plant might acutally decrease in the future, resulting in higher concentrations of pollutants and biosolids. This is a key factor to address as high concentrations of pollutants/biosolids present significant challenges to the sewer system and treatment plant processes.

➢ **Research byproduct markets.** "Disposal" gives way to "reuse" when markets can be realized for the byproducts of processed waste. For example, there is a market for phosphorous, which can be extracted from the liquid stream. Considering uses for byproducts can help determine the Plant's optimal treatment path.

➢ **Prepare for stricter regulations.** TAG includes a regulatory expert to help our team determine issues that could affect the Plant's future permit requirements for effluent. PCBs, selenium, fire retardants, and trace organics and nutrients could be included in future regulations.

➢ **Consider sea level rise.** Sequestration of carbon could also become a policy or regulatory driver as governments work to stem the trend of climate change and related sea level rise. The impact of sea level rise on the Plant itself must be considered, as it could require raising levees and installing pumps for discharge into the Bay.

➢ **Test drive.** The pursuit of sustainable processes is a path to be traveled and tested. Prior to major investment, undertaking pilot tests of new processes enables the fine-tuning or hybridization that delivers successful outcomes.

Visited more regularly by ducks than people, a unique place exists at the 2,600-acre property of the San Jose/Santa Clara Water Pollution Control Plant. Here, urbanization gives way to the natural ecosystem — from the bustling Highway 237 corridor at the property's southern edge to the low rumble of the wastewater facility at its center to the quiet Bay wetlands that demark the property's northern edge. Expansive bufferlands around the wastewater facility have long served to reduce the impacts of odors and hazards on nearby communities. But new technologies could improve odor control, remove hazards, and reduce the acreage needed for operations. This opens up new possibilities for the Plant lands.
The Plant Master Plan is examining new technologies for the Plant's future and also brings together experts, decision-makers, and the public to …

Consider New Land Uses

SUMMARY

Plant Master Plan Land Use Workshop

January 30, 2009

The third of three workshops with experts to lay a foundation for developing Master Plan alternatives for public review

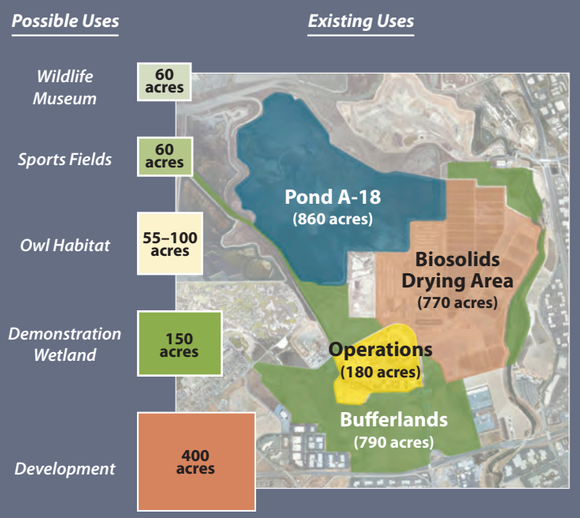
SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT

Plant Master Plan

The Land Use Workshop: Who Attended and What They Did

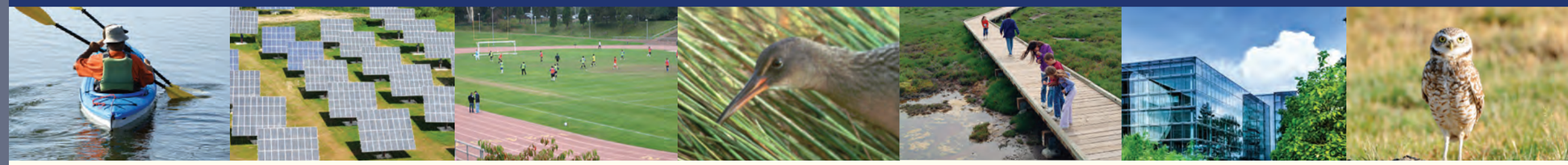
Land use experts from the planning and design firms Skidmore, Owings & Merrill (SOM) and Hargreaves Associates led the Plant Master Plan team and about 50 representatives from the cities and sanitary districts of the Plant service area in an exploration of potential uses of the Plant's bufferlands. This brochure summarizes these group discussions.

The Plant's 2,600-acre site



The above possible uses are scaled examples and only serve to show how a mix of uses could fit on the site. Other complementary uses include algae farming, solar energy, a resource recovery facility, regional composting, a living museum, and water recreation. The public input process may identify other desired uses.

A Balance of Land Uses



"Your community is fortunate: This large site means the decision here is not wrestling with "which use" but rather "where and how" to best integrate a variety of land uses." *Ellen Lou, Director of Urban Planning, Skidmore, Owings & Merrill*

Below are suggested land use considerations that came out of the workshop, organized by the framework of the Plant Master Plan's four goals. Workshop participants discussed geographical conditions of the Plant site, including topography, stream and drainage corridors, wind and sun directions, and the potential impact of sea level rise — all of which are factors that can influence land use decisions.

operational

Operational land uses that result in a reliable Plant that can flexibly respond to changing conditions

Any lands needed for the Plant's operational future must be reserved for such use. However, new approaches to solids management could significantly reduce the amount of land used for drying sludge – from the current 770 acres to perhaps as little as 100 acres. Switching to new methods could have higher costs and take more than a decade to implement, but participants agreed that opening up the land to new economical, environmental, and social uses would provide worthwhile benefits to the region.

Another operational objective is for the Plant to generate enough energy to fully meet its own needs, and perhaps beyond that, to supply energy to the community. This could mean using land for solar installations or facilities that would extract energy from food waste. This latter concept is already under study. These kinds of uses would help achieve environmental goals such as reducing carbon emissions and the amount of waste sent to landfills.

economical

Economical land uses that generate revenue and minimize costs to Plant customers

Land uses that generate jobs and revenue can provide economic benefits to the Plant and its tributary agencies and their customers. Participants agreed that the land use scenarios developed for public consideration should include a clear economic analysis and how revenues could support the Plant Master Plan goals.

One idea is to attract businesses complementary to a clean technology park, along with entities focused on corporate or academic research. Buildings could be designed for maximum sustainability and use the Plant's treatment byproducts (such as recycled water and energy). Any proposed developments should complement the site's neighbors including the communities of Alviso and Milpitas, high tech campuses, McCarthy Ranch, and other properties.

Some participants suggested also exploring revenue potential from wetlands banking and increased recycled water sales.

environmental

Environmental land uses that improve habitat and minimize impacts

Lying in the Pacific flyway, some of the Plant lands are ideal for preserving or restoring wildlife habitat, specifically near the existing wetlands, native grasslands, and along Coyote Creek. The site is already identified as having an important role in providing a home for the Western Burrowing Owl, a California species of special concern.

The Plant's clean effluent is an ample source of nonpotable water that can be diverted to enhance existing or create new waterways, helping to meet environmental or recreational goals. Workshop leaders presented a variety of waterway concepts that showed how a delta in the South Bay could be reestablished.

social

Social land uses that improve aesthetics and offer recreational/educational amenities

Participants agreed that aesthetics — how the Plant looks and how it controls odors — are important to being a good neighbor and to accommodating future land uses. If the final master plan brings more visitors into the area, then the aging facility should be rebuilt with architectural features that convey its importance as a world-class treatment plant. Some parts of the Plant, however, might also require screening from public view.

Participants acknowledged that recreational and educational opportunities abound at the site. It is already part of the Bay Trail project, but additional trails could give even closer access to the Bay. New recreational elements could include kayaking, fishing, and sports fields. New educational elements could include a natural living museum or education center that showcases the fascinating South Bay ecosystem and/or future energy technologies. Transportation, access, parking, construction costs, and long-term maintenance costs must be considered in the economic feasibility analysis of recreational amenities.

All feedback will be considered when developing the Plant Master Plan alternatives. Ways to give input and related input summaries can be found at the project Web site:

www.sanjoseca.gov/esd/plantmasterplan

WHO USES THE PLANT

The cities of San José and Santa Clara co-own the Plant. Either directly or through sanitation districts, six other cities contract for the Plant's services. These cities and districts collectively fund Plant operations and include:

1. San José, co-owner
2. Santa Clara, co-owner
3. Milpitas
4. Cupertino/Cupertino Sanitary District
5. Los Gatos/West Valley Sanitation District
6. Monte Sereno/West Valley Sanitation District
7. Campbell/West Valley Sanitation District
8. Saratoga/West Valley Sanitation District
9. County Sanitation District No. 2-3 (unincorporated)
10. Burbank Sanitary District (unincorporated)

PROJECT MANAGEMENT AND CONTACTS

City of San José Environmental Services Department operates the Plant and is overseeing the Plant Master Plan. For more information, contact:

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San José, CA 95134

www.sanjoseca.gov/esd/plantmasterplan

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

SAN JOSE/SANTA CLARA WATER POLLUTION CONTROL PLANT
700 Los Esteros Road, San José, CA 95134

Master Plan Approach

Planning Principles

The Plant Master Plan will chart a course for the next 30 years that continues the Plant's success in protecting public health and the environment and in supporting the region's economy. The intent is to achieve the four master plan goals (below) in coordination with other key planning efforts, such as the South Bay Salt Pond Restoration Project, the Watershed Management Initiative, the City of San José's Envision 2040 General Plan, and the City of San José's Green Vision — including initiatives pertaining to energy, water recycling, and zero waste.

Plant Master Plan Goals

- Operational — Result in a reliable, flexible Plant that can respond to regulations and changing conditions.
- Economical — Develop cost effective technical and land use options to benefit customers.
- Environmental — Improve habitat and minimize impacts to the local and global environment.
- Social — Maximize community benefits through improved aesthetics and recreational uses.

Plant Master Plan

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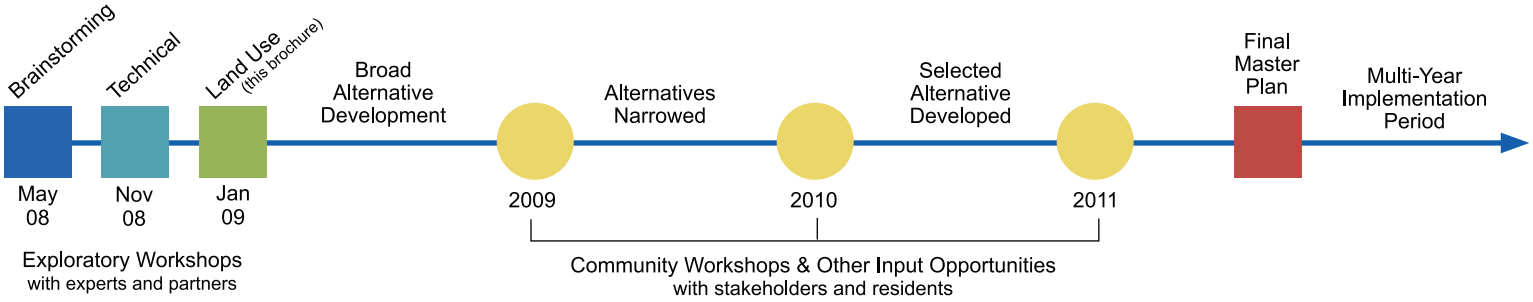
NEXT STEPS

The Plant Master Plan involves a three-year process that begins with a series of exploratory workshops that lead to development of a set of alternatives for the Plant and site. The public will be engaged through community meetings and other ways to give input for the process of narrowing alternatives and selecting the course that culminates in the final Plant Master Plan.



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