CHAPTER 2
DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

Three alternatives for the proposed water recycling facility are evaluated in this EA: Alternative 1 (Centralized Storage), Alternative 2 (Multiple Storage Sites), and the No Action Alternative. Both action alternatives propose the rehabilitation and reuse of an existing building within the Letterman Complex for the proposed treatment plant. This Chapter provides background information on the development and refinement of the alternatives, as well as project conditions that have been identified by the Trust. A brief discussion of alternatives initially considered but removed from further evaluation in this EA is provided in Section 2.4. A regional location and map showing Presidio planning districts is presented in Figure 2-1.

2.2 DESCRIPTION OF ALTERNATIVES

2.2.1 BACKGROUND ON ALTERNATIVES DEVELOPMENT

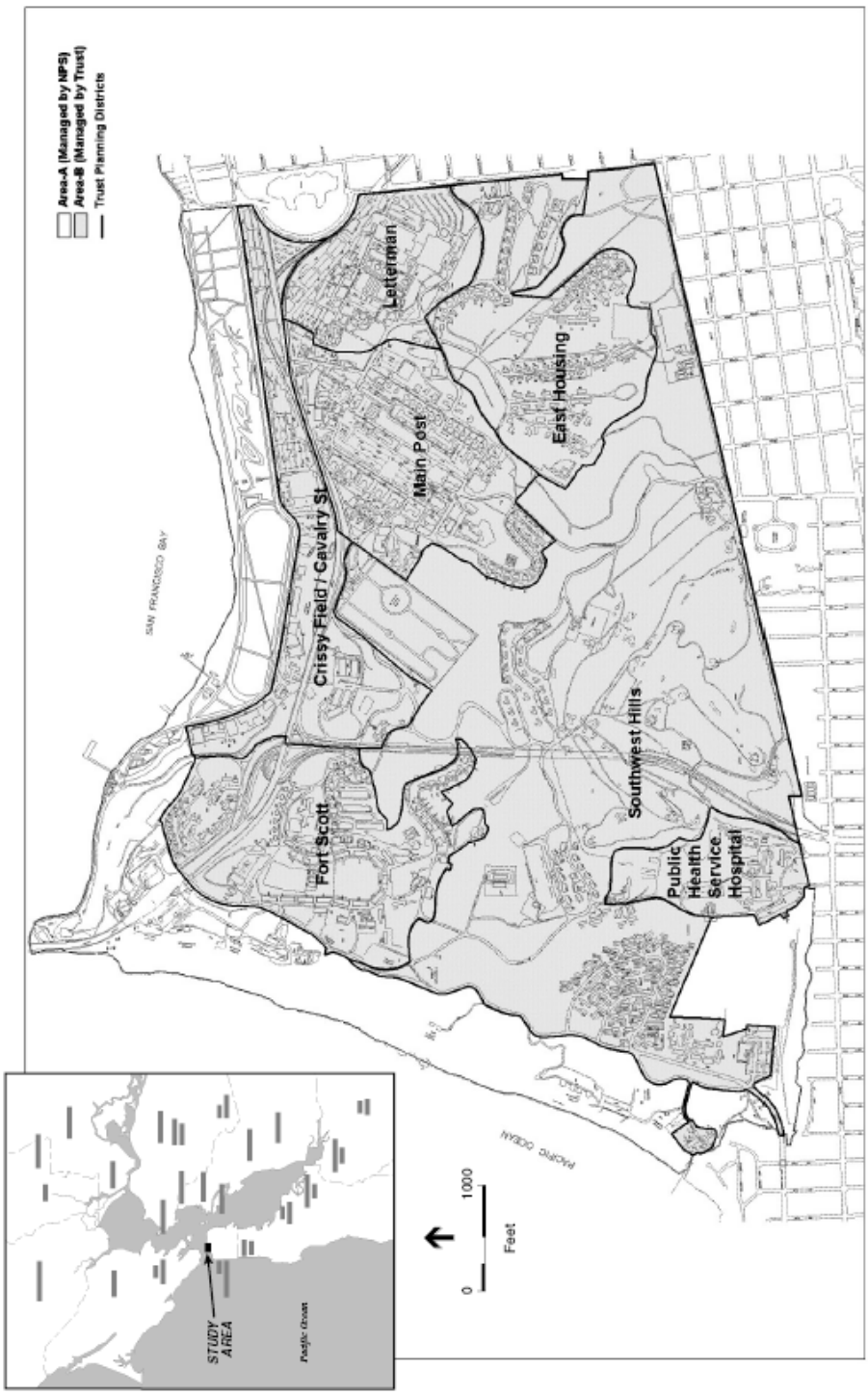
The Trust developed and refined the two action alternatives evaluated in this EA through the planning process and in response to scoping comments. A summary of the salient facts or other background that influenced the development of these alternatives is provided below.

- Approximately 85% of total wastewater flows at the Presidio are conveyed via the "Presidio Main" pipeline and discharged to the CCSF's combined sewer system near the Gorgas Gate within the Letterman Complex.

- Some water storage capacity is necessary to operate a recycled water system. Consistent with industry standards, proposed storage facilities are generally sized to accommodate the average daily demand during the summer period, providing operational flexibility and reliability, as well as supplementing treatment capacity during peak demand periods.

- Crissy Field (Area A) has already been equipped with the infrastructure necessary to receive recycled water (i.e., purple pipe). The Letterman Digital Arts Center (LDAC) is also being designed to accept recycled water.

- Treatment technologies were identified for their ability to meet the most stringent water quality requirements for a disinfected tertiary recycled water. The related requirements and byproducts are also considered, including facility/space needs, energy demands and potential odor generation.



Presidio Water Recycling Project ■ **Figure 2-1** Regional Location and Planning Districts

SOURCE: Presidio Trust

- In order to minimize environmental and historic effects of the project, pipelines and storage facilities were sited in areas that were previously disturbed or that have been identified for future environmental remediation activities. Preliminary pipeline alignments were revised based on field visits with various resource specialists to minimize potential impacts, as well as through the environmental analysis conducted during the preparation of this EA.

- In response to scoping comments, additional information on water conservation and its role in each of the alternatives was incorporated into the EA. Other modifications to the action alternatives in response to scoping comments include the provision of additional detail on the amount of projected recycled water use, size of facilities, and various operational aspects.

2.2.2 COMMON COMPONENTS OF ACTION ALTERNATIVES

Both action alternatives assume that the project would be implemented in phases, with Phase 1 representing a 0.2 MGD project and Phase 2 representing a 0.5 MGD project. Phasing is necessary based on the availability of raw wastewater flows, as currently vacant buildings become occupied in the future. It is assumed that Phase 1 would be implemented as soon as possible following completion of required NEPA and other compliance and permitting activities, while Phase 2 would be implemented in approximately seven to 10 years. Both alternatives could achieve the reductions in potable water use and in sanitary sewer discharges to the CCSF combined sewer system, as shown in Table 2-1.

The following components (discussed below) would be similar under both action alternatives:

- Water Conservation Practices;
- General Operations of the Proposed System;
- Recycled Water Users and Demands, and
- Basic Components of the Proposed System.

WATER CONSERVATION PRACTICES

The Trust will continue to identify and implement various water conservation measures, and these efforts would continue under all alternatives, including the No Action Alternative. Current measures include infrastructure repairs, installation and use of water-efficient fixtures, and public education. Water savings are already being realized through these practices, as reflected in the last several years of water use data. Specifically, average water use over the past three years has remained relatively constant at approximately 0.8 MGD, while building reuse/occupation has increased.

Conservation practices that are already being implemented by the Trust include the installation of low-flow fixtures, including aerators, low-flow showerheads, and low-flow toilets. These fixtures are installed in all rehabilitation projects throughout the park, and can improve water efficiency by as much as 50 percent. As additional buildings are rehabilitated, the Trust will continue to ensure that the water-efficient systems are installed. Other measures are currently being

TABLE 2-1
SUMMARY OF ANNUAL POTABLE WATER USE AND SANITARY SEWAGE DISCHARGES WITH AND WITHOUT THE PROPOSED PROJECT (IN MILLION GALLONS/YEAR)

	Existing	Existing Plus Project (Phase 1)	Future 2020 No Action	Future 2020 with Project (Phase 1 and 2)
Estimated Potable Water Use:				
Irrigation	133	98	184	100
Other Uses	152	152	264	264
Total	285	250	448	364
Projected Recycled Water Use	0	35	0	84
Estimated Total Sanitary Sewage Discharged to CCSF System	120	85	238	154

[1] Estimated existing and future water use is based on currently available information and information provided in the PTIP Draft EIS (Presidio Trust 2001). Future water projections, and thus future sanitary sewage flows, do not factor in water savings that would be provided through implementation of conservation practices. Recycled water production amounts are based on estimated average annual demand, and would vary from year to year depending on annual precipitation, climate, etc.

implemented and/or will be implemented in the future, including the installation of water meters in Presidio buildings. Metering water enables billing to be based on consumption volume, which in turn promotes conservation.

Irrigation accounts for approximately half of the water usage on the Presidio. Efficient irrigation methods and scheduling are the key to reducing evapotranspiration (ET), seepage and surface runoff. In addition, the recently adopted Final Vegetation Management Plan (VMP) includes requirements for the use of drought-tolerant vegetation in all new landscapes. Although the Trust has made progress in increasing irrigation efficiency, this is an area where the Trust will be focusing future, new water conservation activities. The Presidio Golf Course irrigation system now operates on a satellite-based system that bases daily irrigation on ground moisture conditions, solar radiance, and precipitation. The Trust is in the process of replacing inefficient manual watering systems with new computer-controlled systems (timers) that will help increase future irrigation efficiencies, as well as other actions that will help further reduce water consumed for irrigation purposes.

GENERAL OPERATIONS OF THE PROPOSED SYSTEM

Raw wastewater would be diverted from a sanitary sewer main and conveyed to a treatment plant. Treatment would include biological treatment, filtration and disinfection, meeting the highest quality standards of California's Code of Regulations, Title 22 for Disinfected Tertiary Recycled Water. Following treatment, recycled water would be conveyed to a reservoir for storage, and subsequently delivered to the irrigation sites through a distribution system. This type of water is suitable for unrestricted body contact, and is commonly used throughout the state for landscape irrigation and a variety of other more restrictive uses (including irrigation of food crops).

The system would be designed to provide treatment capacity equal to the Maximum Month, Average Day irrigation demand. Peak demands would normally be met from a combination of treatment capacity and storage. The storage volume is planned to be sized equal to one day of Maximum Month, Average Day Demand. In addition, a standby connection to the potable water system would be provided at the storage reservoir to provide operational reliability (i.e., to meet prolonged periods of high demand or provide service when the treatment plant is off-line for maintenance).

The estimated average annual energy use would represent slightly less than two percent of the current average annual demand, which would be easily accommodated within the existing infrastructure and supply. Over time, energy demand would increase as the capacity of the plant increases and the distance (i.e., pumping needs) to irrigated areas increases. Even at the maximum capacity of the proposed water recycling system, average demands would represent just over three percent of current average demand. These demands would be partially offset by avoided pumping and treatment activities from the existing potable water treatment plant (which currently serves all irrigation demands at the park). In addition, irrigation with recycled water and the corresponding bulk of energy demands (i.e., pumping) would occur during the off-peak evening hours.

It is anticipated that the treatment and distribution system would typically require one full-time employee; however, start-up activities, some maintenance tasks and other seasonal demands would require full-time support from two operators.

Normal Operations

During the spring, summer and fall, the system would operate to meet varying seasonal irrigation demands. Raw wastewater would be diverted and treated primarily during the day, when the largest volumes of wastewater are available between the early morning and evening peaks. As the nighttime irrigation demand period begins, water would be pumped (or would flow by gravity, depending on the alternative) from storage to the user site. When demands exceed available storage and treatment capacity, supplemental potable supply would used.

Winter Operations

There are two basic operational scenarios that can be employed during the winter: the first, Continuous Operation, would maintain year-round plant operations and reduce wet weather

wastewater discharges to the CCSF system, while the second, Seasonal Operation, would shut down the plant during the low-demand winter months. Continuous Operation has been included in this EA at the request of the CCSF. Please refer to Sections 2.2.2 and 2.2.3 for additional information.

RECYCLED WATER USERS AND DEMANDS

Recycled water is proposed for irrigation use at several areas on the Presidio. Refer to Figure 2-2, which depicts the general use area boundaries and Table 2-2, which summarizes the projected recycled water demands.

Phase 1 – 0.2 MGD

The initial customers would include the 23-acre LDAC and Crissy Field. The Crissy Field (Area A) irrigation system was previously designed and constructed with the intent of using recycled water, and is ready to accept service at this time. The LDAC is being designed for recycled water use. During periods of lower irrigation demand, the treatment plant may operate below its full design capacity; during times of peak irrigation demand, supplemental water from the Presidio potable water system would be necessary to meet demands.

Phase 2 – 0.5 MGD

The Trust would continue to monitor wastewater flows at the Presidio, and would consider implementation of Phase 2 as flows approach 0.5 MGD at the Gorgas Gate. Phase 2 customers would include all Phase 1 customers plus additional landscaped areas along the Lombard corridor, the Main Post area and potentially the National Cemetery and Fort Scott. The landscaped areas along Lombard Street as it enters the park (referred to in this document as the Lombard corridor) consist primarily of turf and trees between Letterman Drive and Lombard Street, and Sherman Road and Lombard Street. The Main Post area includes several discrete existing turf areas, and the demand projections include the possibility that the historic parade ground could be converted from the existing asphalt parking lot to turf. The National Cemetery site is a well-defined turf area. The Fort Scott area is primarily turf in landscaped areas and a ball field.

If desired by the CCSF, it is also possible that the Trust's plant would supply recycled water to Marina Green turf areas along Marina Boulevard may during Phase 2. Marina Green consists of three separate turf areas. This action would require the CCSF to conduct its own review and consideration of the project, and would require the Trust to eliminate some of the on-site use of recycled water so that the Marina Green demand could be met. There is an existing connection (purple pipe) located near Mason Street and Yacht Road that could potentially be used to provide service to Marina Green. Additional discussions with the NPS and CCSF would be needed to confirm the feasibility of this connection.

Presidio Water Recycling Project ■

Figure 2-2

Proposed Recycled Water Use Areas

NOTE: Shaded areas are approximate.

SOURCE: Kennedy/Jenks Consultants

TABLE 2-2
PROPOSED IRRIGATION AREAS AND
RECYCLED WATER DEMANDS BY PROJECT PHASE

Recycled Water Use Area by Phase	Average Annual Demand (AF/yr)	Average Monthly Demand (MGD)	Peak Month, Avg. Day Demand (MGD)	Peak Month, Peak Day Demand (MGD)
Phase 1- 0.2 MGD				
Crissy Field	81.7	0.097	0.155	0.233
Letterman Complex	23.3	0.021	0.052	0.060
Subtotal Phase 1	105.0	0.118	0.207	0.293
Phase 2- 0.5 MGD				
Lombard corridor	19.8	0.023	0.038	0.056
Main Post	46.7	0.055	0.089	0.133
National Cemetery	51.3	0.061	0.097	0.146
Fort Scott	34.1	0.040	0.065	0.097
CCSF/Marina Green	44.3	0.053	0.084	0.126
Total Phases 1 and 2[1]	256.9	0.297	0.496	0.725

[1] CCSF/Marina Green not included in total – future service to this area to be determined in future through consultation with the City as part of Phase 2.

SOURCE: Kennedy/Jenks Consultants 2002.

All Phase 2 users would require modifications to existing irrigation systems prior to receiving recycled water. Modification would include signage to meet the regulatory requirements of the California Department of Health Services, as well as ensuring that cross-connections to existing potable water supply are removed. In addition, all hose bibs must be removed from the irrigation system and other operational practices would be enforced as part of the water recycling permit requirements (see Section 3.3 for additional information on regulatory requirements).

BASIC COMPONENTS OF THE PROPOSED SYSTEM

Raw Wastewater Diversion

The raw wastewater source location would be in the vicinity of the Letterman Complex/Gorgas Gate area, where the Presidio's sanitary sewer discharges to the CCSF system. A diversion structure and pipeline would be installed underground, and equipped with a submersible pump station to convey the raw wastewater to the nearby treatment plant. Waste sludge and screenings from the treatment plant would be conveyed back to the CCSF sewer system for treatment and disposal (see below for additional information on proposed treatment process).

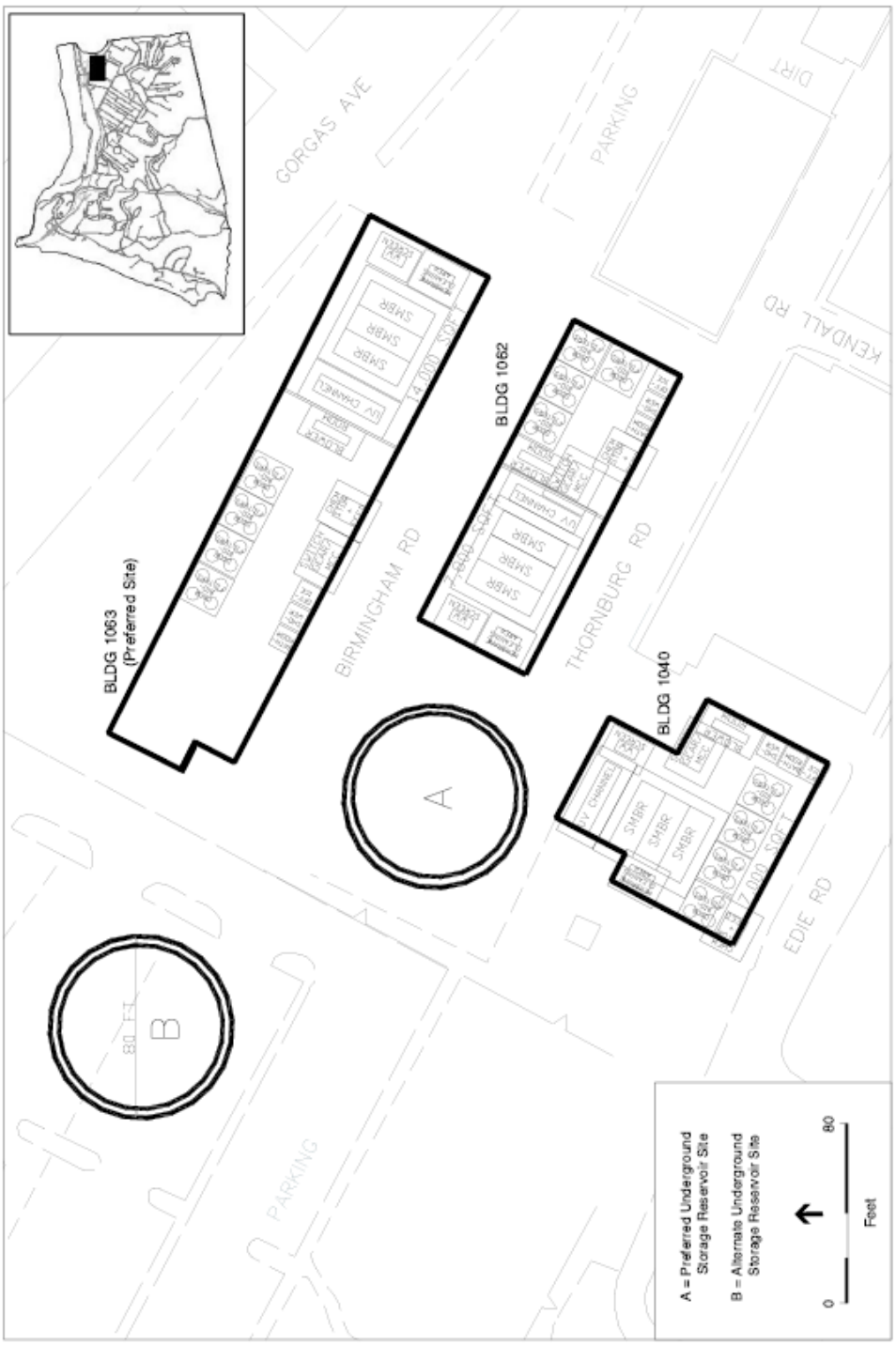
Recycled Water Treatment Facility

Consistent with Section 110 of the National Historic Preservation Act, the Trust is proposing to reuse and rehabilitate an existing historic structure to house the recycled water treatment plant, rather than construct a new facility. For both action alternatives, the same three buildings are being considered as alternate site locations: Buildings 1040 (former Powerhouse & Steam Plant), 1062 (former Quartermaster's shop) and 1063 (former Medical Supply Warehouse - and the Trust's preferred site). The buildings are in close proximity to the Gorgas Gate source of raw wastewater supply. The various treatment plant alternative sites are depicted in Figure 2-3, together with a conceptual layout of facilities within the buildings. Reuse of an existing structure would require seismic retrofit and other modifications to provide the necessary floor and overhead space for equipment, access for construction and operations and maintenance, and other modifications necessary to support equipment or rehabilitate architectural surfaces. The retrofit and layout would be refined through the design and engineering process, and would comply with the *Secretary of the Interior's Standards for the Rehabilitation of Historic Structures*. Although detailed cost estimates were not prepared for each alternative site, Building 1040 is likely to cost substantially more than the other two sites, based on the condition, size and layout of the building.

Raw wastewater would be diverted to the proposed plant for treatment, which would consist of fine screening, biological treatment/filtration, and disinfection. The product water would be pumped to a storage reservoir for distribution to end-users. The waste (solids/screening) from the system would be returned to the sewer, as is currently practiced.

The treatment process would consist primarily of a submerged membrane bio-reactor for biological treatment and filtration, and an ultraviolet (UV) light process for disinfection. Other ancillary systems include a fine screening, chemical storage and handling facilities, odor control facilities, air blowers with sound attenuation devices housed in a separate room, pumping systems, mechanical piping, electrical and control systems, fire sprinkling systems, and HVAC systems. Because the proposed system would function as a satellite treatment facility and no sludge/solids handling would occur, potential odor generation at the plant would be minimal. Odor control facilities within the plant building would further reduce the potential for any nuisance; in addition, provision would be made for future chemical addition (magnesium hydroxide) to suppress odor in the raw wastewater, but it is not anticipated that chemical addition will be necessary to control odor. Potential odor impacts are described in Section 3.8.

There is one chemical that would be necessary for routine use in the treatment building. Sodium hypochlorite (household liquid bleach) would be used as a cleaning solution for membrane maintenance, for odor control of screenings, and for residual disinfection of the recycled water. All chemical materials would be handled, stored and used in a manner consistent with applicable health and safety regulations. The degree of hazard associated with this chemical is described in Section 3.6.



NOTE: See table of contents for acronms.
NOTE: The location and orientation of treatment facility components are conceptual.

SOURCE: Kennedy/Jenks Consultants

Presidio Water Recycling Project

Figure 2-3
Alternative Recycled Water Treatment and Underground Storage Sites

2.2.3 ALTERNATIVE 1 (CENTRALIZED STORAGE)

Alternative 1 is the Trust's preferred alternative. Under Alternative 1, all storage needs would be met by the construction and operation of a new 500,000-gallon subsurface reservoir. The project components associated with Alternative 1 are presented in Figure 2-4.

RECYCLED WATER STORAGE

During Phase 1, a 500,000-gallon subsurface storage reservoir (tank) located in the vicinity of the treatment plant would be constructed. This facility would provide adequate storage for Phases 1 and 2 of the project, and no supplemental storage facilities would be needed.

The new 500,000-gallon subsurface storage reservoir would be approximately 80 feet in diameter by 20 feet overall structure depth, and would be buried below turf or paved/parking areas. Two sites (A and B) have been identified as potential locations for this facility (see Figure 2-3). Both sites are currently covered by asphalt (one within an existing parking lot), and both have been identified for environmental remediation (i.e., excavation) of petroleum hydrocarbon contamination. It is assumed that construction of the storage reservoir would be concurrent with site remediation activities in order to minimize total ground disturbance and construction activities at the park.

A pump station would be needed at either subsurface storage reservoir to provide the delivery pressure and flow to meet the necessary service conditions. The pump station would be submersible, and would be housed within the proposed subsurface storage reservoir. The pumping units would be designed for serving different customer requirements to conserve energy and provide good demand/supply matching (i.e. low lift for Crissy Field, medium lift for Letterman and high lift for the National Cemetery and Ft. Scott). A motor control center and electrical service would be located in the selected treatment building. Access to both facilities would be provided for regular maintenance.

Reservoir Option A

This site would require pavement/foundation and utility demolition and relocation of existing electrical, sanitary, storm drain and potable water lines. Several of these utilities appear to be abandoned. This site has the highest priority for site remediation work and is closest to all building options, and is the Trust's preferred location. The reservoir roof would be designed so that it is buried below earth fill and sodded, or used for another use, including parking or as a roadway.

Reservoir Option B

This site would require the temporary removal of parking pavement and removal of an apparently abandoned sanitary sewer. Treatment of the reservoir surface would be similar to that described for Reservoir Option A.

RECYCLED WATER DISTRIBUTION SYSTEM

The recycled water distribution system would include underground pipelines ranging in size from 4 to 12 inches in diameter. Refer to Figure 2-4, which presents the proposed distribution system pipeline alignments by phase as well as linear feet and other relevant information. As shown in Figure 2-4, the proposed pipeline alignments would be located within existing roadways and/or paved areas. The California Department of Health Services (DHS) has established Sanitary Separation Requirement for recycled water pipelines that also set minimum clearances for horizontal separation between recycled water and potable water or sanitary sewer pipelines. This requirement is generally 10 feet horizontal; however, it can be as little as four feet if additional pipe design requirements are met.

WINTER OPERATIONS

Under Alternative 1, there would be two basic operational scenarios that could be employed during the winter: continuous plant operation or seasonal closure. Continuous operations are included to be responsive to requests made by CCSF. Further coordination with CCSF would be needed to ensure an effective operational regime is achieved during continuous winter operations and that related logistical issues are addressed.

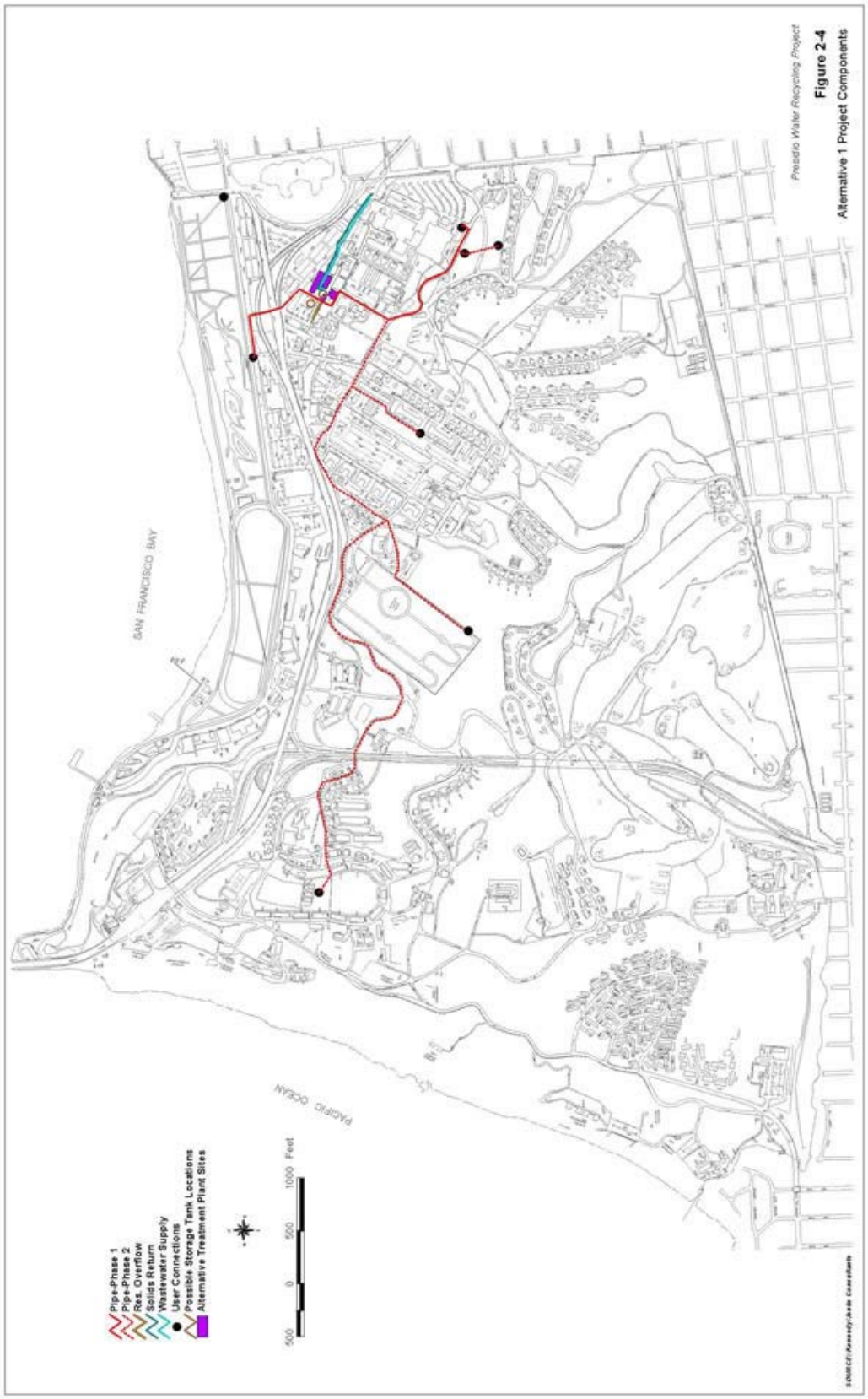
Continuous Treatment Plant Operation

At times during the winter, irrigation demands would be minimal and the treatment plant would operate at the minimum rate possible to maintain the health and viability of the biological treatment process. If inadequate irrigation demand exists, small amounts of treated (not disinfected) water would be sent back to the sanitary sewer. Additional time would be needed by operators during the winter to manage the treatment process under this scheme, as compared to the seasonal operation as described below; costs would also increase for this operational scenario.

The recycled water storage reservoir could be maintained at low levels during the winter, so when wet weather occurs, the treatment system could be manually operated to fill the reservoir with treated water, reducing wet weather discharges by up to 500,000 gallons. When the reservoir fills, the treatment system stops. Following the storm event, the treated water could be used for irrigation or discharged to the sanitary sewer system during off-peak periods.

Seasonal Treatment Plant Operation

Another possible operating scenario is to decommission the treatment plant during late-November each year for the winter season, and use the standby potable water connection to fill the storage reservoir to meet the very low winter irrigation demands. This operating scenario does not provide any wet-weather discharge reduction, but would likely reduce operations effort and cost, and provide time for scheduled maintenance of facilities. The plant could be brought back into operation over a two-week period in March for seasonal use.


Presidio Water Recycling Project
Figure 2-4
Alternative 1 Project Components
SAN FRANCISCO BAY
PACIFIC OCEAN
Pipe-Phase 1
Pipe-Phase 2
Res. Overflow
Solids Return
Wastewater Supply
User Connections
Possible Storage Tank Locations
Alternative Treatment Plant Sites
500
0
500
1000 Feet

CONSTRUCTION METHODS AND SCHEDULE

It is estimated that it would require 12 months to construct each phase. Phase 1 is proposed for implementation starting in fall 2002, with completion in fall 2003. Implementation of Phase 2 would occur sometime in the future, and would be dependent upon the reuse/occupation of buildings at the Presidio and subsequent availability of raw wastewater. At this time it is anticipated that Phase 2 would be implemented in seven to 10 years from the implementation of Phase 1, or between 2010 and 2013.

Pipeline construction would be traditional "cut and cover" construction within a trench. Pipeline trench width would be vary between 24 and 30 inches. Pipeline depth is anticipated to range from three feet minimum to six feet from grade where a utility crossing exists. At crossings with multiple existing utilities, the pipeline may need to be deeper to maintain one foot of vertical clearance between pipelines. There would typically be active work areas of about five feet on one side of the trench and 10 to 12 feet on the other side for access by trucks and loaders, resulting in a construction easement approximately 20 feet wide, unless otherwise restricted for environmental protection (see Section 3.6). Excavated trench materials would be reused for trench backfill or taken to an approved landfill for disposal. Following construction, the pipeline corridor would be rehabilitated to match the pre-construction conditions (i.e., roadway resurfacing, approved vegetation treatment or replacement of trail tread material). Work would proceed at a rate of approximately 200 feet per day. Construction equipment used for pipeline construction would include pavement saws, jack hammers, backhoes, front-end loaders, dump trucks, flat-bed delivery trucks, cranes, compactors, concrete trucks, and paving equipment. There would be an estimated 10 workers for pipeline construction.

The existing building used for the proposed treatment plant would need to undergo a seismic upgrade, which would be required regardless of whether the project is implemented. Seismic upgrade would likely consist of reinforcing diaphragm connections and use of sheer walls**,** and would need to be coordinated with the planning of construction of the treatment facilities.

During construction of the treatment facilities, concrete for the building foundations and pads would be delivered to the site by ready-mix trucks; a crane would be used to set equipment; and supply trucks would be used to deliver materials and equipment used in the treatment process. All construction phases would involve the use of pickup trucks and worker vehicles. There would be approximately ten workers at the treatment plant site during the entire construction phase. Adjacent paved areas (i.e., parking lots) would serve as staging areas.

Construction of the underground storage reservoir would occur concurrently with the treatment plant construction. As stated previously, petroleum hydrocarbon remediation efforts are planned for the area that would consist of soil excavation and disposal. Once the removal of hazardous materials is completed, reservoir construction would begin that would likely include additional soil excavation, installation of a foundation, placement of concrete forms and then concrete. Dewatering of the construction site would be necessary during construction.

2.2.4 ALTERNATIVE 2 (MULTIPLE STORAGE SITES)

This alternative also proposes the construction and operation of a water recycling system, similar to that described for Alternative 1. The Phase 2 pipeline alignments, storage facilities, and potential wet weather operations distinguish this alternative from Alternative 1 (Centralized Storage). The project components associated with Alternative 2 are presented in Figure 2-5.

RECYCLED WATER STORAGE

During Phase 1, recycled water would be stored in a 400,000-gallon subsurface storage facility located in the vicinity of the treatment plant. Storage sites A and B described above would be applicable to this alternative. As part of Phase 2, supplemental storage would be provided through the rehabilitation and reuse of an existing (abandoned) 100,000-gallon reservoir in the western side of the park (near Washington Blvd and Highway 1). Refer to Figure 2-5.

Existing Abandoned Reservoir

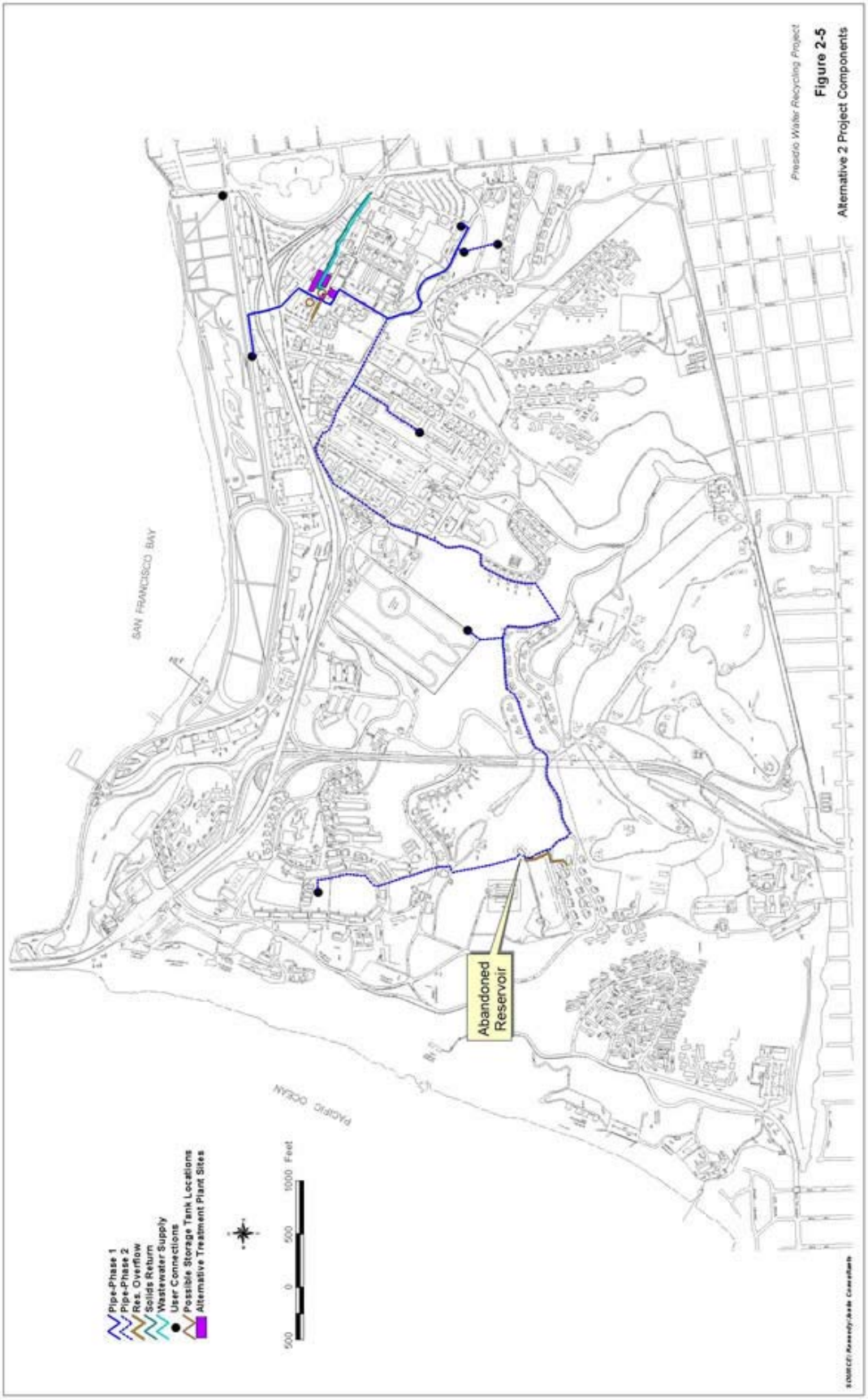
The existing abandoned 100,000-gallon reservoir was constructed in 1897 by the Army as part of its potable water supply system. Reuse of this reservoir would require rehabilitation, as well as site restoration and piping modifications. Based on field investigations, it is anticipated that the site (i.e., area within the existing fenceline surrounding the reservoir) would require clearing of overgrown vegetation and new fencing. The abandoned reservoir would likely require roof repairs, painting, bug screen, seismic retrofit, telephone/electric service, level controls, and possibly a liner or coating system to provide a water-tight structure. A new standby potable water connection would need to be provided, as well as a gravity overflow pipeline to provide safe routing to an existing sewer.

RECYCLED WATER DISTRIBUTION SYSTEM

The proposed pipeline distribution system for Alternative 2 is presented in Figure 2-5. Information related to the relative size, depth and DHS requirements for pipeline construction described under Alternative 1 would apply to Alternative 2 as well.

WINTER OPERATIONS

As described for Alternative 1, there would be two basic operational scenarios that can be employed during the winter: continuous operation and seasonal closure. Each of these operational scenarios is described below, with an emphasis on the differences between the two alternatives.


Presidio Water Recycling Project
Figure 2-5
Alternative 2 Project Components
SAN FRANCISCO BAY
PACIFIC OCEAN
Abandoned Reservoir
Pipe-Phase 1
Pipe-Phase 2
Res. Overflow
Solids Return
Wastewater Supply
User Connections
Possible Storage Tank Locations
Alternative Treatment Plant Sites
500
0
500
1000 Feet

Continuous Treatment Plant Operation

Under this scenario, operations would be generally as described for Alternative 1. However, under Alternative 2, Phase 2, the reuse of the abandoned 100,000-gallon reservoir has the potential to provide a third scenario for wet weather operations (beyond the two scenarios already described for Alternative 1). This third scenario would allow continuous discharge of recycled water to the City's Oceanside Plant, which the City previously requested the Trust to consider (refer to Section 2.1 for background information). Reuse of the existing reservoir would require that a gravity overflow pipeline providing safe routing to an existing sewer be established. During peak wet-weather conditions, the treatment plant could be continuously operated, recycled water could be pumped to the reservoir, and subsequently diverted via the overflow pipeline into the sanitary sewer that ultimately flows to CCSF's Oceanside Plant. Detailed hydraulic analyses and coordination and evaluation with the CCSF would be needed prior to implementation. This operational scenario would require the most operational effort and the highest cost of all treatment scenarios.

Seasonal Treatment Plant Operation

Seasonal treatment plant operation would be the same as described for Alternative 1.

CONSTRUCTION METHODS AND SCHEDULE

Construction methods and schedule described under Alternative 1 would be the same for Alternative 2, with the exception of a substitution of additional work involved in piping and rehabilitation of the reservoir, per the above description.

2.2.4 SUMMARY OF ACTION ALTERNATIVES AND CAPITAL COSTS

Table 2-3 provides a summary comparison of the two action alternatives described above, together with the estimated capital costs for both alternatives and phases. For additional background on the alternatives, please refer to the Presidio Water Recycling Project Plan, which is on file at the Presidio Trust Library (34 Graham Street, Presidio of San Francisco). Copies will also be made available upon request (see cover page of this EA for contact information).

TABLE 2-3
ALTERNATIVES SUMMARY COMPARISON

Component	Alternative 1: Centralized Storage	Alternative 2: Multiple Storage Sites
Raw W/W diversion / Sludge return pipeline	Gorgas Gate	Same
Treatment Plant Location	Bldgs 1040, 1062, or 1063	Same
• Phase 1 capacity, MGD	0.2	Same
• Phase 2 capacity, MGD	0.5	Same
Treated Water Storage	0.5 MG underground storage (2 alternative sites)	0.4 MG underground storage (2 alternative sites), plus rehab existing 0.1 MG reservoir
• Winter Operation: continuous operation option	Up to 0.5 MG wet-weather storage per event	Up to 0.4 MG wet-weather storage per event in Phase 1, up to 0.5 MG or possibly continuous diversion to CCSF Oceanside system in Phase 2[1]
• Winter Operation: seasonal closure option	No wet-weather flow reduction	No wet-weather flow reduction
Recycled Water User Areas		
• Phase 1	Crissy Field, Letterman	Same end users, different piping/distribution system
• Phase 2	Areas A & B, Main Post, National Cemetery, Fort Scott, and/or Marina Green	Same end users, different piping/distribution system
Capital cost (Phase 1/Phase 2) (millions of dollars)	$5.35 / $2.93	$5.22 / $3.35
Total capital cost (millions of dollars)	$8.28	$8.57

[1]Additional evaluation and consultation with the CCSF would be required prior to implementation of continuous diversion option

2.2.5 NO ACTION ALTERNATIVE

Under the "No Action" alternative, the proposed recycled water project would not be implemented and all irrigation demands at the Presidio would continue to be met with potable water. Based on metering data from the last several years, average water consumption at the Presidio has remained at roughly 0.8 MGD. Of this total, about 54 percent can be attributed to domestic consumption and 46 percent goes for irrigation uses. Over time, as the buildings in the Presidio are rehabilitated and occupied, water demands are projected to increase. Under all of the

alternatives in this EA, the Trust would continue to develop and implement water conservation practices. In particular, irrigation efficiency at the park would noticeably increase over time; however, there would always be a demand for irrigation water at the park. Under the No Action Alternative, this demand would be met exclusively by potable water. In addition, wastewater flows would continue to increase at the park as buildings are rehabilitated and occupied. Although water conservation measures and various infrastructure repairs would help minimize the volume of wastewater, all flows from the park would be conveyed to the CCSF's combined sewer system.

2.3 BEST MANAGEMENT PRACTICES

The Trust has identified a series of best management practices (BMPs) that would be implemented as part of either action alternative. Additional project-specific mitigation measures that were developed through the environmental analyses are presented in Chapter 3. All of these conditions have been incorporated into the two action alternatives. In addition, various regulatory requirements would also apply to the two action alternatives. A description of these requirements is provided in relevant sections of Chapter 3.

BMP-1: EROSION/RUNOFF CONTROL

The Trust would require construction contractors to implement a Stormwater Pollution Prevention Plan (SWPPP), which includes Best Management Practices (BMPs) to minimize potential water quality impacts, control erosion and sedimentation, and prevent the inadvertent introduction of non-native invasive plant species during construction. The Trust would require contractors to implement the SWPPP and BMPs for construction activities similar to those included in the California Storm Water Best Management Practices Handbook (Stormwater Quality Task Force, 1993) and/or the Manual of Standards for Erosion and Sediment Control Measures (ABAG, 1995). The BMPs would include measures guiding the management and operation of construction sites to control and minimize the potential contribution of pollutants to storm runoff, disturbance of wetland features (via runoff or sedimentation), and prevent the inadvertent introduction of non-native invasive plant species into construction areas. Measures would include procedures for controlling erosion and sedimentation and managing all aspects of the construction process to ensure control of potential water pollution sources and restrictions on the removal and disposal of non-native plant species.

Erosion and sedimentation control practices typically include:

- Developing a long-term and short-term approved erosion control strategy;
- Limiting construction to the dry-weather months, to the greatest extent practical;
- Installing silt fencing, weed-free rice straw mulch or bales, check dams, geofabrics, drainage swales, sand bag dikes and/or straw wattle wherever deemed appropriate for runoff and erosion control (only rice straw would be permitted to prevent inadvertant introduction of wheat and barley species); and

- Soil stabilization, to include compacting to natural state, and grading to natural topography to the greatest extent feasible.

BMP-2: DUST CONTROL

Consistent with the Bay Area Air Quality Management District's recommendations, the Trust would require construction contractors to implement a dust abatement program during construction, which should include, at a minimum, the following elements:

- Water all active construction areas (where soil is exposed) at least twice daily, depending on type of operation and wind exposure;

- Designate a person or persons to oversee the implementation of a comprehensive dust control program and to increase watering, as necessary;

- Construction grading and trenching activities should be discontinued in high wind conditions where excessive dust problems occur, as determined by the construction inspector;

- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer) in accordance with Section 23114 of the California Vehicle Code during transit to and from the site;

- Sweep streets daily (preferably with water sweepers) if visible soil material is carried onto adjacent streets.

BMP-3: NOISE CONTROL

To reduce noise due to construction, the Trust would require that construction contractors muffle or control noise from construction equipment through implementation of the following measures:

- Equipment and trucks used for construction would be required to utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible). Construction vehicles would be properly maintained and equipped with exhaust mufflers that meet relevant standards;

- Impact tools (e.g., jack hammers and pavement breakers) used for construction would be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust would be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves would be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures would be used such as drilling rather than impact equipment whenever feasible;

- Noise-generating construction activities would be avoided during times of the day in which such construction activities are prohibited under the San Francisco Noise Ordinance;

- Stationary noise sources would be designed with acoustical treatments (building enclosures, louvered vents, noise walls, etc.) that are adequate to maintain potential noise generation to levels at or below ambient levels, and/or sources would be located as far from sensitive receptors as possible muffled so that the noise is reduced to an acceptable levels.

BMP-4: BIOLOGICAL RESOURCE PROTECTION

To minimize the potential for impacts on biological resources, the Trust would implement the following actions – along with those previously described for erosion, dust and noise control:

- Construction activities would be located at least 100 feet from the edge of existing native plant communities and/or assemblages. If this is not feasible, the following measures would be used:

  – Temporary protective fencing or other barriers would be installed, in consultation with Trust natural resource staff, around affected native plant communities and natural habitat to avoid inadvertent disturbance by construction crews;

  – Consistent with the adopted *Presidio Vegetation Management Plan* (VMP) measures NP-2, 3 and 6, a revegetation plan would be prepared and implemented for any area where native plant communities would be disturbed. The plan would include performance standards, species selection, a monitoring plan, and maintenance program. The plan would be prepared prior to soil disturbance activities to ensure that propagules and plant material would be available. If this is not feasible, soil stabilization and invasive non-native plant inhibition measures would be employed until future revegetation occurred. Approved erosion control measures would be installed and either weed inhibition fabric or dense rice straw mulch would be applied to the area until the revegetation plan was completed and implemented (see below). Weed inhibition measures would be developed on a site-specific basis (i.e., considering constraints within each VMP management zone) and could include the application of weed protection fabric and 4 to 6 inches of mulch; and

  – Daily inspections by Trust natural resource protection staff would be completed in the affected areas during construction.

- Non-native plant control would be done to ensure no new non-native invasive plant species are introduced to the park and to prevent the spread of existing non-native plants. Control measures would be defined in accordance with the Trust natural resource staff, and would include, but are not limited to:

  – Conduct weeding program in areas where revegetation occurs for a minimum of three years to ensure plant establishment. Post-construction qualitative monitoring would be conducted to identify locations where targeted non-native species have established;

  – Preserving stratigraphy of soils (to include supported vegetation and seedbank that would be used as top-dressing post construction) removed during construction of distribution line in areas deemed appropriate by either natural resource specialist or forester;

  - Cleaning equipment during construction activities whenever equipment works within patches of invasive non-native species (that could be transported by equipment) prior to beginning construction in other non-impacted areas; and

  - Disposal of non-native plants removed during pipeline construction would be done in accordance with Trust guidelines.

- The Trust Forester would be consulted prior to construction activities in any forested area to ensure that appropriate tree protection measures are implemented. These measures would include identifying areas where protective fencing would be installed prior to construction to prevent impacts to trees or root systems directly adjacent to the project area, as well as examining the proposed route in the field. During construction, the Trust Forester would be notified if roots greater than two inches in diameter are encountered or severed;

- Consistent with VMP mitigation measures WI-1 through 4 (Appendix E, pg. 22), construction activities would be phased or otherwise modified to avoid or minimize impacts on nesting birds;

- No incompatible fill materials would be introduced into natural or historic forest areas; only fill material that is compatible with future restoration/rehabilitation would be approved in coordination with a natural resource specialist or geologist; and

- Plant operations would be done in a manner consistent with the Trust's Integrated Pest Management practices to ensure that pests are not attracted to the site.

BMP-5: TRAFFIC AND TRANSPORTATION

A Construction Traffic Management Plan (CTMP) would be prepared by the construction contractor to show specific methods for maintaining traffic flows on roadways directly affected by project construction. The CTMP will include, at a minimum, the following elements:

- Construction equipment and vehicle routes would be documented and would comply with City restrictions on neighborhood streets surrounding the Presidio.

- Hours of operation for trucks and/or employee traffic would be established, as would the quantity and location of construction parking during various phases of construction.

- The contractor would install appropriate barriers or fencing around construction zones, and put up signage showing safe detours to ensure the safety of vehicles, pedestrians, and bicyclists.

- Where feasible, alternate one-way traffic flow past the pipeline construction zone would be maintained. Intermittent traffic control plans would be developed prior to closing any roadways, and advance warning signs for major closures will be provided and coordinated with park police.

- The contractor would be required to maintain access to driveways and side streets with alternate routes or steel plates across open trenches, as appropriate.

- Access for emergency vehicles would be provided at all times.

- Construction trenches in streets would not be left open after work hours.
- The contractor would proactively work with the Trust and area transit providers (MUNI, GGT and the Presidio Shuttle) to ensure adequate access for transit vehicles, and minimize disruption of transit services.

The CTMP must be reviewed and approved by the Trust prior to issuance of permits, and would be implemented by the contractor during construction. The CTMP would be a requirement of the project, and information about this requirement would be made available to construction contractors during the Request for Proposals process. The selected construction contractor(s) would complete the CTMP at least 60 days prior to commencing work.

BMP-6: HAZARDOUS MATERIALS

To minimize the potential for hazardous materials to impact soil, surface waters, or groundwater quality, the Trust would implement the following actions:

- Follow manufacturer's recommendations on use, storage and disposal of chemical products used in construction;
- Avoid overtopping construction equipment fuel gas tanks;
- During routine maintenance of construction equipment, properly contain and remove grease and oils; and
- Properly dispose of discarded containers of fuels and other chemicals.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

A brief discussion of the alternatives that were considered but eliminated from detailed study is provided below, including an explanation for their removal.

2.4.1 LARGER PROJECT

During early planning, the Trust considered a larger project involving partnership with the CCSF. At that time, this option was considered based on the apparent excess demand for recycled water and the potential to treat wastewater from both City and Presidio sources. Since that time, however, additional information on potential recycled water use areas/demands (see below) led to removal of this alternative from further evaluation in this EA. If, in the future, conditions change that make this alternative feasible, the Trust and City could consider this opportunity and conduct necessary environmental review.

2.4.2 MULTIPLE, SMALL TREATMENT PLANTS

The construction of a series of 'package' treatment plants throughout the Presidio was initially considered as possible project alternative. Based on the lack of available wastewater flows at

multiple locations throughout the park, this was determined to be infeasible. (Refer to Section 2.2 for additional background on the availability of raw wastewater and location of recycled water demands.)

2.4.3 ALTERNATIVE RECYCLE WATER USE AREAS AND USES

RECYCLED WATER USE AREAS

There are other areas within the Presidio where potable water is currently used for landscape irrigation, which were initially considered as potential recycled water use areas but were removed for the reasons described below. These areas include the Presidio Golf Course, various residential areas, and several ballfields/recreation sites.

Lobos Creek is the primary potable drinking water source for the Presidio, and the Trust's Domestic Water Supply Permit specifically prohibits the use of recycled water within the Lobos Creek watershed. The **Presidio Golf Course** is located within the Lobos Creek watershed, and was therefore removed as a possible future recycled water use area.

The **Wherry and Washington Housing** areas have several small landscaped areas that are currently irrigated; however, these areas are located within the Lobos Creek Watershed and were therefore removed from consideration as part of this project, as described above for the golf course. In addition, all of Wherry and potentially some of the Washington housing would be removed over time to accommodate natural resource restoration activities.

Several residential areas and ballfields in the **East Housing** planning district are located within the Tennessee Hollow restoration study area. It is anticipated that the need for irrigation water and associated infrastructure in this area could be substantially reduced or possibly eliminated, depending upon the outcome of the restoration planning that was initiated late last year. Because future demand for irrigation in this area is unknown, and current demands are relatively small, these possible recycled water use areas were removed from consideration as part of the proposed project. Following removal of the above areas, the park-wide projected demand for recycled water was reduced such that the proposed 0.5 MGD project would successfully meet the bulk of on-site recycled water demand.

DISCHARGE OF RECYCLED WATER

The concept of discharging recycled water into Crissy Field or Tennessee Hollow was initially considered as a way to increase water available for restoration projects, as well as to reduce the amount of wet weather flows entering in the CCSF's combined sewer system during peak wet weather events. The availability of other measures to effectively achieve the same end (i.e., reduce wet weather flows to the CCSF system), and the opposition expressed by the National Park Service during scoping led to its removal from further evaluation at this time.

TOILET FLUSHING

The use of recycled water for toilet flushing was initially considered. While there are many uses for recycled water, the primary focus for this project is on irrigation, as irrigation represents a substantial portion of the potable water budget for the Presidio, and as such provides the greatest potable water savings opportunities. Additionally, many of the structures at the Presidio are historic, including those that are contributing features to the National Historic Landmark district. Implementation of dual plumbing within these structures could require major renovation that would likely disturb the historic fabric.

Removal of the above potential recycled water use areas or uses from this EA does not preclude consideration of these activities in the future, should conditions or circumstances change which alter the basis for their removal.