City of San José

San José/Santa Clara Water Pollution
Control Plant Master Plan

TASK NO. 5
PROJECT MEMORANDUM NO. 8
SITE OPPORTUNITIES, CONSTRAINTS, AND CONSIDERATIONS

DRAFT
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CITY OF SAN JOSÉ

SAN JOSÉ/SANTA CLARA WATER POLLUTION
CONTROL PLANT MASTER PLAN

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SITE OPPORTUNITIES, CONSTRAINTS, AND CONSIDERATIONS

1.0 INTRODUCTION

The San José /Santa Clara Water Pollution Control Plant (WPCP) site is rich with opportunities. With an area of over 2,600 acres, a land parcel of this size located in an urban area is unusual and offers extraordinary opportunities for the WPCP. Opportunities to rehabilitate existing habitat and create new ecologies, or to utilize the resources associated with the operation of the wastewater facility, are great. All the essential pieces for creating a world-class center for ecological rehabilitation, education, recreation, solid waste processing and energy production, business, and/or research ventures are present onsite: abundant water, nutrients, undeveloped land, and energy potential.

The purpose of this project memorandum (PM) is to provide an overview of the opportunities, constraints, and other considerations relevant to the future use and development of the WPCP site. The information contained in this PM will provide important background information that supports subsequent land use planning efforts conducted as part of the ongoing San José /Santa Clara Water Pollution Control Plant Master Plan (Master Plan), including a Land Use Workshop and the establishment of Conceptual Site Development Alternatives which will be described in PM 5.9. The land use and development opportunities outlined by this PM build on the concepts previously explored during the Brainstorming Workshop held on May 29 through 30, 2008. This workshop explored a range of conceptual planning alternatives for the future "highest and best use" of WPCP lands. Participants included City of San José (City) staff from nine departments, representatives from tributary agencies, sustainability "thought leaders," and leading urban developers, architects, engineers, and scientists.

Site opportunities described in this PM are also aligned with the intent and scope of the Master Plan goals, which are described in PM 1.1. Additional sources of background data used in this PM include the following:

- PM 5.7 Description and Delineation of Existing Site Conditions (PM 5.7).
- WPCP site visit by the planning team held on July 31, 2008.
- San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates.

- San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Pond A18 Existing Conditions and Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates.

As identified in Figure 1, the WPCP is located at the southern shore of San Francisco Bay. Coyote Creek is located to the east of the WPCP, the Alviso neighborhood is located to the west, and State Route 237 is located to the south.

2.0 PLANNING POLICY CONTEXT

It is intended that the Master Plan provide a vision for the long-term development of WPCP lands that is consistent and compatible with policies established by the City and other relevant regulatory agencies. Therefore, the process of identifying opportunities and constraints for the WPCP needs to be understood within the context of San José's broader planning policies. The various planning policies described in the following section of this PM are particularly relevant to potential future physical development and other uses of the WPCP site.

2.1 San José General Plan 2020 and Envision San José 2040 General Plan Update

The San José 2020 General Plan (General Plan) is the City's official policy regarding the future character and quality of development. The General Plan describes the amount, type and phasing of development needed to achieve the City's social, economic, and environmental goals.

The current General Plan specifically addresses the WPCP with reference to service level goals and policies for urban services that are provided by the City. The WPCP is identified by the General Plan as the sole wastewater treatment facility in San José and as a facility that serves other tributary agencies located within the Santa Clara Valley. The General Plan therefore defines the role of the City as follows: "monitor and regulate growth so that the cumulative sewage treatment demand of all development can be accommodated by San José's share of the treatment capacity of the San José/Santa Clara Water Pollution Control Plant" (City of San José, 1996).

WPCP lands currently have a land use designation of "Public/Quasi Public." This category is used to designate a wide range of public land uses, including water treatment facilities. According to the General Plan, development intensities within this designation should generally be no greater than a Floor Area Ratio of 1.5. Only existing uses and ownerships and future uses for which substantial planning has been completed are designated Public/Quasi-Public. New Public/Quasi-Public uses may be established according to the Discretionary Alternate Use Policies.

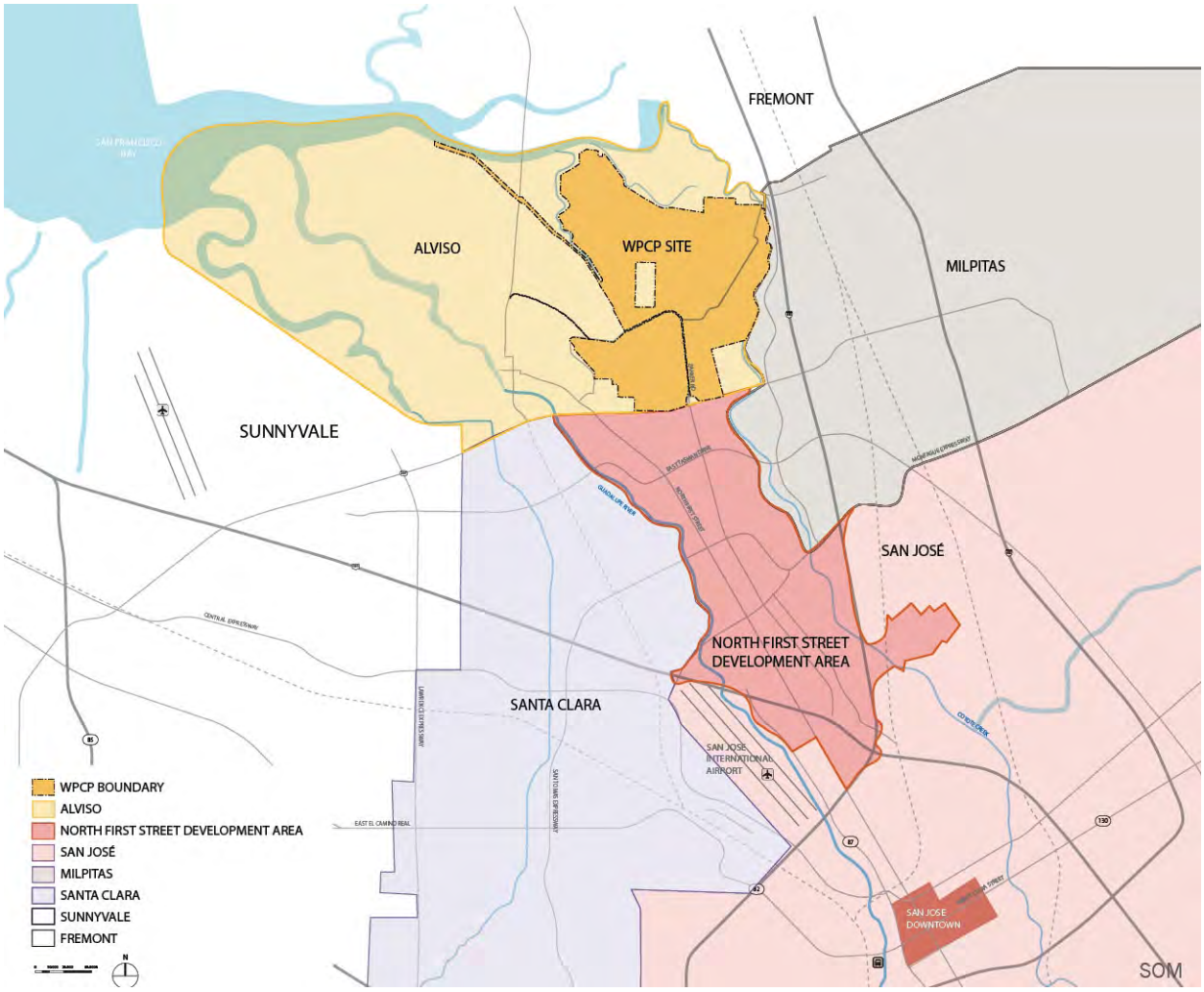

Figure 1
WPCP LOCATION CONTEXT
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Salt Pond A18, which was acquired by the WPCP in 2005, is designated as Private Open Space. This category designates privately-owned lands used for low intensity, open space activity primarily within the Urban Service Area. This designation is usually applied to existing uses but can be applied to other lands when their proposed use conforms to this category. Appropriate uses in this category include cemeteries, salt ponds, land that is restricted to agricultural use, and private buffer lands, such as riparian set back areas.

In June of 2007, the City Council initiated the Envision San José 2040 General Plan Update (General Plan Update) process. The General Plan Update involves the analysis of existing conditions and future projections, the development of an overall vision for San José's future, the development of a preferred alterative for the future growth of the City, and the reviewing and refining all General Plan goals and policies. General Plan and General Plan Update policies and guiding principles are outlined in PM 1.2. This review provides an important opportunity to update the General Plan and to designate WPCP lands appropriately based on the Master Plan vision and goals. The new designation or designations would reflect current WPCP operational needs and potential future developments of vacant land, and the provision of land for recreational, habitat protection, or other public uses.

2.2 Alviso Master Plan

The Alviso Master Plan is the principal document governing long-term growth and development within the Alviso planning area. The Alviso Master Plan is incorporated into the San José 2020 General Plan as the Alviso Planned Community. The General Plan contains the major features of the Alviso Master Plan, including a brief description of the overall intent, permitted land uses, and major policies. The Alviso planning area includes all properties within the City north of State Route 237, between Coyote Creek and Guadalupe River, and it encompasses the entire WPCP lands. The entire planning area is roughly 10,730 acres. The Alviso village, a subset of the planning area, includes both core residential and commercial uses. The village is located approximately 0.5 miles from the western boundary of the WPCP Operational Area.

The primary intent of the Alviso Master Plan is to guide the enhancement and beautification of the community while retaining its "small town character." The Alviso Master Plan promotes protection of existing neighborhood character while allowing new housing on an infill basis.

The Alviso Master Plan provides ten principles for determining appropriate land uses in the Alviso planning area. The only principle with direct reference to the WPCP states the following: "… undeveloped lands that are part of the Water Pollution Control Plant buffer lands should contain Plant-related, public land uses which effectively separate Plant activities from private, urban uses" (San José, 1998).

The Alviso Master Plan provides ten principles for determining appropriate land uses in the Alviso planning area. The only principle with direct reference to the WPCP states the following: "… undeveloped lands that are part of the Water Pollution Control Plant buffer lands should contain Plant-related, public land uses which effectively separate Plant activities from private, urban uses". Amendment of the Alviso Master Plan may be necessary to more appropriately recognize the opportunity for a range of land uses and developments on WPCP lands which are not entirely WPCP-related or public.

2.3 North San José Area Development Policy

The vision of the North San José Development Policy is to create a mixed use "Innovation District" that emphasizes new employment and up to 27 million square feet of new Research and Development (R&D) and Office uses with 600 acres focused in an Urban Corporate Core located along the North First Street Light Rail Corridor. The policy also provides the opportunity for up to 32,000 new high density dwelling units, encouraging a mixed use configuration with housing above new employment, retail and other uses. This policy also incorporates other important supporting uses such as parks, commercial services, and schools to support the new community.

The North San José "Innovation District" currently includes approximately 42 million square feet of R&D and office space, 6,675 housing units, 3,000 hotel rooms, and the San José Mineta International Airport. The northern boundary of the "Innovation District" is State Route 237, which is the southern boundary of WPCP lands.

Even though WPCP lands are located outside of the policy area boundary, the WPCP site may provide opportunities for alternative land uses that are compatible with the goals of the North San José Area Development Policy. These uses may include commercial, light industrial, open space, or community facilities.

2.4 City Council Policy on Use of San José/Santa Clara Water Pollution Control Plant Lands

The San José City Council approved the "City Council Policy on Use of San José /Santa Clara Water Pollution Control Plant Lands" (Policy) in November 2000. The purpose of this Policy is to guide land use decisions on WPCP lands. Even though this Policy is a foundational document for the current WPCP master planning process, it will be replaced by the plans and policy direction established by the Master Plan.

According to the Policy, WPCP lands "must be effective in buffering Plant operations from adjacent land uses" (City of San José, 2000). Buffer lands, currently comprising approximately 253 acres, are defined in the Policy as "lands needed to buffer adjacent land uses from odors and potential safety hazards" (City of San José, 2000). Buffer lands are the undeveloped areas of the WPCP lands and "non current facilities" which include the Residual Solids Management (RSM) Area – 750 acres, Recycled Water Transmission

Pump Station – 4 acres, Burrowing Owl Relocation Site – 45 acres, Santa Clara Valley Water District (SCVWD) flood control easement – 140 acres, and the Municipal Water System Water Tank – 4 acres.

The following policies apply to buffer lands as defined by the Policy.

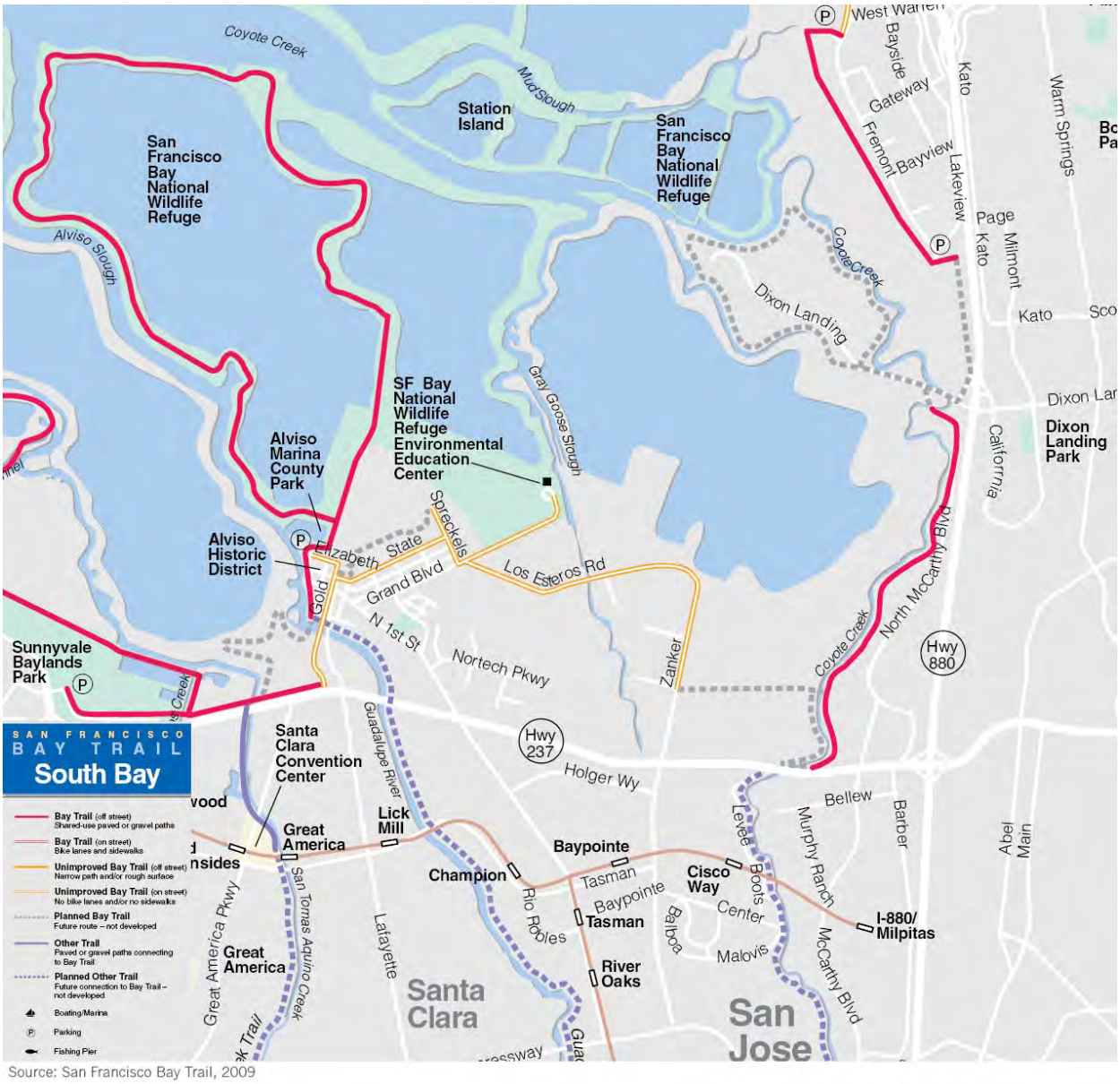
- Buffer land uses must ensure sufficient buffer for odors and potential toxic releases.
- Buffer land uses must support National Pollutant Discharge Elimination System (NPDES) permit compliance and not constrain the WPCP's flexibility to respond to unknown future requirements.
- Buffer land uses must protect existing biological resources.
- Buffer land uses should provide environmental benefit.
- Buffer land uses should ensure public support for WPCP land uses consistent with WPCP operations.
- Buffer land uses must be compatible and consistent with the City's General Plan and the Alviso Master Plan.
- Buffer Land uses that provide "Dual Use" benefits may be considered.

2.5 San José Bay Trail Master Plan

The San José Bay Trail Master Plan (Bay Trail Master Plan) is a specific trail plan for the City's segment of the San Francisco Bay Trail (Bay Trail) project that will be a continuous trail around the perimeter of the San Francisco and San Pablo Bays. The Bay Trail Master Plan was approved in 1989. The Bay Trail Master Plan Map is shown in Figure 2. It proposes a trail alignment and policies to guide the selection of specific, local Bay Trail routes and strategies for implementing the system.

In 1990, the City conducted a study that explored specific Bay Trail alignment options between Dixon Landing Road at the Santa Clara/Alameda County line and the Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center. Since then, staff at the Association of Bay Area Governments (ABAG), Santa Clara County and the City have worked together to try and secure opportunities for a Bay Trail alignment through San José. As a result, small segments of the Bay Trail have been built at both ends of its alignment through the City.

Work on the City's Bay Trail Master Plan began in 1990. The purpose of this plan is to expand and build on the San Francisco Bay Trail Master Plan and further refine a preferred and viable alignment through the City.



Source: San Francisco Bay Trail, 2009

Figure 2
BAY TRAIL MASTER PLAN MAP
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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The City's portion of the Bay Trail will connect to completed portions of the Bay Trail in Santa Clara and Fremont. The Bay Trail could connect through the WPCP and offer users the opportunity to enjoy and learn about both local and region's natural, recreational, historic and cultural resources. Trail users will also have a rare opportunity to learn about flood control, creek hydrodynamics, solid waste and water recycling, treatment plant operations, as well as view wetland habitat and wildlife.

2.6 South Bay Salt Pond Restoration Project

One of the key Master Plan goals relevant to habitat protection and restoration related to former Salt Pond A18 and other on-site habitat, as defined by the Steering Committee from the City and the Tributary Agencies is to encourage environmentally positive outcomes consistent with the South Bay Salt Pond restoration effort that will increase wildlife habitat, reduce flood risk, and conserve energy (City of San José, 2007).

On March 16, 2003, the State of California and the US Fish and Wildlife Service (USFWS) acquired 15,100 acres of commercial salt ponds from Cargill in South San Francisco Bay. The purpose of the acquisition was to protect, restore, and enhance the property for fish and wildlife, as well as to provide opportunities for wildlife-oriented recreation and education.

The State of California and the federal government have embarked on the implementation of a restoration plan for the former commercial salt ponds. The South Bay Salt Pond (SBSP) Restoration Project will use a combination of restored tidal marshes, managed ponds, flood control measures and public access features to meet the three goals of the plan: to restore wildlife habitat, provide flood protection, and provide wildlife-oriented public access. The ponds are located at the Don Edwards San Francisco Bay National Wildlife Refuge and at the Eden Landing State Ecological Reserve.

Specific objectives of the SBSP Restoration Project include the following:

- Create, restore, or enhance habitats of sufficient size, function, and appropriate structure to:
    - Promote restoration of native special-status plants and animals that depend on South Francisco Bay habitat for all or part of their life cycles.
    - Maintain current migratory bird species that utilize existing salt ponds and associated structures such as levees.
    - Support increased abundance and diversity of native species in various South San Francisco Bay aquatic and terrestrial ecosystem components, including plants, invertebrates, fish, mammals, birds, reptiles and amphibians.
- Maintain or improve existing levels of flood protection in the South San Francisco Bay area.

- Provide public access and recreational opportunities compatible with wildlife and habitat goals.
- Protect or improve existing levels of water and sediment quality in the South San Francisco Bay, and take into account ecological risks caused by restoration.
- Implement design and management measures to maintain or improve current levels of vector management, control predation on special status species, and manage the spread of nonnative invasive species.
- Protect the services provided by existing infrastructure (e.g., power lines, railroads).

The Final Environmental Impact Statement/Report (FEIS/R) was completed in December 2007. This FEIS/R is intended to provide the public and responsible and trustee agencies with information about the potential environmental effects of the SBSP Restoration Project. It will be used by the lead agencies when considering approval of the SBSP Restoration Project.

The FEIS/R includes program-level evaluation of the SBSP long-term alternative restoration plans as well as project-level analysis of the first phase of restoration (Phase 1 actions). The decision by the USFWS to approve SBSP Restoration Project is yet to be issued.

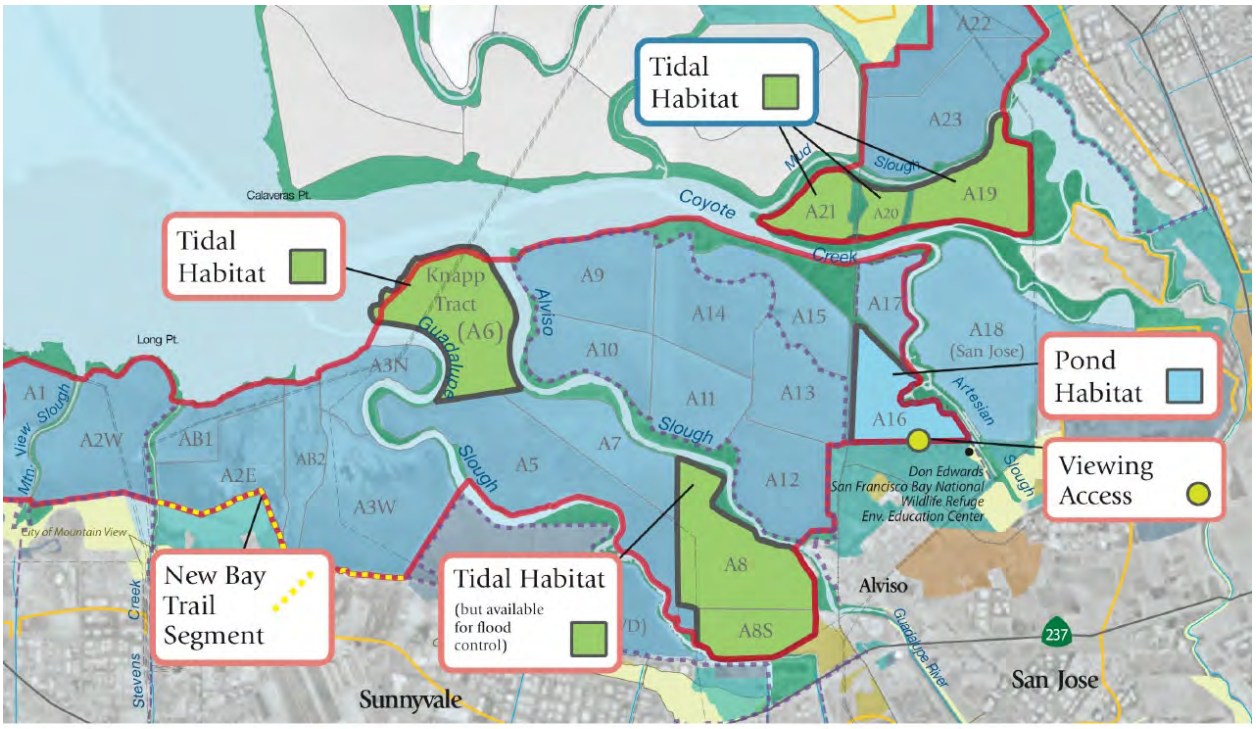
An Initial Stewardship Plan (ISP) is now in operation to maintain and enhance the biological and physical conditions within the SBSP area in the interim period between the cessation of salt production and the implementation of the long-term restoration plan that will emerge from the SBSP Restoration Project planning process. The ISP area includes the Baumberg, Alviso (partial), and West Bay pond complexes, but excludes Salt Ponds A18, A4, and other WPCP lands. Figure 3 identifies the SBSP Restoration Project Initial Restoration Actions located in close proximity to the WPCP.

2.7 Green Vision Goals

The City of San José City Council adopted the City of San José Green Vision (Green Vision) on October 30, 2007. The Green Vision goals are generally intended to serve as a roadmap to enable San José to be the world leader in environmental technology and protection. The goals are listed below as described during the Brainstorming Workshop, along with how the WPCP links to them.

Within 15 years, the City will:

- Reduce per capita energy use by 50 percent. The WPCP is the largest energy user in the City; it is challenged to reduce energy use by 50 percent.
- Use 100 percent clean renewable energy. WPCP currently uses 70 percent renewable energy and goal is 100 percent.



Initial Restoration Actions
South Bay Salt Pond Restoration Project—Alviso Area
2006 - 07
proposed 2008

Source: South Bay Salt Pond Restoration Project, 2009

Figure 3
SBSP RESTORATION PROJECT
INITIAL RESTORATION ACTIONS
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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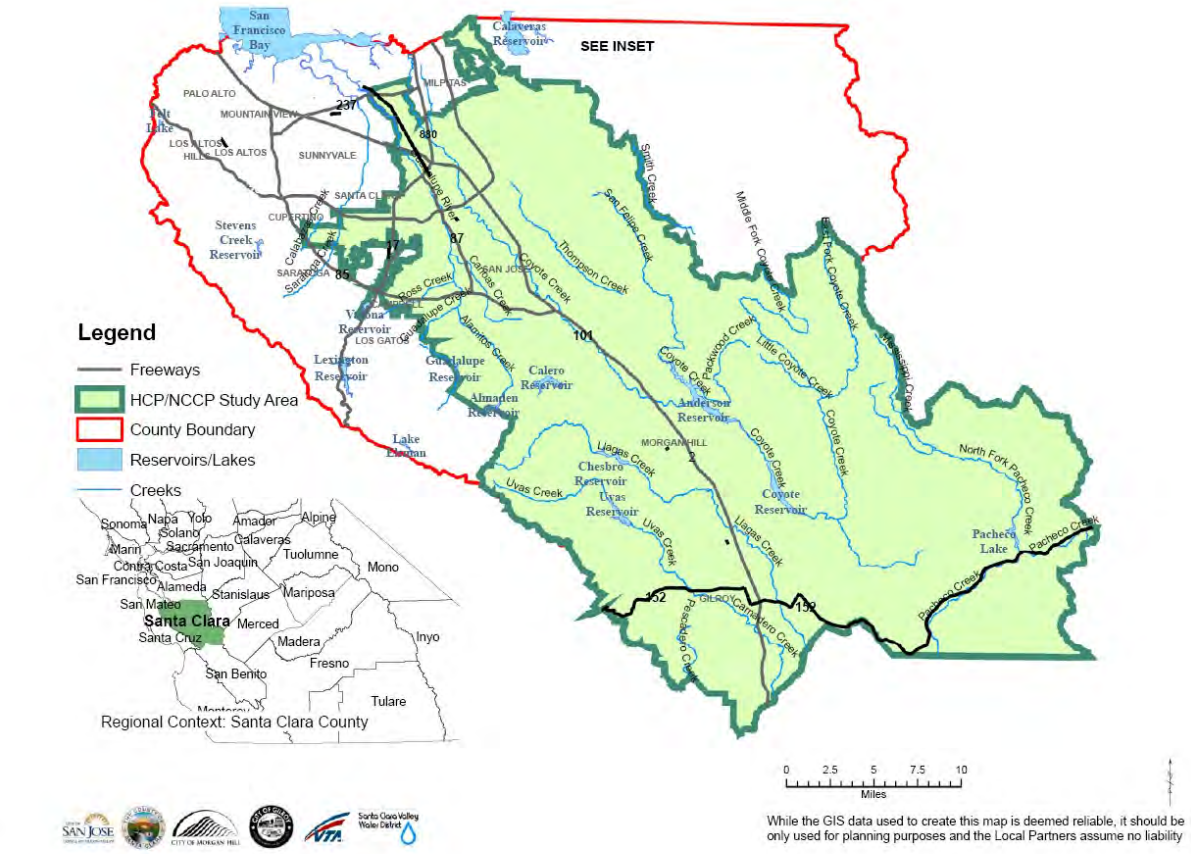
- Recycle or beneficially reuse 100% of wastewater (100 million gallons per day). Currently recycle 10%; WPCP goal is to recycle 50% or more.
- Divert 100% of waste from landfill. The WPCP can contribute to this goal through waste to energy and food waste digestion projects; WPCP lands are one of the last large industrial plots that can be used to site waste processing facilities.
- Create 100 miles of interconnected trails; there are a variety of opportunities for trails around the WPCP.
- Create 25,000 clean technology jobs as the World Center of Clean Technology Innovation. WPCP lands have frontage along State Route 237 allowing a high degree of visibility to clean technology business and activities.
- Plant 100,000 trees. The WPCP presents an opportunity to participate in meeting this goal.
- Use alternative fuels in 100% of public fleet vehicles. WPCP may be able to produce biodiesel for fleet.
- Build or retrofit 50 million square feet of green buildings; the City of San José's Environmental Services Department (ESD) is rebuilding their headquarters as a green building.

2.8 Santa Clara Valley Habitat Plan

In response to continued demand for urban development and growth, the County of Santa Clara, Santa Clara Valley Transportation Authority, SCVWD, and the cities of Gilroy, Morgan Hill, and San José initiated a process to prepare and implement a joint Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) to promote the recovery of endangered species while accommodating planned development and infrastructure. The HCP/NCCP will provide a framework for the protection of natural resources while streamlining and improving the environmental permitting process for both private and public development including activities such as road, water, and other infrastructure construction and maintenance work. It will create a number of new habitat reserves that will be larger in scale and more ecologically valuable than the fragmented, piecemeal habitats currently yielded by mitigating projects on an individual basis.

The HCP/NCCP is studying approximately 62% of the land area of Santa Clara County, or approximately 520,000 acres. As shown in Figure 4, the study area lies primarily within southern Santa Clara County and includes all of the City of San José except for Bayland areas. Project maps prepared for the HCP/NCCP identify that WPCP buffer lands located between the WPCP Operational Area and State Route 237 are included in the HCP/NCCP study area.



Source: Santa Clara Valley HCP/NCCP, 2009

Figure 4
SANTA CLARA VALLEY
HCP/NCCP STUDY AREA BOUNDARY
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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3.0 WPCP SITE CONSTRAINTS

3.1 Introduction

The following section outlines the constraints relevant to planning and development of WPCP lands. Primary constraints to existing and future WPCP operations and development include current WPCP facilities and land uses, applicable planning regulations, natural environment conditions and habitats, and ancillary uses and development.

Extensive research was undertaken to identify site constraints during previous planning efforts, including a detailed review contained in the San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates. Many of the constraints identified in 2007 remain relevant, and therefore these previous findings have been incorporated into this summary.

3.2 Existing Land Uses

Table 1 identifies existing WPCP land uses. The table is based on data obtained from the San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates. Portions of the WPCP lands are currently subject to a variety of encumbrances, including WPCP operations, easements, leases, and existing or planned land use not directly related to operations (e.g. a 25-acre bomb disposal site is located within the old biosolids lagoon area and is administered by the City of San José Police Department). By far, the largest constraint to future WPCP site uses and activities is the large area devoted to solids processing.

Existing WPCP land uses are identified in Figure 5.

3.3 WPCP Land Use Constraints

The primary constraints relevant to existing WPCP land use and activities are summarized as follows:

Current WPCP Facilities. The current WPCP facilities area encompasses the following: Operational Area, which incorporates primary, secondary, and tertiary treatment processes, maintenance shops, administration building, and the Environmental Services building; the RSM area, including current biosolids lagoons, drying beds and operations; Recycled Water Transmission Pump Station; SCVWD Flood Control Easement, and the Municipal Water System Tank. Alternative uses of the RSM area may be considered as part of the Master Plan following further technical evaluation of alternative wastewater treatment technologies.

Table 1	**Existing Land Uses** **San José/Santa Clara Water Pollution Control Plant Master Plan** **City of San José**
Existing Land Uses	**Land Area (acres)**
Current Plant Facilities	
Operational Area	160
Residual Solids Management Area	532
Old Biosolids Lagoons	254
Recycled Water Transmission Pump Station	3
Santa Clara Valley Water District Flood Control Easement	171
Municipal Water System Tank	3
Sub Total	*1123*
Buffer Lands	
East of Zanker Road (excluding water recycling expansion area, and including Tesla Motors site – 90 acres)	103
West of Zanker Road	415
North of Zanker Road including Nine Par Landfill	123
Sub Total	*641*
Proposed Expansion Areas	
South Bay Water Recycling Expansion Area	31
Sub Total	*31*
Other	
Salt Pond A18	856
Sub Total	*856*
Total	**2651**
Source: H.T. Harvey & Associates, 2007.	

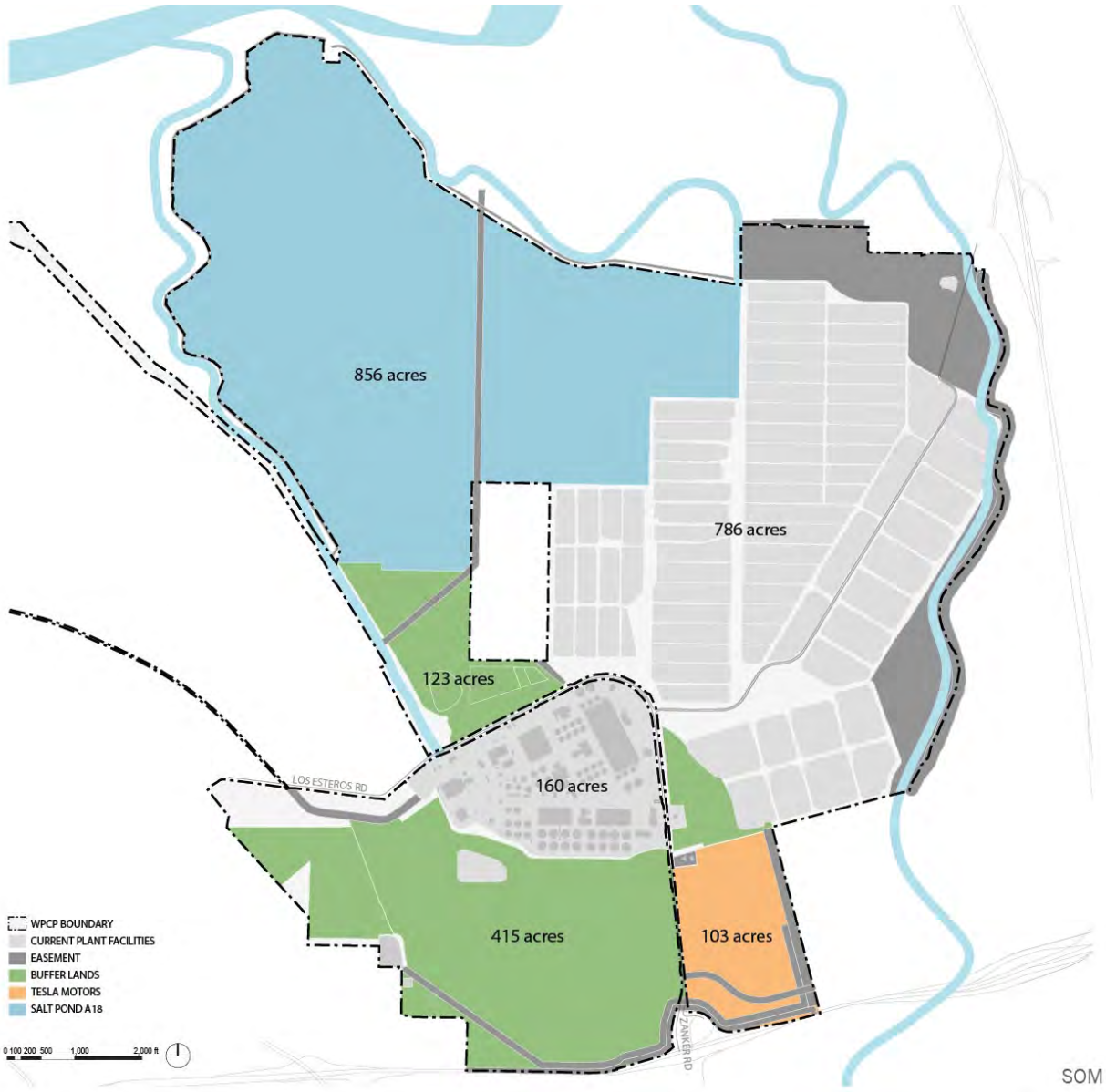

Figure 5
EXISTING WPCP LAND USES
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Easements. The San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates outlines in detail the various easements that present a constraint to the WPCP site. The relevant easements, easement areas, and the associated constraints are summarized in Table 2.

Table 2 Easement Constraints Summary
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

Easement	Area (acres)	Constraint
SCVWD Conservation Easement	171	Easement land not available for WPCP uses incompatible with SCVWD flood control, flood control mitigation, habitat restoration and habitat mitigation.
Salt Pond A18 Ingress/Egress Easement	1.8	Easement within SCVWD conservation easement.
Right-of-Way Easement	3.3	Easement within SCVWD conservation easement.
Pacific Gas and Electric Easements	19.7 and 65.5	Uses incompatible with function and maintenance of power lines may be prohibited.
Silicon Valley Power Easement	19.6	Uses incompatible with function and maintenance of power lines may be prohibited.
Los Esteros Critical Energy Facility Access Road right-of-way	11.6	Power company has access rights and maintains an open space area.
Southern Pacific Railroad Easement	6.3	Easement land not available for WPCP use so long as railroad activities are maintained.
Zanker Ingress/Egress Easement	1.1	Easement land not available for WPCP use. Access to Zanker Road Landfill is to be maintained.
Total	**299.9**	

Security and Public Safety. Due to safety concerns associated with chemicals used in WPCP processes (including chlorine and sulfur dioxide), public access and use of the WPCP lands is restricted to authorized personnel.

Odor. According to PM 5.7, sources of undesirable odors at, or adjacent to, the WPCP include the Zanker Road Landfill, the Zanker Materials Processing Facility, the Newby Island Sanitary Landfill and Recyclery, and the San Francisco Bay mudflats. The nearest sensitive receptors to odors are Milpitas residents, one-half to three-quarters of a mile east of the site.

Non-engineered Levees. Non-engineered levees comprise the majority of the perimeter levees around Salt Pond A18, and are not sufficient for flood protection requirements. The top of the non-engineered levees does not provide an all weather surface, making it unsuitable for vehicular access. Limited access makes it difficult to maintain the levee structure.

Contamination. The WPCP has an area of older biosolids ("legacy biosolids") and other WPCP-related solids that have been stored for several decades. Preliminary analytical work has been completed on some of these solids. These data indicate that some uses for this material could be limited. According to PM 5.7, cadmium and lead is known to exist in the old biosolids lagoons nearest to the Zanker Road Landfill, specifically lagoons 5, 6, 7, and 9 through 12.

Further data are being collected, and the City is working with regulatory authorities to complete characterization of the solids so that its disposition can be properly managed. The legacy biosolids area will be defined on Master Plan maps until the disposition issues are settled.

WPCP land use constraints and easements are identified in Figure 6.

3.4 Planning Regulations

Zoning regulations and development standards are established by the City in order to guide, control, and regulate future growth and development in a manner that achieves the goals and objectives of the General Plan. The City's zoning regulations typically provide restrictions on the type, location, height, and size of development. The use and development of land in the City must comply with the development and performance standards of the Zoning Ordinance.

Zoning regulations and development standards will be revised based on the outcomes of the Master Plan. For reference, details regarding existing zoning districts and development standards relevant to WPCP lands are included in Appendix B of this PM.

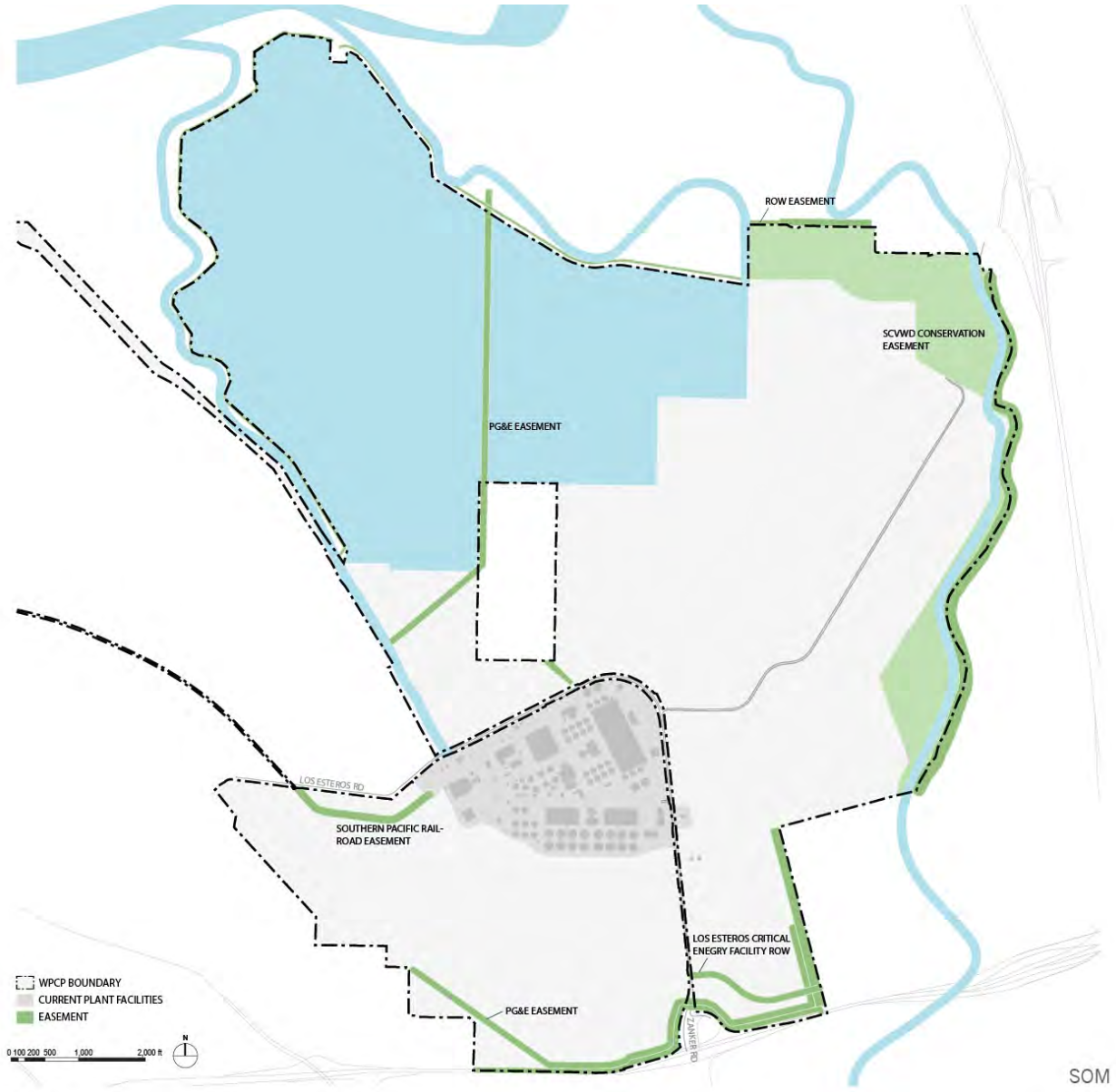

Figure 6
LAND USE CONSTRAINTS AND EASEMENTS
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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3.5 Natural Environment and Habitat Constraints

Regulated Habitats. The San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates identified that wetland and open-water habitats currently exist on site, including Salt Pond A18, and likely meet the regulatory definition of waters of the U.S., under US Army Corps of Engineers (USACE) jurisdiction. Placement of fill into jurisdictional waters of the U.S. would require permits from the USACE, San Francisco Bay Regional Water Quality Control Board (RWQCB), and the San Francisco Bay Conservation and Development Commission (BCDC) (for some of the wetlands and other-waters), and mitigation would likely be required. The riparian-woodland habitat along Coyote Creek likely falls under the regulatory jurisdiction of the California Department of Fish and Game (CDFG). A streambed alteration agreement and riparian mitigation would be required from CDFG for impacts to this riparian habitat.

Special Status Species. Three special status species are present on WPCP lands. These include the following:

- *Congdon's Tarplant:* Congdon's Tarplant is a flowering annual herb that is native to California and is limited to California alone. The presence of Congdon's Tarplant will not greatly influence potential construction, but impacts to this species must be considered under California Environmental Quality Act (CEQA) review and likely mitigated.

- *Burrowing Owls:* The Burrowing Owl is a species of special concern by the CDFG. The Burrowing Owls are known to use the southern portion of the WPCP lands where open grassland habitat occurs. Any impacts to the owls from construction would need to be mitigated in consultation with the CDFG.

- *Salt Marsh Harvest Mouse:* The Salt Marsh Harvest Mouse is a small, nocturnal rodent found only in the San Francisco Bay area. The Salt Marsh Harvest Mouse was listed under both the federal and state Endangered Species Acts in 1970 and is fully protected by the CDFG. As such, mitigation measures require approval from the USFWS. Any impacts to pickleweed on WPCP lands would have to be evaluated to determine if they impact the Salt Marsh Harvest Mouse.

Climate Change / Sea Level Rise. Evidence suggests that global sea levels are expected to rise as the result of global warming. According to the climate change data provided by the BCDC, historical records show that sea level in San Francisco Bay has risen 7 inches over the past 150 years. The Intergovernmental Panel on Climate Change and the 2006 California Climate Action Team project that mean sea level will rise between 12 and 36 inches by the year 2100. The California Climate Change Center estimates that mean sea level will rise between 4 and 35 inches by 2100. According to BCDC, the impacts of relative

sea level rise in the San Francisco Bay could be more extreme in the southern and northern reaches of the San Francisco Bay where land has subsided to below mean sea level. Sea level rise models indicate that an 11.8-inch rise in sea level would shift the 100-year storm surge-induced flood event to once every 10 years.

Through the sea level rise mapping project, BCDC employed geographic information system (GIS) software to identify the shoreline areas likely to be most impacted by sea level rise. The sea level rise maps are generally consistent with the projections in the 2006 California Climate Action Team Report. They illustrate an impact scenario in which sea level rises one meter by the year 2100. BCDC maps are based on US Geological Survey (USGS) 2m digital surface model data.

Flood Control. WPCP lands are mapped within the Federal Emergency Management Agency (FEMA) coastal floodplain (FEMA, 1988), except for the higher elevation of the southeast corner of the property. This is because ground elevations for most of the site are below the 100-year flood level and many of the existing levees on, and adjacent to, WPCP lands do not conform to FEMA flood protection standards.

Figure 7 provides an overview of the natural environment and habitat constraints relevant to the WPCP site.

3.6 Ancillary Uses and Adjacent Development

A number of ancillary uses and adjacent developments are located within or in close proximity to the WPCP site. These ancillary uses are described below.

Alviso Village. The Alviso village area includes the historic western grid, the neighborhood grid, and the lands on both sides of North First Street from Liberty Street to the southern boundary of the George Mayne School. Existing land uses in the village include single-family residences, some duplexes, triplexes, and small apartment buildings, small grocery stores, restaurants, warehouses, and trucking operations. The village also contains San José's only yacht club and associated harbor.

Jubilee Church: The Jubilee Church is located at Nortech Parkway. The church consists of three buildings; the Main Sanctuary building contains a bookstore, early childhood development center, and multi-purpose rooms; an Administration Building; and a Young Adults Center. The church currently leases a small plot of land from the WPCP.

Nine Par Landfill: The Nine Par Company began landfill operations in 1938. The site accepted residential solid waste and construction debris until its closure in 1977. Zanker Road Resource Management, Ltd. purchased the northeastern 70 acres of the original 166 acres from Nine Par Company in 1984 and reopened the site as part of the existing Zanker Road Landfill in 1985. The remaining 90 acres of the site was purchased by the City as a buffer land for the WPCP. The remaining operating life of the Nine Par Landfill is unknown.

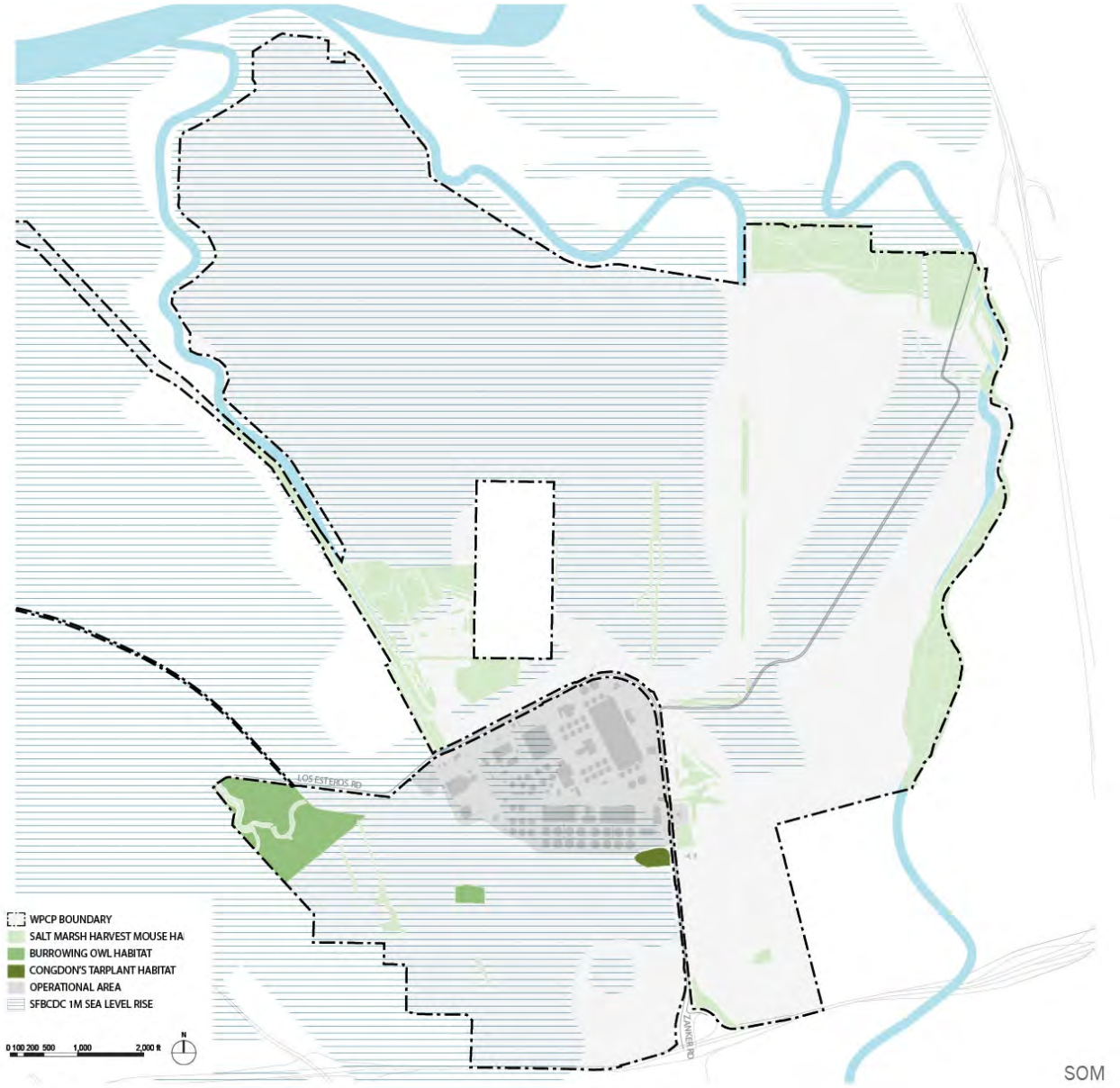

Figure 7
NATURAL ENVIRONMENT AND HABITAT CONSTRAINTS OVERVIEW
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Newby Landfill. The Newby Landfill is one of the largest active sanitary landfills on the shores of the San Francisco Bay. It is operated by Allied Waste Services of Santa Clara County, and it accepts waste for San José, Milpitas and other cities. The facility encompasses approximately 342 acres with the permitted footprint of 313 acres. The facility is permitted to accept up to 4,000 tons of municipal solid waste per day. Allied Waste Services estimates that, at the current filling rate, the Newby Island has approximately 14 years of life remaining. The waste pile is permitted to a maximum height of 120 feet. A levee surrounds the landfill island and protects runoff from directly entering the San Francisco Bay. Electricity for the facility is generated by burning methane that is collected from decomposing waste. Dried sewage sludge from the WPCP is used as waste-mix and as a cover material.

Zanker Road Landfill and Zanker Road Landfill Wetland Mitigation Area. The Zanker Road Landfill and Zanker Materials Processing Facility are located immediately to the northwest of the current WPCP Operational Area. The facility currently recycles concrete rubble, wood waste, yard waste, clean and mixed demolition debris, cardboard, gypsum, metal, and bulky items. The Zanker Materials Processing Facility can accept and process unsorted demolition debris materials at the rate of 135 tons per hour. According to information provided by the City, the Zanker Road Materials Processing Facility is planned to expand with a new processing facility which would potential quadruple its current capacity and the associated truck traffic.

Pacific Gas and Electric Los Esteros Sub Station. The Pacific Gas and Electric (PG&E) Los Esteros sub station is located adjacent to the southeast corner of the WPCP site and connects to power lines running along most of the southern site border.

Calpine Los Esteros Critical Energy Facility. The Calpine Los Esteros Critical Energy Facility is located adjacent to the southeast corner of the WPCP site. The facility produces up to 190 megawatts of electricity for peak demand periods and is contracted to deliver power to the California Department of Water Resources (CDWR) and the California Independent System Operator (CAISO).

PG&E Easements. A row of PG&E towers are located at the eastern edge of Salt Pond A18. These towers support high capacity connection between the City of San José and the City of Milpitas.

Southern Pacific Railroad Easement. The Southern Pacific Railroad maintains a 60-foot wide railway easement that begins at Los Esteros Road and ends west of the Operational Area. The easement provides railroad access for WPCP deliveries and prohibits other land uses.

Cisco Systems. The Cisco Systems campus is primarily located south of State Route 237 and is situated between Interstate 880 and Vista Montana Avenue. Cisco also maintains office space at Baytech Drive (a number of other tenants are also located at Baytech Drive),

located immediately southwest of the WPCP Operational Area, and also at McCarthy Ranch Road, located east of the WPCP Operational Area.

McCarthy Ranch. The McCarthy Ranch is a regional business park and shopping center located at the northwest corner of Interstate 880 and State Route 237.

Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center. Don Edwards San Francisco Bay National Wildlife Refuge was established in 1974 as the first urban national wildlife refuge in the U.S. The Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center is located at the end of Grand Boulevard adjacent to the WPCP Artesian Slough outfall weir. The building, designed for education, contains two classrooms, an auditorium, and an enclosed observation tower. Trails and a boardwalk provide access to nearby wetland habitats.

New Chicago Marsh. New Chicago Marsh is a tidal slough located southwest from the Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center. The marsh was planned for manufacturing and residential development in 1890 by P.H. Wheeler. However, it was realized at a later stage that many of the lots were situated in wetlands and therefore unbuildable. New Chicago Marsh was eventually given to the Don Edwards San Francisco Bay National Wildlife Refuge.

Tesla Motors. Tesla Motors announced in September 2008 that it would construct a new 600,000sf manufacturing facility and 100,000 sf headquarters on approximately 90-acres of land located within the WPCP site boundary at the intersection of Zanker Road and State Route 237. It is estimated that the factory will employ about 500 workers and an additional 500 plus workers will be located in Tesla's headquarters. It is also predicted that suppliers, vendors and others expected to locate their operations nearby could increase the total job potential associated with this project to 2,000.

Proposed North San José Santa Clara Valley Unified High School. A new high school is planned to occupy 38 acres of land situated on Grand Boulevard between Disk Drive and Wilson Way. The site is located immediately north of the San José Fire Department Station No. 25?

Figure 8 identifies ancillary uses and adjacent development to the WPCP.

4.0 WPCP SITE OPPORTUNITIES

4.1 Introduction

The concept of integration is a central tenet of the Master Plan. The various land use opportunities described in this section are not intended to be considered as mutually exclusive. Instead, the purpose of the following section is to describe a wide range of viable opportunities for the WPCP that may work in synergy and by doing so produce enhanced outcomes for WPCP operations, the local habitat, and the San José community.

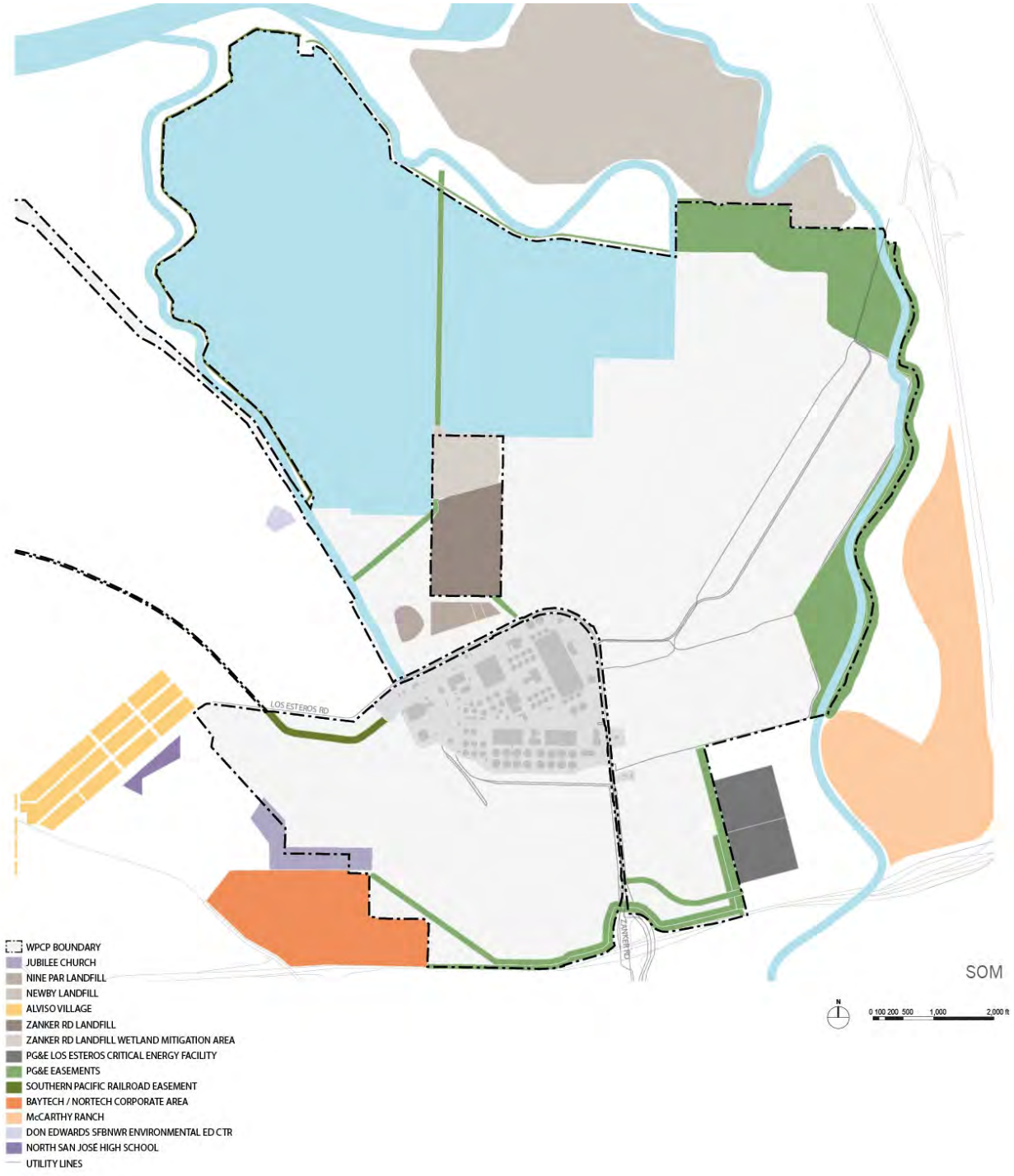

Figure 8
ANCILLARY USES AND ADJACENT DEVELOPMENT
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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4.2 Planning Principles and Land Use Opportunities

A Brainstorming Workshop was held on May 29-30, 2008 to explore a range of conceptual planning alternatives for the future "highest and best use" of WPCP lands. Participants included City staff from nine departments, representatives from tributary agencies, sustainability "thought leaders," and leading urban developers, architects, engineers, and scientists. The ideas and concepts generated during this workshop were intended to provide a framework for subsequent phases of technical and land use analyses.

It was generally agreed during the workshop that the WPCP has a unique opportunity to accommodate uses that capitalize on the intrinsic qualities of the WPCP, including water treatment operations and the natural context. For example:

- Existing natural habitat can become unique amenities to residents and employees who work at or near the site. An extensive network of outdoor recreation trails and viewing platforms could be established within habitat areas of the WPCP lands.
- Buffer land area located outside the core Operational Area can provide recreational and aesthetic value in addition to providing buffer from WPCP odors and hazards.
- By-products associated with WPCP operations (water, biosolids, etc.) can be used to support commercial, research, and educational activities.

4.2.1 Planning Principles

A key outcome of the Brainstorming Workshop was the establishment of the following planning principles. Together, these principles provide a framework for land use elements of the Master Plan.

- 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.
- Weave major themes of water and integration throughout the Land Use Plan.
- Maintain a whole system watershed perspective and consider "upstream" solutions.
- Build on the opportunity to connect humans to nature, and ecology with economy, by integrating the contrasts found on the site: South San Francisco Bay and the Golden (Innovation) Triangle; industrial and natural; seawater and fresh water; wet and dry.
- Integrate a wide variety of compatible land uses.
- Promote education about the commonalities and differences in how the WPCP and nature clean water.

- Increase energy production and utilization efficiency.
- Demonstrate the use of alternative energy sources, including solar, wind, fuel cells, algae farms, micro-hydropower, etc.
- Develop "green" metrics - tons of carbon dioxide (CO_2) fixed; gallons of freshwater filtered, kilograms of biomass produced, etc.
- Plan for Zero Waste, using industrial ecology techniques that co-locate organizations that use one another's waste products.

4.3 Land Use Opportunities

With the implementation of new wastewater treatment technologies, and a reduction in the land area dedicated to solid waste processing, the opportunity exists to make WPCP land available for alternative uses. At this stage, various technologies are being investigated as part of the WPCP master planning process to determine the extent of solids processing footprint that can be minimized. Based on preliminary estimates, an area ranging from 600 to 900 acres or more may be made available for alternate uses (confirmation of this estimate is subject to on-going evaluation work by the Master Plan team).

The Brainstorming Workshop conducted in May 2008 also identified a series of unique land use and development opportunities that may be located on available WPCP lands. These include following:

- **World Center of Clean Technology Innovation.** The WPCP can help generate a range of "clean technology" opportunities that create jobs and help the City to achieve its Green Vision goals. Clean technology uses may be located on buffer lands. For instance, commercial buildings could target clean technology companies for leasing. Co-locating such companies with ready access to local academic, non-profit, and business resources can create the opportunity for synergies that can accelerate bringing innovative products and services to market.
- **Bioremediation / Clean Energy / Wastewater Innovation Research Center.** A multi-disciplinary research center that demonstrates and incubates innovation in bioremediation, wastewater treatment, clean energy, and other technologies. The center could tie in with universities and other research organizations for research and development on wastewater treatment and reuse.
- **San Francisco Bay Area Living Museum.** A habitat museum housing regional plants and animals is an opportunity to restore the connection of people to nature. It would provide recreation and education opportunities, and give people an interactive experience with wildlife, as well as inspire them to be more ecologically aware and active. The Living Museum could become a bioregional zoo that focuses on local ecosystems as they were before development, similar to the Arizona Sonoran Desert

Museum in Tucson, which attracts local schoolchildren and visitors from all over the world (www.desertmuseum.org). The Living Museum could host community celebrations of local activities, such as if the salmon returned to Coyote Creek to spawn. The Arizona Sonoran Desert Museum has almost 2 miles of trails on 21 acres. It is run by a non-profit on County land, and funded by membership dues, entrance fees and grants. Another model, which highlights the opportunity to demonstrate leadership, is the Monterey Bay Aquarium, which was the first to focus on local habitat and is now considered the model for large scale aquariums. Key elements could include research and education center with volunteer activities, native habitat, reconstructed wetlands, botanical gardens, an aviary and/or butterfly house, viewing platforms, and wetland and riparian trails. One group in the Brainstorming Workshop suggested locating the Living Museum either near the grasslands and Coyote Creek, or in an area with Alviso village as the interface.

- **Wastewater Education Center and/or Interpretive and Education Trail.** A center and/or network of kiosks that tell a story about how natural systems and humans clean water -- engineered wetlands, eco-machines, WPCP treatment -- focusing on human technologies that replicate nature's methods is another potential opportunity. As visitors learn about wastewater treatment, they become get more comfortable with reusing water and biosolids. A viewing tower, or similar structure, may be established to allow for enhanced viewing of the WPCP lands, including wastewater treatment facilities and wetlands.

- **Ecological Restoration.** A wide range of ecological restoration opportunities exist: use local resources (nitrogen, phosphorous, recycled water) for ecological restoration; expand the Coyote Creek corridor to provide flood control benefit; divert recycled water upstream to rehabilitate Guadalupe and Coyote Creeks; restore grasslands on south end of the site using recycled water; create a salt marsh estuary by connecting Coyote Creek to Salt Pond A18; and remove of non-native plants. One possibility is to investigate "smart ecostructures" such as wetlands and riparian corridors to reduce the "freshwater shock" created by the WPCP outfall.

- **Sea Level Rise Wetland Mitigation Area.** As sea levels rise, wetlands will be inundated, so there will be increasing value in providing wetlands for mitigation due to losses around the San Francisco Bay. The opportunity exists to establish a wetland area to mitigate losses associated with global warming and rising sea levels. This opportunity was also described in the San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates. This report describes how tidal wetland mitigation credits, beyond that needed to compensate for impacts due to Master Plan implementation and future potential WPCP wastewater discharge impacts, could be sold to private or governmental project proponents. Revenue generated from the mitigation bank could be used to offset operational costs of the

WPCP. The report also describes that the market for tidal wetland mitigation in the South San Francisco Bay will be substantially reduced if the SBSP Restoration Project is implemented.

- **Ponds & Canals.** Shallow water ponds and or canals may be established to provide enhanced opportunities for wildlife viewing, recreation, and general access into remote pond or wetland areas. Ponds, canals, or other appropriate water bodies may be established within areas of the WPCP site that do not currently have waterfront access in order to create additional amenities for public facilities and other potential development.

- **Recreational Facilities and Open Space.** Residential development located in close proximity to the WPCP will require the development of a significant number of new park and recreation facilities and other community facilities such as libraries, schools, and community centers. The WPCP site may be one possible location for addition parkland for community facilities. During City staff interviews held in December 2008, the following recreation facility needs were identified: 8 softball fields, 8 soccer fields, and 10 multi-purpose playfields. The total area for the required recreation facilities is estimated to be 50 acres.

- **Sculpture Park or Art Park.** A sculpture or art park could be established to transform the buffer lands and other open spaces of the WPCP into a cultural destination. The sculpture park would provide local residents and visitors the opportunity to experience a variety of sculpture in an outdoor setting. The theme of resource recovery, water, habitat, and sustainability could be woven into artwork.

- **Farming.** Farming can be a value-added way to provide visual and noise buffers between the WPCP Operational Area and other land uses, as well as provide use for recycled water. A diverse range of farming opportunities may be appropriate at the WPCP, including for example organic methods for research and demonstration, producing food, energy, and/or fiber crops, tree farming such as bamboo forest to produce building materials, a native plant nursery, goat farming (goats are increasingly farmed and used by municipalities for weed control), etc. Additionally, algae farming to produce biodiesel and/or butanol can be piloted. Some strains of algae are over 50% oil and produce a high yield per acre. According to the US Department of Energy, algae can yield 30 times more energy per acre than land crops such as soybeans (Washington Post, 2008).

- **Resource Recovery - Energy Production Facilities (Combustion, Cogeneration, and Fuel Cell).** Resources produced or located at WPCP, including municipal solid waste, biosolids, and biogas, can be used to power a range of electrical energy generation systems such as combustion engines, cogeneration and fuel cell systems. Details regarding resource recovery opportunities, including energy production opportunities, are described in Appendix B of this PM.

- **Digestion Feedstock and Processing Areas.** Digestion feedstock, such as organic solid waste, can be added to the anaerobic digestion treatment process in order to create additional biogas for that can be combusted for electrical energy. The digestion feedstock delivery process would require additional facilities for receiving, storing and processing.

- **Solar Greenhouse Biosolids Drying.** Solar-drying within greenhouse systems is becoming more common in Europe and elsewhere as technology improves. The greenhouse system allows air containment and treatment for odor control, and a refined climate control within the greenhouse to maximize drying rates. Based on preliminary calculations conducted for greenhouse sizing, an area of between 10 to 30 acres would be needed for greenhouses and associated equipment/facilities.

- **Neighborhood Emergency Staging Area. Land may be designated for the purpose of providing a staging area for support and recovery operations, such as a temporary field hospital, following a large-scale disaster such as an earthquake, flood, fire, or hazardous materials incident.**

4.4 H.T. Harvey & Associates – Land Use Opportunities

A wide range of land use opportunities were identified by H. T. Harvey & Associates during a previous planning effort for the WPCP. These opportunities are described in the following two documents:

- San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates.

- San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Pond A18 Existing Conditions and Opportunities and Constraints Assessment Final 2007 Report by H. T. Harvey & Associates.

A broad summary of each previously identified land use opportunity is described below along with brief commentary regarding their merit for future consideration as part of the current master planning process.

4.4.1 Operation-Specific and Ancillary Uses

- ***Water Recycling Facilities Expansion.*** Approximately 31 acres of WPCP land along the east side of Zanker Road has been set aside for advanced recycled water treatment facilities.

  Water recycling facilities expansion continues to be considered an opportunity in the current master planning effort. Currently, it is estimated that over 100 acres of WPCP land located around the perimeter of the current operations area may be set aside for

future water recycling facilities expansion. The extent and location of expansion will be refined during the master planning process.

- ***Interim Land Uses for WPCP Expansion Area and Buffer Lands.*** Interim land-use opportunities for the WPCP expansion/buffer lands include mini recreation facilities, agriculture, and constructed seasonal wetlands and/or willow sausals (dense thickets dominated by willows with some Fremont cottonwood).

  The concept of using WPCP expansion/buffer lands for a variety of interim land uses continues to be considered an opportunity in the current WPCP master planning process. However, it should be noted that the use of buffer lands by the general public may be limited due to the presence of hazardous chemicals such as chlorine and sulfur dioxide at the WPCP. Therefore, the extent and intensity of public use requires further study and coordination with the City and WPCP staff.

- ***Biosolids Odor Reduction Opportunities - Relocate Biosolids Lagoons and Drying Beds.*** The existing biosolids storage lagoons and drying beds located in the furthest eastern areas could be relocated to the old biosolids lagoon area and/or to a new site within Salt Pond A18 to reduce potential offsite odor impacts.

  New wastewater treatment processes that are to be investigated as part of the Master Plan may, if implemented, render the existing biosolids lagoons as unnecessary for operational purposes. Therefore, the bosolids lagoons footprint may be reduced considerably and their relocation may not be required to reduce offsite odor impacts.

- ***Co-Composting Facility.*** A co-composting facility that creates compost from biosolids and wood waste/green waste could be established on WPCP lands. Dried or co-composted biosolids could potentially be used beneficially for tidal-marsh restoration in Salt Pond A18 or in other locations associated with the SBSP Restoration Project.

  A co-composting facility continues to be considered as an opportunity in the Master Plan effort.

- ***Regional Biosolids Processing Facility.*** The San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates identified that there is a need for a regional biosolids processing facility and such a facility could be located on WPCP lands.

  A regional biosolids processing facility continues to be considered as an opportunity in the Master Plan. Biosolids may be used by the WPCP as feedstock for anaerobic digestion processes or for energy production through incineration.

- ***Biosolids Monofill.*** A portion of WPCP lands could be used to develop a biosolids monofill similar to the facility used by the Sacramento Regional County Sanitation District. The monofill could be used exclusively by the WPCP, or it could accept biosolids from other wastewater utilities in the San Francisco Bay area.

  Development of a biosolids monofill continues to be considered as an opportunity in the Master Plan.

- ***Solar Power Generating Facilities.*** A portion of WPCP lands could be used to develop a solar energy production facility. Electricity and/or heat could be generated using photovoltaic generation or concentrating solar power technologies.

  Solar power generating facilities continues to be considered as an opportunity in the Master Plan effort. A recent U.S. Department of Energy Solar Site Evaluation for the WPCP lands concluded that existing buffer lands may be suitable available for solar power implementation. The study also concluded that up to 35.8MW could be generated with high-efficiency solar photovoltaics on a land area of 111 acres.

- ***Soil Stockpiling for Construction Projects.*** A portion of WPCP lands could be leased to landfill operators as a place to store excess soil from construction sites in the region.

  Even though soil stockpiling for construction projects is a potentially viable land use, this activity will not enable the Master Plan to achieve its stated project vision and planning principles.

4.4.2 Habitat Creation/Enhancement Uses

- ***Riparian Corridor Widening Along Lower Coyote Creek.*** Relocation of the biosolids drying beds away from Coyote Creek would create an opportunity to both restore additional riparian habitat and improve flood protection along Coyote Creek. This opportunity would entail relocating the existing flood control levee to a location further west to the current location of WPCP biosolids drying beds.

  Riparian corridor widening along Lower Coyote Creek continues to be considered as an opportunity in Master Plan. This riparian corridor would offer aesthetic, recreational, and environmental education opportunities.

- ***Restoration of Riparian to Tidal-Habitat-Transition Zone along Lower Coyote Creek-Coyote Slough.*** The opportunity exists to combine the riparian-corridor widening option with tidal marsh habitat restoration in Salt Pond A18. Combining these opportunities would restore a broad, natural transition zone along the salinity/tidal gradient from non-tidal riparian habitat (freshwater) to tidal freshwater marsh and finally to tidal-brackish marsh.

Restoration of riparian to tidal-habitat-transition zone along Lower Coyote Creek-Coyote Slough continues to be considered as an opportunity in the current master planning effort.

- ***Flood Protection Improvements-South San Francisco Bay Shoreline Study.*** The opportunity exists for the City to partner and cost-share with the USACE in planning, design, and implementation of flood protection and habitat restoration. The future shoreline levee would be an engineered levee providing 100-year flood protection that would meet FEMA standards.

  Flood protection improvements continue to be considered as an opportunity in the master planning effort.

- ***Public Access and Environmental Education – San Francisco Bay Trail Primary Spine.*** An alternative alignment for the future San Francisco Bay Trail Primary Bay Spine may be possible along the future shoreline levee that could be located along the southern perimeter of Salt Pond A18. This alignment would connect the proposed short spur terminating at the Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center to the existing Bay Trail along the east side of Coyote Creek.

  An alternative alignment of the future San Francisco Bay Trail Primary Bay Spine continues to be considered as an opportunity in the Master Plan.

- ***Tidal Marsh Restoration.*** Restoration of tidal marsh within Salt Pond A18 to provide habitat for federally-listed endangered species is another opportunity for the WPCP site. This restoration effort could also reduce or eliminate future salt marsh mitigation requirements associated with increased freshwater effluent discharge due to WPCP expansion and increased discharge needs.

  Tidal marsh restoration continues to be considered as an opportunity in the master planning effort.

- ***Pulsed-Discharge Wastewater Wetlands.*** All or portions of Salt Pond A18 could be converted to a pulsed-discharge wastewater wetland (a constructed wetland designed to provide tertiary wastewater treatment while minimizing the freshwater impacts of effluent discharge on downstream tidal salt marsh habitat.) Pulsed-discharge wastewater wetlands would detain freshwater effluent during the incoming tide and discharge the effluent during the outgoing tide, potentially protecting tidal salt marsh habitat. Treatment wetlands would also filter nutrients and heavy metals improving effluent water quality. The wetlands would also provide wildlife habitat, aesthetic values and environmental education opportunities.

  Pulsed-discharge wastewater wetlands continue to be an opportunity in the Master Plan effort.

- ***Conventional Wastewater Wetlands (not Pulsed-discharge).*** Conventional wastewater wetlands with a continuous discharge to the South San Francisco Bay could also be installed in all or portions of Salt Pond A18. Conventional wastewater wetlands could provide pollutant filtration, removing nutrients and heavy metals. According to the San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates, this conventional system would likely cost less than a pulsed-discharge system to design, install, and maintain.

  Conventional wastewater wetlands continue to be considered as an opportunity in the master planning process.

- ***Managed Pond for Shorebirds.*** Salt Pond A18 could be converted into a shallow water (<15 cm) pond with islands to provide shorebird nesting, roosting, and foraging habitat.

  Conversion of Salt Pond A18 to a managed pond for shorebirds continues to be considered as an opportunity in the Master Plan.

4.4.3 Other Opportunities

- **Workplace Market Opportunities.** ABAG estimates the addition of 440,000 jobs in Santa Clara County between 2005 and 2030. Of these projected additional jobs, 240,000 are expected to be located within the City of San José. Some of these jobs would be accommodated within vacant building space; however a large proportion will require the development of new space to meet the project demand. The North San José Area Development Policy facilitates the future development of 26.7 million square feet of new industrial office space (approximately 83,000 jobs) that will contribute significantly to meeting projected job growth. The financial benefits of additional workplace include tax revenues and economic activity with lower demand for public services when compared to, for example, housing development. For example, employment lands provide 60% of City of San José revenues but only occupies 15 percent of the total City area.

  The Green Vision plays an important role in shaping the future workplace market. The Green Vision provides a comprehensive strategy that seeks to demonstrate how environmental responsibility makes financial sense and stimulates economic opportunity. This vision includes ten goals that aim to reduce the carbon footprint of City by more than half. The first goal of the vision is to create 25,000 “clean technology” jobs as the World Center of Clean Technology Innovation.

  WPCP lands, especially areas with frontage onto State Route 237 will be particularly desirable to “clean technology” development given a combination of factors such as visibility, accessibility, proximity to the “Innovation Triangle” and its highly skilled

workforce specializing in electronics, software, manufacturing processes, and venture capital, and local recreational and natural amenities.

- **Retail Market Opportunities.** The North San José Area Development Policy provides capacity for 1.7 million square feet of retail development that would serve employees and residents in the area over a 30 year planning horizon. As part of the North San José Neighborhoods Planning Taskforce work program, the Taskforce, staff and consultants reviewed the role of retail development as anticipated in the North San José Area Development Policy. The Taskforce concluded that retail is a key development component for North San José, and it views retail as not only providing needed services, but also having a crucial place-making role. Market demand was estimated based on the resident and existing employee base located in a "five-minute trade area", which includes North San José and areas beyond it. The estimated market demand for retail was $511 million annually, which is considered to be a low number. Research conducted by the Taskforce showed evidence of high weekday lunch time demand generated by local employees but the low household number does not support high evening and weekend retail traffic. Residential growth, not employment growth, is critical to generating 7-day a week demand. Residential growth must increase before there is significant new retail development. The Taskforce also concluded that the following four criteria are vital to determining a successful location for retail:

  - *Visibility:* Quantified by the average number of vehicles per day that pass the site.

  - *Access:* Ease of access and the ability for customers to make spontaneous decisions to enter the shopping area.

  - *Size and Dimensions:* Site area must be adequate for retail buildings that can accommodate a complementary mix of tenants.

  - *Market Demand:* Location of site in relation to customers.

- **Enhanced Identity and Character.** The WPCP's physical appearance, including its buildings, facilities, infrastructure, signage, and open spaces are important to the overall profile and perception of WPCP. An external appearance based on the WPCP's vision and mission can effectively market and promote the activities and functions that occur at WPCP.

  This WPCP planning process provides an important opportunity to establish an image and identity for the WPCP that recognizes and reflects its unique physical setting and also its role to provide vital public services and to create additional opportunities for education, research, habitat preservation, recreation, and economic development.

One relevant international example of a wastewater treatment facility with high quality design and aesthetic standards is located in Munich, Germany. As demonstrated by the site photographs in Figure 9, the wastewater treatment facility in Munich exhibits the following positive design elements:

- Well-designed visitors center that clearly displays and provides educational material regarding the water treatment process.
- Cohesive architectural character that unifies the site, and reflects a high quality image.
- Extensive use of permeable paving materials in order to minimize stormwater runoff, improve water runoff quality, and to allow groundwater recharge.
- Campus-like open space and landscape design that produces a high quality aesthetic image.
- Opportunities to observe facilities and adjoining areas from elevated viewing area.

Table 3 summarizes the approximate land area requirement for each of the land use opportunities described in Section 4. Land area requirements are based on research of comparable project examples which are also described in Table 3.

4.5 Access, Movement and Connectivity Opportunities

Access, movement, and connectivity, including vehicular, transit, pedestrian, and bicycle systems, are important considerations for the future planning and development of the WPCP. An important goal of the Master Plan should be to implement a successful transportation framework that provides efficient, convenient, and safe access and movement options for existing and future uses located on WPCP lands. The following section describes existing and future opportunities to enhance the existing transportation framework relevant to the WPCP.

4.5.1 Regional Vehicular Access

Figure 10 identifies the various vehicular access routes currently available to the WPCP. Regional vehicular access routes to the WPCP include the following:

- *From Northeast:* Vehicular access from the northeast is via Interstate 880. Interstate 880 is aligned parallel to the eastern shore of San Francisco Bay and connects San José to Oakland.

Figure 9
MUNICH WATER TREATMENT FACILITY - SITE PHOTOGRAPHS
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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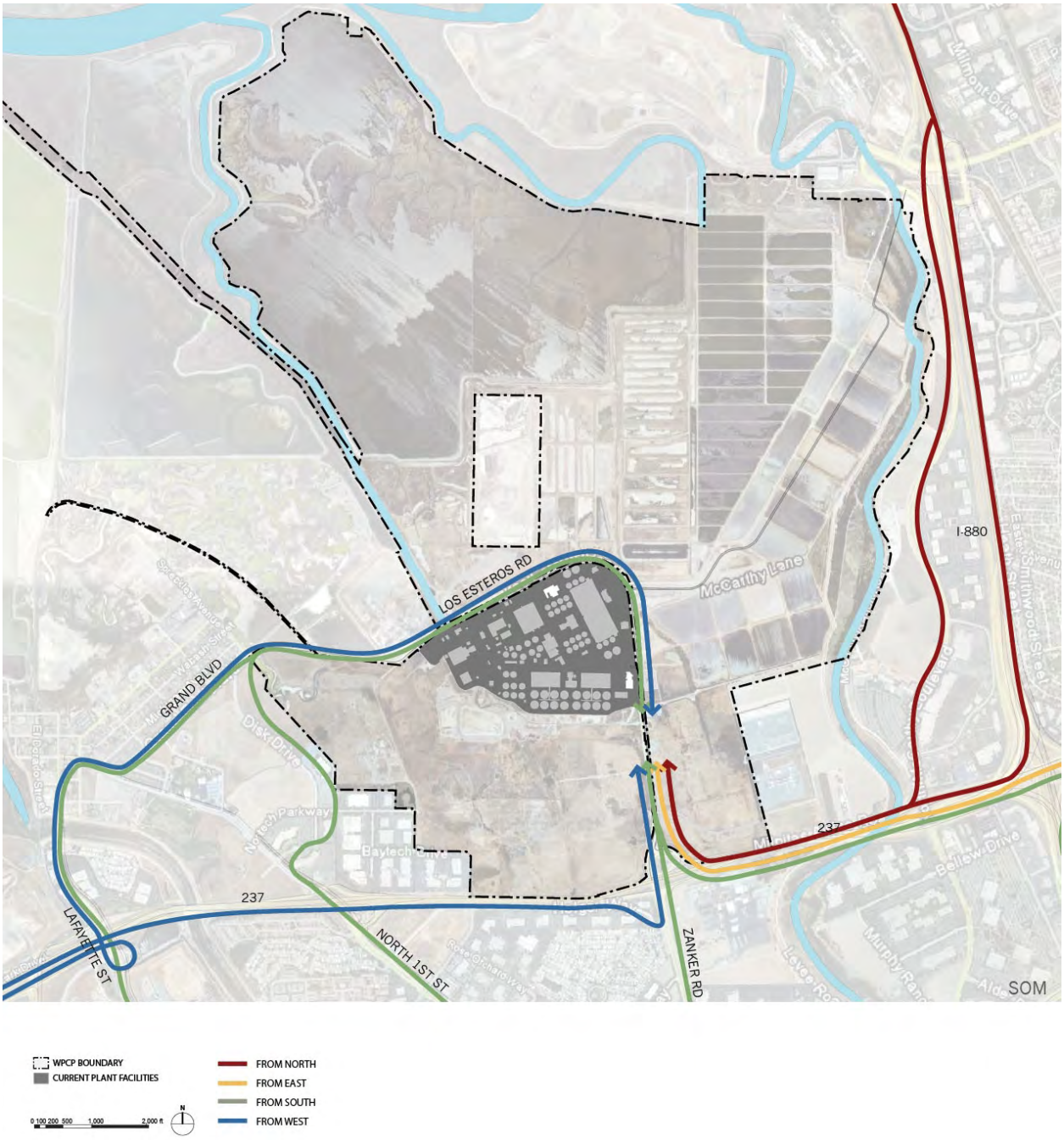

Figure 10
EXISTING VEHICULAR ACCESS
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Table 3 Opportunities and Constraints Approximate Land Area Requirements San José/Santa Clara Water Pollution Control Plant Master Plan City of San José

Opportunity	Approximate Land Area Requirement	Precedent / Example
World Center of Clean Technology Innovation	100 - 200	Tesla Motors Manufacturing Plant, San José, CA
Bioremediation / Clean Energy / Wastewater Innovation Research Center	100 - 200	National Renewable Energy Laboratory, Golden, CO
San Francisco Bay Area Living Museum	<100	Arizona-Sonora Desert Museum, Tuscon, AZ
Wastewater Education Center and/or Interpretive and Education Trail	<100	Whitney Water Purification Facility, New Haven, CT
Ecological Restoration	<100	Guadalupe River Park, San José CA
Sea Level Rise Wetland Mitigation Area	>200	Wildlands Mitigation Bank, Sheridan Placer County, CA
Ponds and Canals	<100	Boeing Longacres Industrial Park, Renton, WA
Recreational Facilities and Open Space	<100	Crissy Field, San Francisco, CA
Sculpture or Art Park	<100	Olympic Sculpture Park, Seattle, WA
Farming	<100	Tilden Regional Park, Berkeley, CA
Resource Recovery - Energy Production Facilities	100 - 200	Wide range of examples. Technology-specific examples identified in Appendix B - Resource Recovery Opportunities.

Table 3	Opportunities and Constraints Approximate Land Area Requirements San José/Santa Clara Water Pollution Control Plant Master Plan City of San José	
Opportunity	**Approximate Land Area Requirement**	**Precedent / Example**
Digestion Feedstock and Processing Areas	<100	Rialto Regional Biosolids Processing Facility, Rialto, CA
Solar Greenhouse Biosolids Drying	<100	Laval, France
Neighborhood Emergency Staging Area	<100	-
Water Recycling Facilities Expansion	<100	-
Biosolids Odor Reduction - Drying Bed Relocation	N/A	-
Co-Composting Facility	<100	Inland Empire Regional Composting Facility, Rancho Cucamonga, CA
Regional Biosolids Processing Facility	<100	Rialto Regional Biosolids Processing Facility, Rialto, CA
Biosolids Monofill	<100	-
Solar Power Generating Facilities	100 - 200	Semitropic Water Storage District Wasco, California.
Soil Stockpiling for Construction Projects	<100	-
Riparian Corridor Widening Along Lower Coyote Creek	<100	Guadalupe River Park, San José CA
Restoration of Riparian to Tidal-Habitat-Transition Zone	100 - 200	-
Flood Protection Improvements	<100	-

Table 3	Opportunities and Constraints Approximate Land Area Requirements San José/Santa Clara Water Pollution Control Plant Master Plan City of San José	
Opportunity	**Approximate Land Area Requirement**	**Precedent / Example**
Public Access and Education – SF Bay Trail	<100	Martinez Regional Shoreline Park, Martinez, CA
Tidal Marsh Restoration	<100	South Bay Salt Pond Restoration Project
Pulsed-Discharge Wastewater Wetlands	>200	-
Conventional Wastewater Wetlands	>200	-
Managed Pond for Shorebirds	>200	-
Office / Industrial Development	100 - 200	North San José, CA
Retail Development	100 - 200	McCarthy Ranch, San José, CA

- *From Northwest:* Vehicular access from the northwest is via Highway 101 (Bayshore Freeway). Highway 101 runs along the west shore of the San Francisco Bay and it connects San José to San Francisco.
- *From Southwest:* Access via the southwest is served primarily via State Route 17 and Interstate 880.
- *From Southeast:* Access via the southeast is served primarily via Highway 101 and locally by North 1st Street. The North 1st Street corridor is the premium location for technology industrial development in the Silicon Valley.
- *From West:* State Route 237 provides access from the west to WPCP lands. At its western end, the route connects with Highway 101 near Moffett Field. To the east, the route connects with Interstate 880 near the McCarthy Ranch shopping center.

In summary, the WPCP is well served by regional roads. The site has good access from both the East San Francisco Bay and peninsular communities.

4.5.2 Local Vehicular Access

Local access and circulation is provided by an existing “loop” road that includes segments of Zanker Road, Los Esteros Road, Dist Drive, and Nortech Parkway. This loop passes through the WPCP lands and also connects with Alviso village at Grand Boulevard. The most direct vehicular route to the WPCP Operational Area is via Zanker Road. Existing vehicular access is shown in Figure 10.

The primary local vehicular access routes include the following:

- *From North:* Dixon Landing Rd. / N. McCarthy Blvd
- *From South:* Milpitas Alviso Rd. (State Route 237) / Zanker Rd.
- *From East:* Milpitas Alviso Rd. Service Lane
- *From West:* Los Esteros Rd.

Future land uses at WPCP may require additional or enhanced roadway infrastructure that provides greater traffic capacity. Even though the type, location, and intensity of future land uses have not been determined at this stage of the master planning process, the following vehicular access and circulation opportunities may be considered.

- For WPCP lands identified for development, establish movement corridors that are logical and extendable over phased growth.
- Roadway infrastructure should balance the needs of various modes of travel, including truck, vehicular, pedestrian, and bicycling.
- A clear hierarchy of access should be established: publicly accessible roads, restricted access roads, service roads, etc.
- Additional roadway connections may be added to meet future traffic needs and to provide additional connections to the community, such as an extension of Dixon Landing Road to connect with Zanker Road, and an extension of Nortech Parkway and or Baytech Drive to Zanker Road
- Enhance the environmental performance of streets. Opportunities include: minimize storm water runoff; coordinate utility infrastructure; materials extended life-cycle; high efficiency street lighting; native landscape materials; extensive pedestrian and bicycle amenities.
- Road layout should take advantage of the scenic qualities of the WPCP lands. Views towards habitat or other natural features can be enhanced by alignment of roadway infrastructure.
- Provide infrastructure, as necessary, to support the operation and maintenance of alternative fuel vehicles.

4.5.3 Transit Access

Access to the WPCP by transit is currently not possible. However, the Santa Clara Valley Transportation Authority operates bus and light rail services in close proximity to the WPCP. These services are described as follows:

- Bus services are provided along Milpitas Alviso Road (Bus Route 104, 120), North First Street (Bus Route 58), and at McCarthy Ranch (Bus Route 33).
- Santa Clara Valley Transportation Authority light rail stations, including the Bayponite and Cisco Way stations, are located approximately 1.30 miles south of the WPCP Environmental Services Building.
- The Altamont Commuter Express (ACE) and Amtrak's Capitol Corridor Great America station is located approximately 2.0 miles southwest of the WPCP Environmental Services Building. ACE is a commuter train that operates between Stockton and San José California and serves Central Valley communities. Amtrak's Capitol Corridor trains serve Oakland and Sacramento.

The opportunity to provide transit services within close walking distance from WPCP will achieve important transportation and mobility objectives, including the provision of enhanced accessibility and the potential reduction automobile travel for local trips. Based on current WPCP land uses and population size it is estimated that there is little or no unmet transit need. However, it is anticipated that the Master Plan will introduce a broader range of uses and activities that would benefit from local transit access, including pedestrian and bicycle trails, education and research facilities, and employment uses. The future demand for transit services is not estimated by this PM, and is subject to further transportation studies that may be conducted during the master planning process.

The Southern Pacific rail line that ends west of the Operational Area has the potential to be used for the transportation of materials other than those required by the WPCP. These materials could, for example, be associated with commercial uses located on the WPCP lands.

4.5.4 Pedestrian and Bicycle Access

Key elements of the existing pedestrian and bicycle access and movement framework are shown in Figure 11 and described as follows.

- City Pedestrian Trails: The State Route 237 Bikeway is accessible to pedestrians even though it is not formally part of the City's Trail Network. The State Route 237 Bikeway connects from McCarthy Blvd in Milpitas to the San Tomas Aquino Creek Trail in Santa Clara, along State Route 237.
- San Francisco Bay Trail: A gravel path segment of the San Francisco Bay Trail is located along Coyote Creek between State Route 237 and Dixon Landing. This

segment of the Trail is connected to the "Alviso Slough Trail Loop", which starts and ends at Alviso Marina County Park, via an on-street segment of the Bay Trail located along Zanker Road and Los Esteros Road.

- City Off-Street Bike Paths: Off-street bike paths are located on both sides of State Route 2377 between Zanker Road and McCarthy Boulevard, and also along Coyote Creek.
- City On-Street Bike Paths: City on-street bike paths are located along Holger Way (south side of State Route 237), North First Street, Zanker Road, and North McCarthy Boulevard.

As described above, existing pedestrian and bicycle facilities at the WPCP are limited. There are no sidewalks or bicycle lanes along the main access routes to WPCP, including Zanker Road or Los Esteros Road.

San Francisco Bay Trail Opportunity: The San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Pond A18 Existing Conditions and Opportunities and Constraints Assessment Final Report 2007 by H. T. Harvey & Associates describes the opportunity for an alternative alignment for the future San Francisco Bay Trail Primary Bay Spine along the future Shoreline Levee that would likely be located along the southern perimeter of Salt Pond A18. This future engineered levee could provide a relatively wide and even surface for pedestrians along the southern perimeter of the San Francisco Bay. This alignment would connect the proposed short spur terminating at the Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center to the existing Bay Trail along the east side of Coyote Creek.

Other Pedestrian and Bicycle Access Opportunities: The Green Vision goals promote the creation of 100 miles of interconnected trails. The WPCP provides a variety of opportunities to help meet this goal, including the following:

- Establish convenient and comfortable pedestrian and bicycle routes, trails, and pathways that connect the WPCP to existing and planned residential, employment or recreational areas.
- Extend the San Francisco Bay Trail through the WPCP site per the San José Bay Trail Master Plan.
- Where necessary, separate pedestrian and bicycle routes from vehicular routes to improve safety.
- Provide adequate signage and wayfinding information for pedestrians and cyclists. Highlight connections to other local and regional routes and trails.

- Integrate educational information with pedestrian and bicycle routes and trails to help improve local knowledge and awareness of WPCP processes and South San Francisco Bay ecological systems.

Figure 11 identifies the existing network of pedestrian and bicycle trails, including the current proposals and alternative alignment for the San José Bay Trail.

5.0 CONCLUSIONS

This WPCP site is rich with opportunities. The size of this undeveloped parcel, coupled with the resources from the wastewater facility and surrounding land uses, offers extraordinary opportunities to expand the function and role of the WPCP lands.

The land use opportunities described in this PM have a significant potential to simultaneously maximize economic self-sufficiency, community benefits, and ecological restoration. The concept of integration is a central to the ongoing master planning effort which, when implemented, will establish the WPCP as an international model of ecological rehabilitation, education, recreation, solid waste processing and energy production, employment, and research ventures.

Through excellence in planning and design, WPCP can be repositioned to become a viable commercial and visitor destination that is both an amenity for San José residents and a destination for the entire San Francisco Bay Area.

Ongoing concerns regarding habitat and wildlife, hydrology, geology, contamination, climate change, and operational process requirements, will help to shape the nature of future land use opportunities. These planning challenges will be evaluated in greater detail during the development of land use alternatives as described in PM 5.9.

Table 4 summaries the primary WPCP site opportunities and constraints.

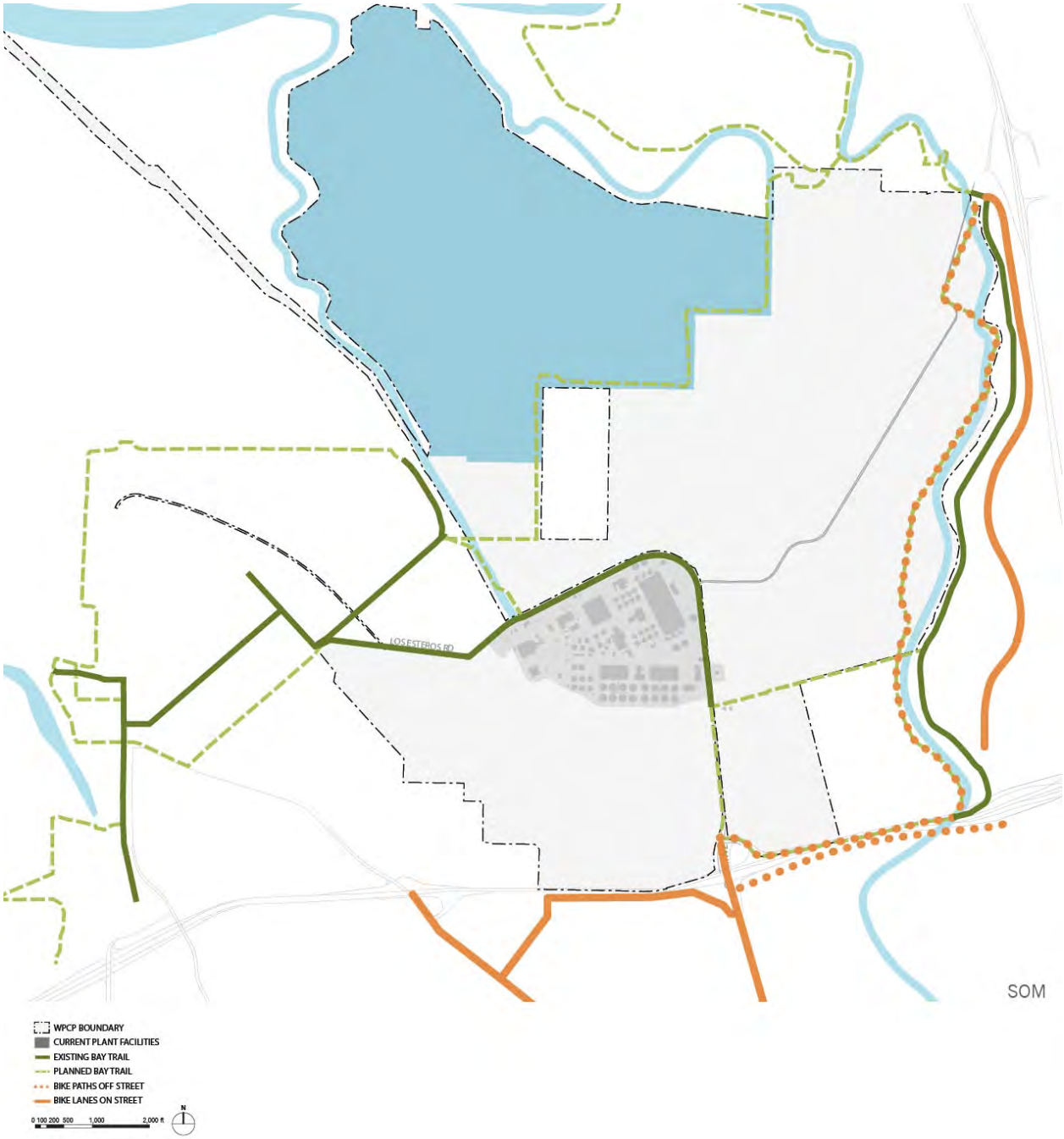

Figure 11
EXISTING PEDESTRIAN ACCESS AND TRAILS
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Table 4 Opportunities and Constraints Summary
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

WPCP Area	Primary Opportunities	Primary Constraints
Operational Area The Operational Area houses primary, secondary, and tertiary treatment processes, maintenance shops, Administration Building, and the Environmental Services Building. It also includes sufficient buffer lands to protect the public and adjacent land uses from odors and potential safety hazards.	• Enhanced wastewater treatment technologies, including digestion process improvements. • Anaerobic digestion feedstock processing area. • Resource recovery, including biogas processing, biosolid processing, and irrigation system infrastructure. • WPCP identity and character through enhanced physical appearance of building and open spaces. • "Green buildings" and sustainable landscape, including enhanced or new visitors facilities. • Visitor's center for public access and educational opportunities.	• Limited public access. • Odor. • Utilitarian image. • Potential expansion area for operational requirements (estimated 200 acres).
Solids Management Areas. Solids management areas include the RSM area and the old biosolids lagoons. Reduced area requirement for solids management associated with the implementation of new wastewater treatment technologies may create opportunities for alternative uses on WPCP lands.	• Solar greenhouse biosolids drying facilities. • Habitat restoration and preservation, including Coyote Creek riparian corridor expansion. • Pedestrian and bicycle trails. • Employment uses, including clean / green technology-sector industries. • Clean power production, including wind, solar. • Anaerobic digestion feedstock processing area. • Address contamination, if identified, through conventional remediation techniques or bioremediation processes. • Commercial-scale or community farming for energy crops or rapidly renewable resources utilizing reclaimed WPCP effluent. • Co-composting facility or biosolids monofill facility. • Development of public educational facilities, including Wastewater Education Center.	• Poor levee conditions. • "Bay Mud" has poor structural qualities and limits construction opportunities. • Climate change induced sea level rise. • Potential soil quality issues associated with legacy biosolids. • Heavy industrial zoning.

Table 4 Opportunities and Constraints Summary
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

WPCP Area	Primary Opportunities	Primary Constraints
Salt Pond A18 Salt Pond A18 is bounded by the tidal habitats of the Artesian Slough, Coyote Creek and the Coyote Creek Bypass Channel. The City owns the entire pond. Even though the SBSP Restoration Project and the ISP excludes Salt Pond A18, the opportunity exists to achieve complementary and aligned outcomes.	• Create, restore, or enhance habitat, including wetlands, tidal marsh, and managed ponds. • Protect or improve existing levels of water and sediment quality (implementation of pulsed-discharge or conventional wastewater wetlands). • Levee enhancements to improve existing levels of flood protection. • Provide enhanced opportunities for public access, recreational, and education which are compatible with wildlife and habitat goals, such as the development of the San Francisco Bay Area Living Museum.	• Potential mitigation requirements established by USACE, BCDC, and the RWQCB. • Poor levee conditions. • Climate change induced sea level rise.
Buffer Lands According to the City Council Policy on Use of San José/Santa Clara Water Pollution Control Plant Lands, buffer lands "must be effective in buffering Plant operations from adjacent land uses" (City of San José, 2000). Buffer lands include areas located east, west and north of Zanker Road.	• Community facility development, including open space / recreation facilities, sculpture or art park, the San Francisco Bay Area Living Museum and / or the Wastewater Education Center. • Employment use development, including clean / green technology-sector industries. • "Clean Technology" Retail development with frontage to State Route 237. • Enhanced pedestrian and bicycle facilities, roadway infrastructure, and transit services.	• City Council Policy on Use of San José/Santa Clara Water Pollution Control Plant Lands provides that "Dual Use" benefits may be considered for buffer lands. • Limited scope of Alviso Master Plan for alternative uses of WPCP lands. • Sensitive habitats, including Congdon's Tarplant, Burrowing Owls, and Salt Marsh Harvest Mouse. • Potential negative public opinion regarding development of buffer lands. • Limited transportation infrastructure.

REFERENCES

REFERENCES

1. H.T. Harvey & Associates, 2007. San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Plant Lands Opportunities and Constraints Assessment Final Report.
2. H.T. Harvey & Associates, 2007. San José/Santa Clara Water Pollution Control Plant/ Pond A18 Master Planning Pond A18 Existing Conditions and Opportunities and Constraints Assessment.
3. City of San José, 1996. City of San José General Plan 2020.
4. City of San José, 1998. Alviso Master Plan: A Specific Plan for the Alviso Community.
5. City of San José, 2000. Council Policy on Use of San José/Santa Clara Water Pollution Control Plant Lands.
6. City of San José, 2007. Request For Proposal Consultant Services to Develop a Master Plan for the San José/Santa Clara Water Pollution Control Plant.
7. Water Environment Research Foundation, 2008. State of Science Report: Energy and Resource Recovery from Sludge.
8. U.S. Department of Energy, 2008. 2007 Solar America Showcase City of San José, California San José/Santa Clara Water Pollution Control Plant Solar Site Evaluation San José, California.
9. Washington Post, 2008. A Promising Oil Alternative: Algae Energy. <http://www.washingtonpost.com/wp-dyn/content/article/2008/01/03/AR2008010303907.html>.
10. San Francisco Bay Trail, 2009. <http://baytrail.abag.ca.gov/>.
11. South Bay Salt Pond Restoration Project, 2009 <http://www.southbayrestoration.org/images/Pond%20Maps/alviso.pdf>
12. Santa Clara Valley HCP/NCCP, 2009.
13. <http://www.scv-habitatplan.org/www/site/alias__default/319/project_maps.aspx>.

APPENDIX A – SITE VISIT NOTES

CONFERENCE MEMORANDUM

Project:	San José/Santa Clara Water Pollution Control Plant Master Plan	**Conf. Date:**	July 31, 2008
Client:	City of San José	**Issue Date:**	August 7, 2008
Location:	San José/Santa Clara Water Pollution Control Plant (SJ/SC WPCP)		
Attendees:	San José: Matt Krupp	SOM: Andrea Wong Ellen Lou Michael Powell Joo Im	Carollo: Andre Gharagozian
Purpose:	San José Site Tour		
Distribution:	Attendees	**File:**	7897A.00

Discussion:
The following is our understanding of the subject matter covered in this conference. If this differs with your understanding, please notify us. Agenda is attached to the end of this file.

SAN JOSÉ SITE TOUR

1. The San José/Santa Clara Water Pollution Control Plant (WPCP) Administration building is located at Los Esteros Road. A portion of it was designed to expand with the addition of a second floor.

2. The original Administration Building was constructed c.1956. It is now used as a Training Center.

3. Approximately two-thirds of the Operational Area treatment facilities and processes are located underground.

4. The WPCP headworks are the first point of contact for sewage entering the WPCP.

5. Overflow basin located immediately southwest of the Operational Area.

6. Buffer lands located immediately south of Operational Area were farmed until approximately 1990. Disking was practiced on buffer lands to control weed growth but this practice ceased following the adoption of Council Policy that prohibits disking on City of San José (City) owned land. The City regularly receives inquiries to purchase or lease this land from interested parties.

7. WPCP treats approximately 100 million gallons of water per day (mgd). Treatment capacity can be increased to 240 mgd. During 100-year storm, the WPCP may treat up to 400 mgd.

8. Tour included inspection of various treatment processes, including primary clarification, secondary aeration and clarification, nitrification tanks and clarifiers, and the dissolved air flotation (DAF) process.

9. The Transmission Pump Station (TPS) is located at the southeast corner of the WPCP. The TPS delivers water to South Bay Water Recycling. This water is then used by parks, golf

courses, City Hall, and industrial users such as the Metcalf Energy Center. The WPCP can supply outside users with recycled water, but lacks the interest of any additional local users. There has been some discussion of locating an microfiltration/reverse osmosis (MF/RO) facility near TPS in the future as part of a joint effort with Santa Clara Valley Water District to implement an aquifer recharge project. Secondary or filtered effluent from the WPCP would be further treated with the MF/RO system prior to recharge of the aquifer.

10. Plans to send recycled water to water-deprived areas of the Monterey coast have been considered but not implemented due to financial and jurisdictional issues.

11. The Environmental Services Building was intended to be the WPCPC "front door." The building was constructed approximately 10 years ago. The building is being renovated and will accommodate an Education Center.

12. The Zanker Road easement is approximately 50 feet wide.

13. Tour included inspection of biosolids lagoons and drying beds located at the northeastern area of the WPCP. General process was described as follows: digested solids are pumped to the sludge lagoons for storage and solar drying. Solids are dredged and dried in the biosolids drying beds located on the eastern side of the WPCP. Dried solids eventually transported to landfill. Several of the lagoons are no longer used and contain dried biosolids with contaminant levels for various pollutants above state regulations (but not federal). There is no consensus on the best approach or use for these lagoons (i.e. leave biosolids in place, dispose of biosolids at hazardous waste landfill, cover, etc…).

14. The majority of WPCP is located on "Bay Mud." This soil type is generally considered a poor building foundation and it can limit the type of development.

15. Don Edwards San Francisco Bay National Wildlife Refuge is located adjacent to the western border of the WPCP. It is located in close proximity to the Artesian Slough outfall / discharge point.

16. Secured areas of the WPCP prevent public access to sulfur dioxide and chlorine storage areas, and also to the Artesian Slough regulatory control point. There has been some discussion of bridging portions of the bay trail across the area to provide limited access.

17. Good examples of polishing wetlands processes are located in Arcadia, CA and Petaluma, CA.

18. Alviso is a small community of approximately 2,000 residents. It was annexed to San José in 1968. The community has a long history of environmental justice. Alviso village is located west of the WPCP nearby.

Prepared By:

Michael Powell

MP:dlt

APPENDIX B – EXISTING ZONING AND DEVELOPMENT STANDARDS

APPENDIX B – EXISTING ZONING AND DEVELOPMENT STANDARDS

Zoning

Currently, zoning districts located within the WPCP boundary, per the City of San José Zoning Ordinance, include the following:

- **Agricultural (A):** The purpose of the Agricultural zoning designation is to provide for areas where agricultural uses are desirable. The regulations contained in this designation are intended to provide for a wide range of agricultural uses.
- **Industrial Park (IP):** The Industrial Park zoning designation is an exclusive designation intended for a wide variety of industrial users such as research and development, manufacturing, assembly, testing, and offices.
- **Light Industrial (LI):** The Light Industrial zoning designation is intended for a wide variety of industrial uses and excludes uses with unmitigated hazardous or nuisance effects. The design controls are less stringent than those for the Industrial Park zoning designation. Examples of typical uses are warehousing, wholesaling, and light manufacturing.
- **Heavy Industrial (HI):** This zoning designation is intended for industrial uses with nuisance or hazardous characteristics which for reasons of health, safety, environmental effects, or general welfare are best segregated from other uses. Extractive and primary processing industries are typical of this type of designation.
- **Multiple Residence (R-M):** The purpose of the multiple residence zoning designation is to reserve land for the construction, use and occupancy of higher density residential development. The maximum allowable density range for the R-M District is 25 dwelling units per acre.
- **Single-Family Residence (R1-8):** The purpose of the single-family residence zoning designation is to reserve land for the construction, use and occupancy of single-family subdivisions. The allowable density range for the R-1 districts is 1 to 8 dwelling units per acre.

In addition to the “base zoning districts” described above, Planned Development zoning designation have been established by the Zoning Ordinance to provide specially tailored zoning regulations with specific development standards for individual projects. Planned Development zoning designation are identified on the City’s Zoning Map with a unique numerical identifier.

Figure B-1 shows the existing zoning for the areas within and surrounding the WPCP lands.

Development Standards

Development standards for uses relevant to WPCP lands are shown in Table B-1.

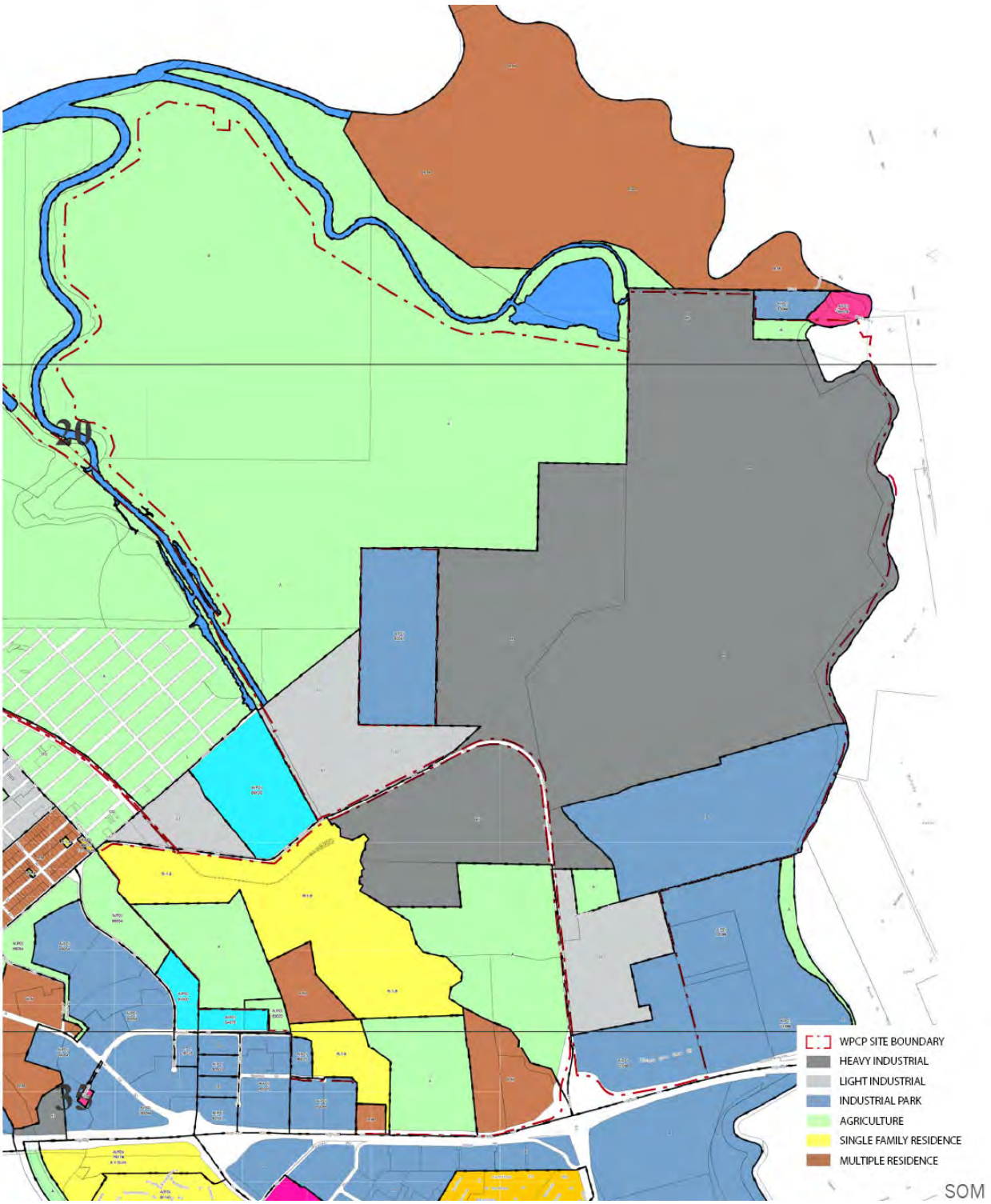

Figure B-1
EXISTING ZONING
SAN JOSÉ/SANTA CLARA WPCP MASTER PLAN
CITY OF SAN JOSÉ

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Table B-1 Development Standards
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

	Industrial Park	Light Industrial	Heavy Industrial	Agricultural	Residential	Multiple Residence
Minimum Lot Area	10,000 sf	10,000 sf	6,000 sf	20 acres	5,445 sf	6,000 sf
Minimum Setback (feet)						
Front					25	15
Building	15	15	15	50 or 300 from residential district		
Parking & circulation for passenger vehicles	25	20	15	As above		
Parking for trucks and buses	40	30	15	As above		
Loading docks	60 or 100 from residential district	60 or 100 from residential district	15 or 100 from residential district	As above		
Side					5 – 12.5	5 – 7.5
Building	0 or 25 from residential district	0 or 25 from residential district	0 or 25 from residential district	50 or 300 from residential district		
Parking and circulation for passenger vehicles	0 or 25 from residential district	0 or 25 from residential district	0 or 25 from residential district	As above		

Table B-1 Development Standards
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

	Parking for trucks and buses	0 or 25 from residential district	0 or 25 from residential district	0 or 25 from residential district	As above		
	Loading docks	100 from residential district	100 from residential district	100 from residential district	As above		
Rear						20	15 - 25
	Building	0 or 25 from residential district	0 or 25 from residential district	0 or 25 from residential district	50 or 300 from residential district		
	Parking & circulation for passenger vehicles	0 or 25 from residential district	0 or 25 from residential district	0 or 25 from residential district	As above		
	Parking for trucks and buses	0 or 25 from residential district	0 or 25 from residential district	0 or 25 from residential district	As above		
	Loading docks	100 from residential district	100 from residential district	100 from residential district	As above		
Maximum Height (feet)		45	45	45	35	35 (2.5 stories)	45 (3 stories)

Table B-1 Development Standards
San José/Santa Clara Water Pollution Control Plant Master Plan
City of San José

Maximum FAR				0.80
Minimum street frontage				
Parking (Office)	1 per 250 sq. ft. of floor area	1 per 250 sq. ft. of floor area	1 per 250 sq. ft. of floor area	
Parking (Research and Development)	1 per 350 sq. ft. of floor area	1 per 350 sq. ft. of floor area	1 per 350 sq. ft. of floor area	
Parking (Industrial Services)	1 per 350 sq. ft. of floor area	1 per 350 sq. ft. of floor area	1 per 350 sq. ft. of floor area	
Parking (Manufacturing and Assembly, Light, Medium, Heavy)	1 per 350 sq. ft. of floor area	1 per 350 sq. ft. of floor area	1 per 350 sq. ft. of floor area	

Source: City of San José, 2007

APPENDIX C – RESOURCE RECOVERY OPPORTUNITIES

APPENDIX C – RESOURCE RECOVERY OPPORTUNITIES

Resource Recovery Opportunities

Zero Waste is a key feature of sustainable systems. This section identifies opportunities to recover resources from wastewater and particularly from the solids or sludges produced in wastewater treatment. The WPCP already extracts energy from its wastewater solids and produces several million gallons per day (mgd) of recycled water for use by South Bay Water Recycling**.** Additional opportunities exist to recover resources and energy at the WPCP. There may also be opportunities to implement "byproduct synergy" projects with other local industries or by collecting other waste materials in the area for co-processing advantages with wastewater residuals. The following summary provides a brief overview of innovative and potentially applicable resource recovery opportunities for the WPCP. A recent report by the Water Environment Research Foundation (WERF) is particularly relevant to this topic. Table C-1 provides a summary of recoverable products from sludge based on this report:

Table C-1 Products Recoverable from Sludge and Their Final Use
San José / Santa Clara Water Pollution Control Plant Master Plan
City of San José

Type of Product	Use of Product
Methane	Electricity, heat, fuel
Gases	Electricity, heat
Oil, fat, grease	Biodiesel, methane
Phosphorus	Fertilizers
Nitrogen	Fertilizers
Metals	Coagulants
Inorganic material	Building material
Organic compounds	Organic acid production
Inoculum	Bio-hydrogen gas production
Crystal proteins, spores	Bio-hydrogen gas production

Source: Water Environment Research Foundation, 2008.

Reclaimed Water from WPCP

On-Site Irrigation: Potential exists to use reclaimed water for on-site irrigation of WPCP lands and landscape features such as gardens. On-site irrigation by reclaimed water would obviously reduce the demand for potable water for irrigation needs. Nutrients from the

reclaimed water may also be beneficially used at the WPCP site in this manner. A certain amount of land-footprint is needed at the site over time to expand the treatment area for reclaimed water production. A 'set-aside' area can be identified, of 50 acres.

Irrigate Green Screen: A vegetation screening barrier around wastewater or solids processing facilities has been used at other wastewater treatment plants as a mitigation measure. The measure is primarily for visual screening and usually involves dense vegetation corridor with various elevation plants to provide a barrier between the wastewater treatment plant functions and adjacent development. Such barrier may have some advantages in sound reduction and in odor reduction, but its primary function is visual. Irrigation is required to produce a substantial vegetation barrier in the South San Francisco Bay climate.

Extract Heat from Effluent

There are some wastewater treatment plants that use heat pumps or heat extractors to produce warm or even hot water from the plant effluent. Electrical power is used for this process, and the economics work better if power rates are low. At the King County, WA Renton Wastewater Treatment Plant, such heat extractors are used to provide hot water to heat the digesters, and all biogas is processed for pollutant removal and sold to the gas utility. This may be a more economical approach in the Pacific Northwest where power rates are low (about 4 cents/KwHr), however, heat extractors are used occasionally in European wastewater plants where power rates are higher. The technical feasibility of this process at the WPCP is yet to be determined.

Produce Algae-Energy from Wastewater

Research and development is underway on more economical methods to grow algae from the remaining nutrients in municipal wastewater – then harvest the algae and process the algae into biofuel. Needing only sunlight, water and carbon dioxide to grow, some strains of algae are over 50 percent oil and produce a high yield per acre. According to the US Department of Energy, algae can yield 30 times more energy per acre than land crops such as soybeans. Saltwater ponds are the typical "habitat" for energy-producing algae. Since algae also thrives on nitrogen and carbon dioxide, opportunities for the integration of algae farming with waste incineration processes may be possible.

Digestion, Biogas, and Energy

The WPCP has an abundance of anaerobic digestion tank capacity. The WPCP currently digests its sludge to create biogas (combination of methane and carbon dioxide). The WPCP has combusted this biogas in cogeneration engines for about 50 years to produce both electrical power for the WPCP and hot water for digester heating and building heating/cooling. This approach has been used in the wastewater industry, both in North America and abroad, and is becoming more desirable with the advent of higher energy prices and the impact of climate change issues.

Bringing additional organic feedstocks, such as organic solid waste, to this large anaerobic digestion complex for greater energy production has been recognized within this Master Plan. Various opportunities exist to use the additional biogas for beneficial purposes. These approaches are discussed here as they relate to potential land use needs at the WPCP.

Digestion Processing and Biogas Treatment Area

The current anaerobic digestion complex encompasses a portion (several acres) of the WPCP Operational Area and is not expected to be expanded at any foreseeable time to handle future wastewater solids quantities. Depending on possible changes to digestion equipment and even tank modifications, the existing digestion tankage could handle major quantities of imported feedstocks. However, in this case, there could be requirements for storage or processing of imported feedstock materials (such materials could include grease materials, food-processing wastes, and various organic and food-waste materials). There could also be possible digestion process enhancements that require additional equipment, resulting in area-footprint expansion for the digestion complex. This will require further examination during the Master Plan. Area at the WPCP site immediately adjacent to the digestion complex should, therefore, be considered for further feedstock preparation needs, digestion-related needs, or biogas-production facilities or equipment. Also, biogas processing and treatment needs may increase in the future with much larger quantities of biogas production and possible need for more extensive treatment of biogas in the future before it is combusted or utilized.

Biogas Production from Covered Lagoons

An option to produce more biogas at the WPCP is to further digest biosolids in covered lagoons. Such lagoons can also be valuable for further biosolids stabilization, thickening, and for short-term or seasonal storage/equalization. This covered lagoon approach has been used more-frequently for animal manure digestion, but with increasing concerns for methane emissions to the atmosphere, the concept is getting renewed attention around the world. Evaluation is required to determine how covered lagoon systems would be operated at the WPCP and how much area would be required, as well as estimating the additional biogas production and determining the costs and economic factors associated with such facilities.

Cogeneration Using Biogas

The WPCP has used several internal combustion engines for cogeneration for 50 years. The engines use biogas as fuel and the engines are tied directly to generators for electrical power production. Engines can also be used to directly drive continuously-operating equipment such as pumps or blowers, with heat recovery from the engines. Current power production at the WPCP from sludge biogas alone is typically about 3 mega-watts. The existing cogeneration system also uses biogas collected from an adjacent landfill, as well as purchased natural gas from the gas utility (total cogeneration engine capacity at the

plant is almost 10 mega-watts). Waste heat is recovered from the engines, producing hot water which is piped to the digestion complex and to other areas for primarily heating value.

Opportunity exists to expand this cogeneration system (assuming greater biogas production), modify the type of engine equipment used, or move to other equipment such as gas turbines for cogeneration service. There are major issues involved with various options, and technical and engineering evaluation will be required to determine the best approach for the WPCP. This type of cogeneration equipment is typically installed within the WPCP Operational Area (as it is currently), and sufficient space-footprint may exist within the current WPCP Operational Area for this type of expanded cogeneration system. At this time, a major new footprint is not likely to be required. Scores of wastewater treatment plants now have this type of cogeneration system in North America.

Fuel Cells Powered by Biogas

Biogas may also be used to power fuel cells. Fuel cells offer the highest efficiency available for electrical power generation using biogas at wastewater treatment facilities. This translates to lower overall greenhouse gas emissions. In addition, when compared to other types of cogeneration equipment, fuel cells generate less emissions of criteria pollutants, which simplifies the air quality permitting process. However, higher levels of biogas treatment are required for fuel cell use, so that there are important economic issues associated with fuel cells.

There are several fuel cell projects using digester gas installed or under construction in California, taking advantage of the State's Self Generation Incentive Program (SGIP) that makes renewable-fueled fuel cells eligible for direct grants. The WPCP is already planning a fuel cell project, which may be sized in the 1mega-watt range. Relatively less waste heat is developed from fuel cells than from the more traditional engine or turbine cogeneration approaches identified in the section above. Footprint requirements are not extensive for fuel cell facilities, so that this equipment may be sited within the existing WPCP Operational Area.

Hot Water and Steam Use from Cogeneration

Large amounts of hot water can be generated from cogeneration-engines, and steam is produced from gas turbine cogeneration systems. These resources have major potential for use at the WPCP. Examples are provided here:

- Current use of hot water is for digester heating and for building heating / cooling.
- Hot water and steam are being used to dry biosolids in Europe – this practice is being introduced to North America. Several different systems are available using low-temperature belt drying (hot water to warm air which is used to dry biosolids), and steam use within fluidized bed dryers.

- Hot water is being piped to and used within greenhouse systems to warm up the floor for biosolids drying, or warm up the air for climate control within nursery greenhouses (for plant growth needs).

- Steam can be used to generate additional electrical power and also used for heating (and cooling) of buildings or facilities located adjacent to the wastewater treatment plant.

- Hot water (or steam) can be used by various private enterprises located adjacent to the WPCP – such as fish farming (that requires a certain water temperature), or industrial processes. The preference is to identify facilities that require hot water or steam on a continuous basis (24/7), and also where the heat load is relatively consistent every hour – the reason for this is because cogeneration heat is produced continuously and is not easily storable.

Carbon Sequestration from Biogas Combustion

There are relatively small-scale operations in Europe reportedly routing exhaust gases from engines burning biogas (exhaust with high carbon dioxide content) through specialized greenhouse systems to sequester the exhaust carbon within plant tissue. Plants grow much more rapidly in an enhanced carbon dioxide atmosphere. The overall effectiveness of this approach would need to be evaluated further, but it may offer a way to sequester or control carbon emissions from biogas combustion.

Other Types of Biogas Use

Anaerobic digestion biogas can also be used for other purposes. There is less experience with these uses in North America, but they are identified here for consideration:

- Biogas can be processed to pipeline quality natural gas, in which case the carbon dioxide must be removed. In this case, the cleansed biogas can be sold to the gas utility and piped directly into the utility's pipeline system. With the rising cost of natural gas, this approach is of increasing interest to wastewater utilities, however the biogas cleanup cost is substantial.

- Cleansed biogas can also be compressed and used as vehicle fuel (compressed natural gas – CNG). There is only limited experience historically with this approach in the US, but more interest and experience has occurred overseas where vehicle fuel prices are higher.

In both the above situations, carbon dioxide is removed as part of the biogas cleansing process, and can be collected as a resource instead of being discharged to the atmosphere. In this manner, this approach is helpful to the environment by removing carbon dioxide from direct atmospheric discharge. However, the recovered carbon dioxide may be released elsewhere, depending on how the recovered carbon dioxide gas is utilized. The

cost of carbon dioxide recovery from biogas cleanup is substantial, but there is increased interest in this approach.

Biosolids Resource Recovery

Various biosolids products can be developed at the WPCP site. Certain materials within biosolids, such as nutrients, can also be recovered. Biosolids can also be used for its energy value (via combustion and related thermal processes), and can be combined with other waste materials for larger energy recovery programs.

Biosolids Use in Land Application

The most common use for biosolids historically has been in agricultural land application. This method uses organics and nutrients within biosolids to assist in soil productivity and crop growth. However, due to widespread public concerns about use of biosolids on agricultural land, this approach is diminishing rapidly in California and is expected to be of limited use in the future. If biosolids use for crop growth can be conducted on a more dedicated parcel of property, or publicly-owned parcel that is more highly controlled, this may be a more acceptable approach. Dedicating such land at the WPCP could have potential. An example of a dedicated site-crop is canola, which can be used to make biodiesel. Experiments in King County, WA have shown how canola seeds (canola produced on biosolids-amended soil) can be crushed to extract the oil, which is then converted to biodiesel. Another dedicated option is to grow trees on biosolids-amended soils. Hybrid poplars have been grown in this manner at dedicated sites in the US.

Produce Dried Biosolids

Currently, the market for dried biosolids in the US encompasses primarily two types of material as follows:

- Pelletized, or granulated, dried Class A product for direct fertilizer use or as fertilizer blending material – typically 90 percent% solids or greater.
- Ungraded product of various particle sizes, with variable solids content (typically 60 to 90 percent solids), either Class A or B biosolids, used directly in land application, as soil amendment, or as landfill cover material.

In the future, there are likely to be more dried product markets/uses, such as dried biosolids for cement kiln use, and dried material for energy use in combustion systems. The various technologies to obtain dried biosolids are summarized here:

- Mechanically oriented technologies using high-temperature drying. This has been a common method over the past 25 years, but is losing ground because of its high energy requirements and typical fossil fuel usage.

- Solar or air-drying approaches, largely in the open atmosphere. This has been the approach used at the WPCP, but this has disadvantages of using large land area and results in odor emissions, and sometimes dust emissions if the product becomes too dry.
- Solar-drying within greenhouse systems is becoming more common in Europe and elsewhere as technology improves – this allows air containment and treatment for odor control, and a refined climate control within the greenhouse to maximize drying rates.
- Low-temperature biosolids drying, using waste heat resources such as hot water or other heat source. This approach is becoming more common as energy prices rise and agencies wish to maximize use of their energy resources.
- The land required for these drying technologies will vary significantly. However, it is clear that major reduction in the current WPCP land area devoted to biosolids drying is possible.
- There has also been a San Francisco Bay area-wide study by the Bay Area Clean Water Association of potential regional biosolids processing. This study has indicated that a regional biosolids drying facility could be attractive, and has identified the WPCP site as an option for further evaluation.

Produce Composted Biosolids

Another major biosolids product is compost. Carbon amendment material is required for such composting, so this involves transporting the amendment material to the site, conducting the composting operation, then storing product and trucking product out. For an urban site like the WPCP, the operation would need to be enclosed which adds considerable cost. Biosolids composting could be conducted for only a portion of the WPCP's biosolids production to keep area-footprint limited. Green waste or wood-waste can be used as carbon amendment material. The composted product could probably be marketed in the San Francisco Bay area, although market studies would be needed to confirm specifics about required product characteristics, marketability, price, seasonal product storage needs, and other factors.

Biosolids Used as Energy Products

There is increasing interest in using biosolids as an energy product. To obtain significant energy from biosolids it needs to be dried or partially dried first, and therefore, the discussion above is pertinent. Once it is dried, biosolids typically have the energy value of a low-BTU (British Thermal Unit) coal. Therefore, it can be combusted or thermally processed in a number of technologies to produce hot gases, fuel gases (syngas), and related materials (even a sludge oil) that can then be used to produce steam to drive steam turbines or other equipment. For several of these processes, there is an ash product which

remains – this has often been disposed to landfill, but there are potential uses of ash residues for construction materials.

These combustion, gasification, and related thermal processing technologies could be located at the WPCP, and the energy produced by the facility used on-site or the power produced can be fed back into the electrical power grid. Such a thermal processing and energy recovery facility can also include other organic feed stocks such as wood-waste and various fractions of municipal solid waste. In this manner, a larger and perhaps more economical facility could be developed.

Another option of interest is to use dried biosolids as feedstock for cement kilns. In this manner, the dried biosolids provide fuel and the products of combustion largely end up in the cement product, so that there is little ash or residual for disposal. This is becoming a more common approach for biosolids utilization in Europe. In North America, cement kiln use for dried biosolids has been tested and is moving forward at a few facilities. In California, this is proposed for a southern California project by Ener-Tech - which will dry the biosolids in a new privatized facility (operational in 2009). Ener-Tech proposes to take the dried biosolids to a nearby cement kiln as an E-fuel.

Nutrient Recovery from Biosolids

It has been suggested that phosphorus is the most valuable compound in wastewater sludge from a sustainability standpoint, due to the likely limited availability of low-cost phosphorus world-wide for mineral fertilizer production. There are several technologies that have been developed to treat a portion of phosphorus-enriched waste activated sludge to remove the phosphorus as calcium phosphate. This has not become widespread because the costs to produce the phosphate are substantially higher than current costs of phosphate mining.

In addition, struvite (magnesium-ammonium-phosphate) can be removed from anaerobically digested sidestreams. Most of the struvite scale removal processes developed to date remove struvite from dewatering recycle streams or lagoon supernatant streams. The problem with this is that significant struvite scaling problems often occur within the digesters, digester piping, or processes immediately downstream from digestion (pumping, lagooning and dewatering). In this manner, the struvite removal processes currently available only remove the residual struvite downstream from scaling problem areas.

Construction Products

Construction or building products that can be produced from wastewater sludge include aggregates, glass, brick, slag, and various forms of tile. Some of these products are created from ash residues that result from combustion of biosolids. Primary interest in creating these types of products has been in Japan, but also in Europe to some extent. Vitrification

of biosolids (creating inert glass aggregate) is now being accomplished in the first North American plant at the North Shore Sanitary District in Illinois.

Other Biosolids Resource Recovery

Many other resource recovery options from biosolids are undergoing research and development around the world because of the current problems with biosolids disposition. Work on additional nutrient recovery options, metals recovery, acid production, and building product options is being pursued. Even recovering bio-pesticides from biosolids is under research. As costs rise for acceptable biosolids disposition, additional processing methods and technologies are likely to become economically viable. Other biosolids resource recovery options will be explored in PM 5.2.

Energy from Municipal Solid Waste

Electricity can be produced by burning "municipal solid waste" (MSW) as a fuel. MSW power plants are designed to dispose of MSW and to produce electricity as a byproduct of the incinerator operation. MSW consists of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint and batteries. It does not include medical, commercial and industrial hazardous or radioactive wastes, which must be treated separately. MSW is managed by a combination of disposal in landfill sites, recycling, and incineration. The Zanker Road Landfill is the primary local recipient of MSW and therefore energy production can potentially occur locally for on-site use. It should be noted that incineration is the lowest priority form of waste management according to the Environmental Protection Agency (EPA). The EPA recommends, "The most environmentally sound management of MSW is achieved when these approaches are implemented according to EPA's preferred order: source reduction first, recycling and composting second, and disposal in landfills or waste combustors last" (Environmental Protection Agency, 2008).

APPENDIX REFERENCES

APPENDIX REFERENCES

1. City of San José, 2007. Municipal Zoning Ordinance. City of San José, 1996. City of San José General Plan 2020.
2. Environmental Protection Agency, 2008. Wastes - Non-Hazardous Waste - Municipal Solid Waste. <http://www.epa.gov/osw/nonhaz/municipal/index.htm>
3. Water Environment Research Foundation, 2008. State of Science Report: Energy and Resource Recovery from Sludge.