ENGINEERING REPORT

PINOLE - HERCULES WATER POLLUTION CONTROL PLANT FACILITIES PLAN

JUNE 1, 2009

PINOLE - HERCULES
WATER POLLUTION CONTROL PLANT FACILITIES PLAN
ENGINEERING REPORT

SIGNATURE PAGE

This document has been prepared under the general supervision and direction of the following professional engineer, licensed in the State of California.

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SECTION ONE
EXECUTIVE SUMMARY

Introduction

The Pinole-Hercules Water Pollution Control Plant (WPCP) Facilities Plan engineering report was prepared to comply with Regional Water Quality Control Board (RWQCB) Order No. R2-2007-0024, Provision C.2.c. Task 2. The provision mandates corrective measures to upgrade the WPCP to increase dry and wet weather treatment capacity, eliminate blending of partially treated wastewater transported to the deep water outfall 001, and to prevent discharge through the shallow water outfall 002. The RWQCB has set a compliance time schedule, as shown in Table 1-1, so that all facilities are completed and on line by June 1, 2016. Accordingly, Task 2 which requires an engineering report that describes the WPCP upgrades that will increase the treatment capacity of the facility, and shall also include a complete antidegradation analysis that fully addresses consistency with the State Water Resources Control Board Resolution 68-16, and 40 CFR 131.12 must be submitted by June 1, 2009. The antidegradation analysis and financial analysis will be submitted as separate reports.

TABLE 1-1. RWQCB COMPLIANCE TIME SCHEDULE

Task	Compliance Date
1. Submit a Collection System Master Plan	June 1, 2008
2. Submit an Engineering Report identifying proposed plant upgrades	June 1, 2009
3. Submit certified EIR for project identified in Task 2.	August 1, 2010
4. Secure funding for WPCP upgrades	August 1, 2011
5. Start design of WPCP facilities	August 1, 2012
6. Complete final design of WPCP facilities	August 1, 2013
7. Commence construction of WPCP facilities	June 1, 2014
8. Complete construction of WPCP facilities	November 1, 2015
9. Ensure WPCP facilities are online and operational	June 1, 2016
10. Status report of collection system projects and WPCP upgrades	Annually (due February 1)

Background

The existing Pinole-Hercules WPCP is owned and operated by the City of Pinole under a joint use agreement with the City of Hercules. The agreement creates a governing body, the joint powers authority (JPA), which includes officials from both cities. The JPA has been meeting over several years to discuss various options for upgrading the wastewater treatment plant to comply with the current RWQCB permit requirements.

In 2007, the JPA retained Brown and Caldwell to evaluate plant upgrades and disposal options at the existing WPCP and Carollo Engineers to evaluate sending wastewater generated by the Cities of Pinole and Hercules to West County Wastewater District (WCWD) for treatment and disposal

to bring the WPCP into compliance. A total of eight (8) treatment and disposal options were developed.

Dodson Psomas, as an independent third party, was retained by the JPA in 2008 to conduct a peer review of the engineering studies prepared by Brown and Caldwell and Carollo on the various options. The peer review study recommended that the JPA proceed with a more detailed engineering report that evaluates not more than two options and develops a predesign for the selected option. The options suggested for further study were Option 2 (New Land Outfall) and Option 4 (Flow Equalization).

On December 10, 2008, City of Pinole representatives on the JPA recommended that additional engineering studies are required to meet the RWQCB deadline. On December 16, 2008, the Pinole City Council authorized this engineering report to further evaluate Option 2 and Option 4, and recommend the apparent best project and required WPCP upgrades.

Existing Facilities

The Pinole-Hercules Water Pollution Control Plant is located at the end of Tennent Avenue in the City of Pinole. Wastewater from the City of Pinole and Hercules is treated at this site and pumped to a joint outfall with Rodeo Sanitary District. Figure 1-1 is a site map showing the location of existing facilities and Figure 1-2 shows the layout of the existing WPCP.

Existing Plant Loadings

Historic plant loadings for Pinole have shown extreme variation for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS). Efforts by the WPCP have significantly reduced the extreme variation in samples and the overall loads since June 2008. Table 1-2 shows the current combined loadings for both Pinole and Hercules.

TABLE 1-2 CURRENT FLOWS AND LOADINGS

Parameter	Combined Influent
Average Dry Weather flow (mgd)	3.0
Peak Wet Weather flow (mgd)	22
Influent BOD (lb/day)	7,300
Influent TSS (lb/day)	8,000

Existing Treatment Process

Flow from Pinole and Hercules enters the headworks, is conveyed to a mechanical screen or through a manually cleaned bar screen, and then to the influent pump station wet well. The influent pump station has a firm capacity of 15 mgd. Ferrous chloride is added to the combined influent for odor control and digester gas hydrogen sulfide reduction.

Wastewater is pumped to the primary clarifier flow distribution box which distributes flow to three primary clarifiers that have a capacity of approximately 12 mgd. Hydraulically the clarifiers have handled flow in excess of 20 mgd during unusual wet weather events. Floatable material is removed and conveyed directly to the anaerobic digesters. Settleable material is removed from the flow stream by gravity and conveyed to the solids handling area.

ALIGNMENT FOR EXISTING 24–INCH LAND OUTFALL

PIPELINE IMPROVEMENT FOR EXISTING 24–INCH LAND OUTFALL (UNDER CONSTRUCTION)

DODSON PSOMAS

File Info. FIG_1-1.DWG HJH 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

SITE MAP

Scale NONE

Figure No. 1–1

DODSON PSOMAS

File Info. FIG_1-2.dwg DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

WPCP EXISTING SITE PLAN

Scale 1"=30'

Figure No. 1–2

The secondary treatment process is a biological process referred to as the activated sludge process. Flow from the primary clarifiers which contains organic material is combined with microorganisms in the aeration basins. The combined flow is referred to as mixed liquor. The capacity of the aeration tank is based on several factors including detention time, organic loading, and the amount of microorganisms that can be maintained in the system. With existing influent BOD load of 7,300 lbs/day the aeration tanks are near capacity. Taking one of the aeration tanks out of service would severely strain the ability to treat the existing organic load.

The secondary clarifiers separate out the microorganisms from the mixed liquor by gravity settling and return them to the aeration tanks. The secondary clarifiers cannot be hydraulically overloaded because the microorganisms will be washed out of the system and the secondary treatment system will fail. The wet weather capacity of the five existing secondary clarifiers is approximately 8.6 mgd without chemical enhancement. Because of the limited secondary treatment capacity, peak flows above the secondary system capacity bypass secondary treatment and are blended with the secondary treated sewage before flowing to the chlorine contact tank for disinfection.

Chlorine (sodium hypochlorite) is added to the effluent flow for disinfection before it enters the chlorine contact tank. After the chlorine contact tank sodium bisulfite is added to remove the chlorine before it reaches the effluent pump station.

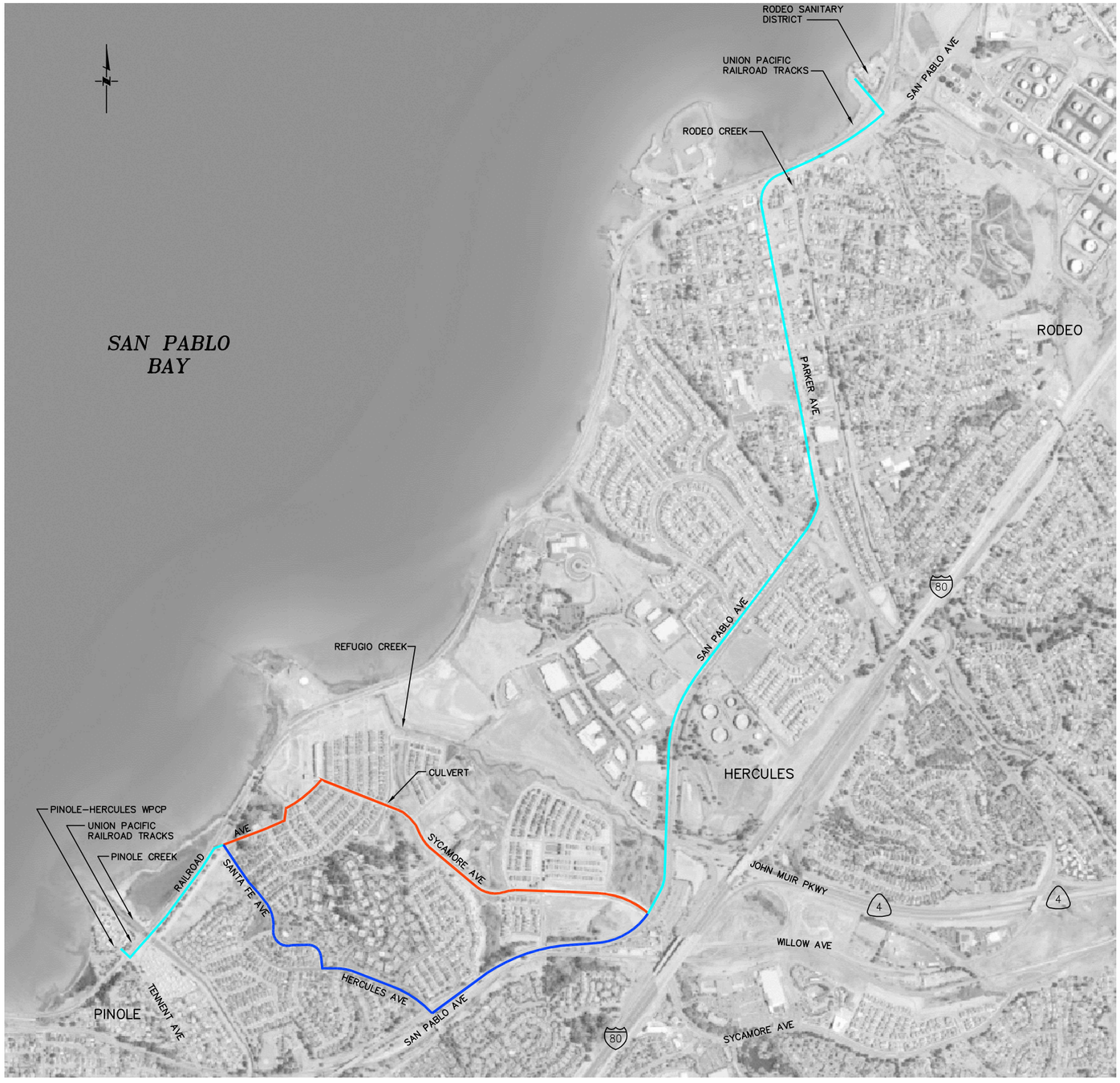
Disinfected and dechlorinated effluent is pumped to the deep water outfall shared with Rodeo Sanitary District. The effluent pump station has a firm capacity of approximately 10.5 mgd. Wet weather flow above 10.5 mgd is diverted to the near shore outfall at the Pinole Treatment Plant site. The deep water outfall is approximately 3600 feet off shore with a diffuser section approximately 120 feet in length. An analysis prepared by Brown and Caldwell indicated the existing diffuser meets or exceeds the minimum initial dilution of 45 to 1 under all discharge conditions.

Primary solids and secondary solids (waste activated sludge) are treated by anaerobic digestion in three anaerobic digesters. Grit solids are removed by centrifugal separation, washed, dewatered and hauled to a landfill. After the grit is removed, the primary solids are sent to a gravity belt thickener where they are co-thickened with waste activated sludge prior to being conveyed to the anaerobic digesters. Digested sludge is returned to the solids handling area where it is dewatered by centrifuge and hauled to landfill. The anaerobic solids treatment system was upgraded in 2008 with the addition of a fourth anaerobic digester which provides solids treatment capacity for the projected 2030 loads.

Pipeline Conveyance

As part of the treatment plant upgrades, a new land outfall pipeline from the WPCP to the deep-water outfall located at RSD is required. The pipeline conveyance analysis was performed on a conceptual level, so the route may require refinement upon further detailed analysis. Two options were developed to convey treated effluent from the WPCP to the deep water outfall located at RSD. The options are shown in Figure 1-3.

Option A: The pipeline is routed beneath the Union Pacific Railroad (UPRR) tracks, along Railroad Avenue parallel to the existing 24-inch land outfall, continues on Railroad Avenue, and



ALIGNMENT FOR NEW LAND OUTFALL, COMMON TO OPTION A AND OPTION B

ALIGNMENT FOR NEW LAND OUTFALL, OPTION A (APPROX 1.2 MILES)

ALIGNMENT FOR NEW LAND OUTFALL, OPTION B (APPROX 1.3 MILES)

DODSON PSOMAS

File Info. FIG_1-3 HJH 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

NEW LAND OUTFALL ROUTING OPTIONS

Scale: NONE

Figure No.: 1–3

then heads south on Sycamore Avenue, northeast on San Pablo Avenue, north on Parker Avenue, east on San Pablo Avenue, and turns north, again crossing the UPRR tracks before entering the RSD treatment plant site.

Option B: The pipeline is routed beneath the UPRR tracks, along Railroad Avenue parallel to the existing 24-inch land outfall, continues south on Santa Fe Avenue and south on Hercules Avenue, then heads east on San Pablo Avenue, north on Parker Avenue, east on San Pablo Avenue, and turns north, again crossing the UPRR tracks before entering the RSD treatment plant site.

Although Option A and Option B coincide for a large portion of the pipeline route, there are factors to take into consideration for the area between the intersection of Railroad Avenue and Santa Fe Avenue to the intersection of Sycamore Avenue and San Pablo Avenue. In this area, Option A is approximately 1.2 miles in length, is required to cross a large culvert, and passes through residential, open space, and commercial areas. Option B which winds through an entirely residential area is approximately 1.3 miles in length of which 0.6 miles are on San Pablo Avenue, a busy thoroughfare that would require traffic control. Some non-economic factors to consider are creek crossings, sensitive habitats and endangered species, railroad crossings, potential Native American archaeological resources, and close proximity to the San Pablo Bay shoreline.

Based on the pipeline route analysis, Option A, WPCP to RSD via Sycamore Avenue, is the apparent best route, primarily due to its shorter length and reduced length of piping on San Pablo Avenue.

Treatment Plant Upgrade

Based on Regional Board requirements and previous evaluation of potential options, two options have been identified for detailed study, evaluation and selection. The two options are identified as follows:

- Option 2 – New Land Outfall
- Option 4 – Flow Equalization

Wastewater Flow and Loadings

Current wastewater flows and loadings were analyzed and projected loads were developed by the Cities of Pinole and Hercules based on each City's plans for future development to the year 2030. Each plant upgrade option was developed based on bringing the plant up to the permitted capacity of 4.06 mgd. Design flows and loadings shown in Table 1-3 assume that Pinole and Hercules will continue their I/I reduction programs and that peak wet weather flows into the plant will be maintained below 20 mgd.

TABLE 1-3. DESIGN FLOWS AND LOADINGS

Parameter	Combined Influent
Average Dry Weather Flow, mgd	4.06
Peak Wet Weather Flow, mgd	20.00
Peak Day Flow, mgd (with I/I Reduction)	14.60
Average BOD Loading, lbs/day	11,000
Average TSS Loading, lbs/day	12,500

Option 2 – New Land Outfall

Under this option, peak wet weather flow up to 20 mgd will receive secondary treatment and will be pumped through parallel 24-inch forcemains to the deep water outfall shared with Rodeo Sanitary District.

Proposed Treatment Process

The existing Pinole and Hercules influent sewers will be routed to a new metering vault located east of the Control Building. The flow is combined after the meters and conveyed to a new headworks facility located south of the Control Building. The new headworks will include four pumps, two mechanical bar screens each rated for 20 mgd, a washer compactor, a grit removal system, a parshall flume for metering, and a diversion channel.

Flow up to 12 mgd will be conveyed from the new headworks to the existing primary distribution box where it will be equally distributed to the three existing primary clarifiers. Flow in excess of 12 mgd is diverted at the headworks and conveyed to the primary diversion structure. From the primary diversion structure the entire plant flow is conveyed to the aeration tanks.

Primary sludge is currently pumped to the solids handling area for grit removal and sludge thickening. With the new headworks and grit removal, primary sludge can be thickened in the primary clarifier and pumped directly to the anaerobic digesters. Floatables (scum) from the primary clarifiers will be pumped directly to the anaerobic digesters.

The existing aeration basins will be converted to four, single pass tanks and lengthened by approximately 85 feet. The aeration tanks will continue to use a fine bubble diffuser and two new blowers will be added. The influent ends of the aeration tanks will be modified so that return activated sludge can be blended with primary effluent or conveyed directly to the front of the aeration basin.

Three new secondary clarifiers will be constructed with a diameter of 80 feet and a sidewater depth of 16 feet. Two sludge pumps will be provided at each secondary clarifier to return activated sludge to the aeration tanks. Waste activated sludge and secondary scum will be conveyed to the solids handling area for thickening before going to the anaerobic digesters. Two secondary clarifiers are required up to a flow of approximately 13 mgd and three secondary clarifiers are required for flows above 13 mgd.

Flow from the secondary clarifiers is conveyed to two UV disinfection channels constructed at the east end of the aeration tanks. The existing chlorine contact tank disinfection and dechlorination systems will be abandoned.

Flow from the UV channels enters the effluent pump station wet well where four pumps convey peak flow through two 24-inch forcemains to the existing 30-inch outfall and diffuser. Three pumps are required to pump the peak wet weather flow of 20 mgd. The existing effluent pumping station will be abandoned.

A parallel 24-inch forcemain and land outfall will be constructed from the Pinole plant site to the connection to the 30-inch marine outfall and diffuser located at the Rodeo Sanitary District. Most of the new forcemain and land outfall routing will parallel the existing 24-inch pipeline except the routing will follow Railroad Avenue to Sycamore Avenue and then up to San Pablo Avenue from where it will parallel the existing 24-inch pipe to the Rodeo plant.

An outfall survey performed in 2005 indicated that the diffuser port diameter had increased due to corrosion and several ports were plugged. Diffuser improvements will include installation of 3-inch elastomer check valves on each diffuser port to provide enhanced jet velocity and improved initial dilution.

Solids Handling and Anaerobic Digestion

The existing secondary clarifiers will be demolished and solids handling will be relocated. The new solids handling facility will include waste activated sludge thickening utilizing rotary drum thickeners. Digested sludge will be returned from the anaerobic digesters to the solids handling facility where it will be dewatered by centrifuge and hauled to landfill.

The anaerobic digestion facility was upgraded in 2008 with the addition of a fourth digester, new sludge pumping mixing and heating systems. No additional work is anticipated in the anaerobic digestion area.

Electrical Building

A new electrical building to house a new plant electrical service and distribution panels will be constructed, housing a motor control center and standby generator.

Non-Economic Factors

Some non-economic factors which may impact the option include requirements related to construction within 100 feet of the shoreline, future regulations, training on the operation and maintenance of the UV system, higher energy demand and decrease in chemical demand.

Construction phasing is required to ensure continuous and effective operation of the WPCP. Coordination for construction of the new secondary clarifiers is necessary since the units are to be sited where the existing solids handling facilities are located. Tie-ins for pipelines and structures would require treatment plant shutdowns, preferably performed in the summer months when flows are reduced.

Cost

The estimated construction cost for Option 2 in 2009 dollars is $40,495,000. The RWQCB mandates that the facilities are completed and on-line by 2016. Thus, escalating the present cost by 2.5% per year to when construction is anticipated to occur, the estimated construction cost in

2015 dollars is $46,961,000. The estimate includes 15% for Contractor overhead and profit, 25% for engineering and administration, and a 25% contingency. The contingency is lower than the typical 30-35% contingency used for planning level estimates because budget costs for most of the major equipment and structures were obtained from the manufacturer and/or supplier.

Option 4 – Flow Equalization

Option 4 will reduce the peak hourly flow (20 mgd) through the biological process units to the peak day flow (14.6 mgd) by diverting flow to an underground equalizing storage facility. Flow above 14.6 mgd will be stored and then returned to the treatment process when flow drops below 14.6 mgd.

Proposed Treatment Process

The existing Pinole and Hercules influent sewers will be routed to a new metering vault located east of the Control Building. The flow is combined after the meters and conveyed to a new headworks facility located south of the Control Building. The new headworks will include four pumps, two mechanical bar screens each rated for 20 mgd, a washer compactor, a grit removal system, a parshall flume for metering, and a flow distribution structure.

Flow up to 12 mgd will be conveyed from the new headworks to the existing primary distribution box where it will be equally distributed to the three existing primary clarifiers. Flows above 12 mgd up to approximately 15 mgd will be conveyed to the primary effluent pipeline and on to the aeration tanks. Flows above 15 mgd will be conveyed to the underground equalizing storage facility. From the primary diversion structure flow up to 15 mgd is conveyed to the secondary treatment system.

The flow equalizing storage facility will be a buried concrete tank 152 feet in diameter with a bottom elevation approximately 30 feet below existing grade. Flow from the equalizing storage will be returned to the primary clarifier distribution structure when plant influent flow falls below 12 mgd.

Secondary treatment using the activated sludge process will be divided into two process trains. The existing aeration tanks, secondary clarifiers, and return activated sludge pumping system will form one train with the capacity to treat 8.6 mgd. A new secondary train will be constructed to treat 6.4 mgd. Primary effluent will be pumped with a new primary effluent pumping station to the new secondary treatment train. The new secondary treatment system will include construction of two, two pass aeration basins similar to the existing except with a length of 83 feet, two new secondary clarifiers with a diameter of 55 feet and a sidewater depth of 14 feet, and two sludge pumps at each secondary clarifier to return activated sludge to the new aeration tanks.

Flow from the existing secondary clarifiers will go to the existing chlorine contact tank for disinfection and dechlorination. Flow from the new secondary clarifiers will go to a new chlorine contact tank and dechlorination facility constructed as part of the aeration basin.

The existing effluent pump station will be retained to pump final effluent from the existing process train up to 8.6 mgd. A new effluent pump station will be constructed for the 6.4 mgd from the new secondary treatment train.

A parallel 18-inch forcemain and land outfall will be constructed from the Pinole plant site to the connection to the 30-inch marine outfall and diffuser located at the Rodeo Sanitary District. Most of the new forcemain and land outfall routing will parallel the existing 24-inch pipeline except the routing will follow Railroad Avenue to Sycamore Avenue and then up to San Pablo Avenue from where it will parallel the existing 24-inch pipe to the Rodeo plant.

An outfall survey performed in 2005 indicated that the diffuser port diameter had increased due to corrosion and several ports were plugged. Diffuser improvements will include installation of 3-inch elastomer check valves on each diffuser port to provide enhanced jet velocity and improved initial dilution.

Solids Handling and Anaerobic Digestion

Primary sludge is currently pumped to the solids handling area for grit removal and sludge thickening. The existing grit removal system and dissolve air flotation thickener will be abandoned. With the new headworks and grit removal, primary sludge can be thickened in the primary clarifier and pumped directly to the anaerobic digesters. Floatables (scum) from the primary clarifiers will be pumped directly to the anaerobic digesters.

Waste activated sludge and secondary scum will be conveyed to the solids handling area for thickening before going to the anaerobic digesters.

The existing solids handling facilities for thickening waste activated sludge and dewatering digested sludge will be retained. The anaerobic digestion facility was upgraded in 2008 with the addition of a fourth digester, new sludge pumping mixing and heating systems. No additional work is anticipated in the anaerobic digestion area.

Electrical Building

A new electrical building to house a new plant electrical service and distribution panels will be constructed, housing a motor control center and standby generator.

Non-Economic Factors

Some non-economic factors which may impact the option include requirements related to construction within 100 feet of the shoreline, future regulations, operating and maintaining two treatment trains, and higher chemical demand.

Construction should have minimal impact on the existing operations of the WPCP as no existing process facilities are to be demolished. Tie-ins for pipelines and structures would require treatment plant shutdowns, preferably performed in the summer months when flows are reduced. Construction of the storage facility will temporarily impact the park's availability for use by the public.

Cost

The estimated construction cost for Option 4 in 2009 dollars is $42,485,000. The RWQCB mandates that the facilities are completed and on-line by 2016. Thus, escalating the present cost by 2.5% per year to when construction is anticipated to occur, the estimated construction cost in 2015 dollars is $49,269,000. The estimate includes 15% for Contractor overhead and profit, 25% for engineering and administration, and a 25% contingency. The contingency is lower than the

typical 30-35% contingency used for planning level estimates because budget costs for most of the major equipment and structures were obtained from the manufacturer and/or supplier.

Summary

Table 1-4 provides a matrix summarizing the factors to consider for the two options, including cost, reliability, environmental constraints, operation, maintenance, and construction. Relative values for the factors are shown in the table.

TABLE 1-4. SUMMARY COMPARISON OF OPTIONS

Factor	Option 2	Option 4
Cost	+	-
Reliability	+	-
Operation and Maintenance	+	-
Future Regulations	+	-
Environmental Constraints	0	0
Permitting	0	0
Energy and Chemical Demand	0	0
Constructability	-	+

0: Neutral, both options are relatively equal
+: Relatively more advantages
-: Relatively more disadvantages

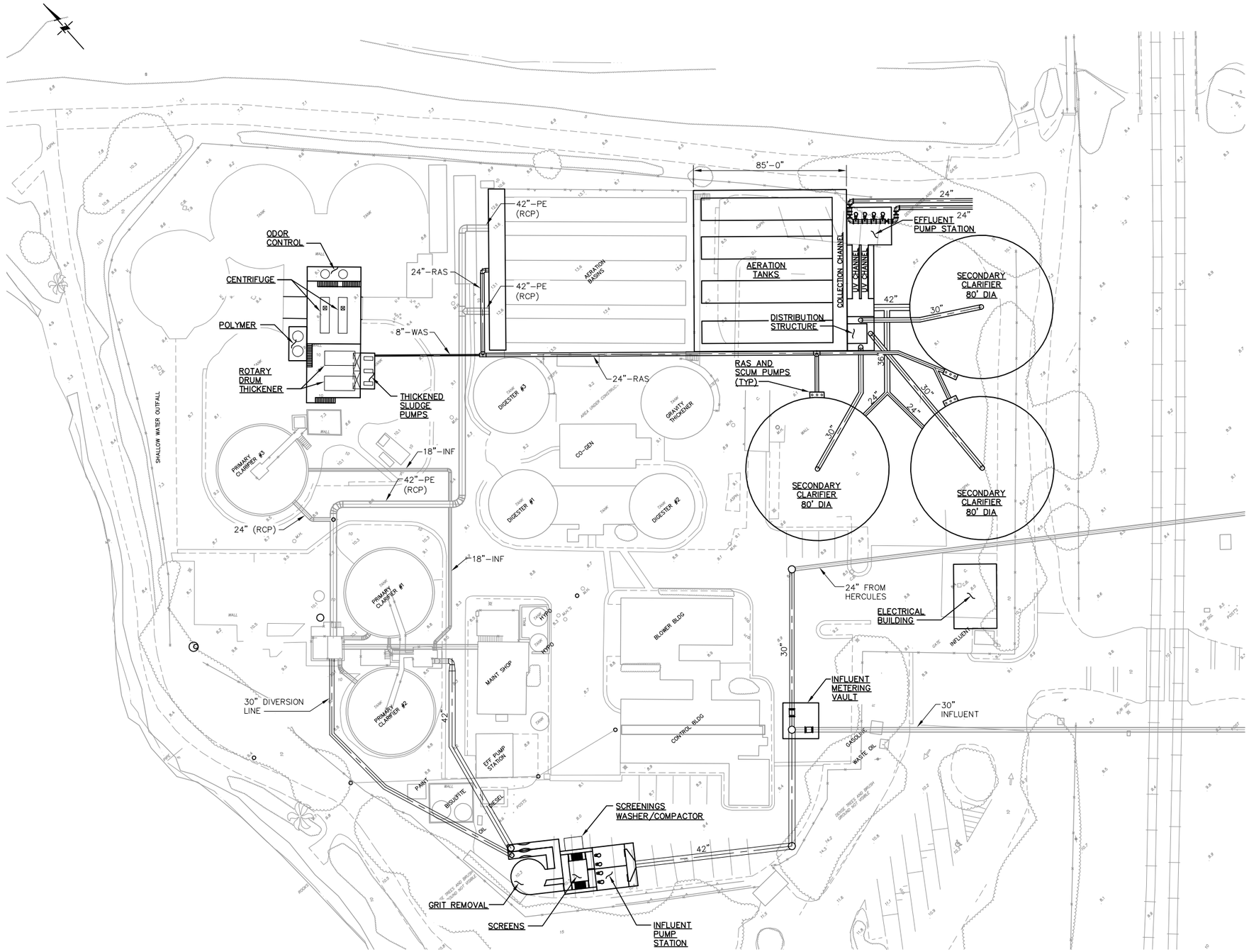
Apparent Best Option

Based on the summary matrix in Table 1-4 which shows that Option 2 has relatively more advantages than Option 4, the apparent best option to implement is Option 2, New Land Outfall.

Project Implementation

The apparent best option site plan and design data are shown in Figure 1-4. The JPA is continuing to refine the WPCP site layout and land outfall alignment to take advantage of construction staging and cost reducing opportunities. Option 2 will meet the discharge conditions set forth in Regional Water Quality Control Board Order No. R2-2007-0024 adopted on March 14, 2007, addresses the discharge prohibitions of near shore discharge to San Pablo Bay where initial dilution is less than 45 to 1, and eliminates blending of primary and secondary effluent discharged to the deep water outfall.

The existing Pinole treatment plant must continue to operate uninterrupted during a major upgrade. Due to the complexity of the design and the sequence of construction, a design, bid, and a construction period of approximately four years is required. In order to meet the Regional Board's compliance date of November 1, 2015 to complete construction of the necessary facilities, the Cities of Pinole and Hercules must start design by November 1, 2011. The schedule differences are shown in Table 1-5.



DESIGN DATA

Design Loadings

Influent Flows and Loading

Average dry weather flow, mgd	4.06
Peak wet weather flow, mgd	20.0
Influent TSS, lbs./day (mg/l)	12,500 (370)
Influent BOD lbs/day (mg/l)	11,000 (325)

Effluent Quality

Effluent BOD, mg/l	10
Effluent suspended solids, mg/l	15

Liquid Treatment Facilities

Influent Pump Station

Type	Submersible
Number	4
Capacity (ea), gpm (mgd)	4,630 (6.7)
Motor size hp (variable speed)	75

Bar Screens

Duty	1
Standby	1
Capacity (ea), mgd	20
Washer/Compactor	1

Grit Chamber

Type	Mechanical Vortex
Number	1
Capacity, mgd	20

Grit Pumps

Type	Recessed Impeller
Number	2
Capacity, (ea), gpm	250

Grit Cyclone

Type	Centrifugal
Number	1

Grit Classifier

Type	Screw Conveyor
Number	1

Influent Metering

Type	Parshall Flume
Influent meter, size (capacity)	18" (12 mgd)
Diversion meter, size (capacity)	12" (8 mgd)

Headworks Odor Control

Type	Biofilter
Air flow rate, cfm	2,000

Primary Treatment

Sedimentation Tanks

Number	3 (existing)
Diameter, ft.	45
Area ft.2 each	1,590
Total area ft.2	4,770
Overflow rate @ 4.06 mgd, gpd/ft	2851
Overflow rate @ 12 mgd, gpd/ ft	22,515

Sludge Pumps

Type	Progressive cavity
Number per tank	2
Capacity, gpm	20–50
Motor	Variable speed
Horsepower	5

Scum Pumps

Existing	

Aeration Basins

Number	4
Length, ft.	190
Width, ft.	20
Water depth, ft.	15
Detention time @ 4.06 mgd (3 basins), hr.	7.5
Loading, lbs. BOD/1,000 ft3/day (3 basins)	42

Blowers

Type	High speed turbo
Number	2
Capacity ea., cfm	1,200
Existing Capacity, (3@ 1,100 cfm) cfm	3,300

Secondary Sedimentation

Tanks

Number	3
Diameter, ft.	80
Side water depth, ft.	16
Area ft2 each	5,026
Overflow rate, gpd/ft2 (2 tanks @ 4.06 mgd)	404
Overflow rate, gpd/ft2 (3 tanks @ 20 mgd)	1,326

Return Activated Sludge Pump

Type	Variable speed vertical solids handling
Number	6
Capacity range, each, gpm	500–1,500

Scum Pumps

Type	Progressive cavity
Capacity	35 gpm

UV Disinfection

Design capacity, mgd	20
UV transmittance	55%
Disinfection limit, MPN (5 day median)	240
Disinfection limit, MPN (maximum)	10,000
Number of channels	2
Total number of UV lamps	448

Effluent Pump Station

Pumps

Type	Variable speed multi–stage vertical turbine
Number	4
Capacity, each, mgd	6.7
Motor horsepower, each	250

Solids Handling

Anaerobic Digester (Existing)

Number	3
No. 1, Vol. gallons	147,530
No. 3, Vol. gallons	233,287
No. 4, Vol. gallons	356,294
Estimated sludge vol., gallons/day	36,271
Estimated detention days	20.3
Volatile solids loading lbs/ft3/day	0.10

Sludge Storage (Existing)

Digester No. 2	
Volume, ft3/gallons	19,723/147,530

Sludge Dewatering

Type	Centrifugal
Capacity, gpm	100
Lbs/hour	1,750

Waste Activated Sludge Thickening

ThickenerType	Rotary drum

DODSON PSOMAS

File Info. FIG_1-4.DWG DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

OPTION 2
SITE PLAN AND DESIGN DATA

Scale 1"=30'-0"

Figure No. 1–4

TABLE 1-5. COMPLIANCE SCHEDULE

Task	Compliance Date	
	Regional Board	Recommended
Engineering Report and Antidegredation Analysis	June 1, 2009	June 1, 2009
Certified Environmental Impact Report	August 1, 2010	August 1, 2010
Secure funding for WPCP upgrades	August 1, 2011	August 1, 2011
Start design of WPCP upgrades	August 1, 2012	November 1, 2011
Complete design of WPCP facilities	August 1, 2013	February 1, 2013
Commence construction of WPCP facilities	June 1, 2014	May 1, 2013
Complete construction of WPCP facilities	November 1, 2015	November 1, 2015

Planning Considerations

Nitrification and recycled water may be implemented in the future. Availability to site these additional facilities should be taken into consideration for planning purposes.

SECTION TWO
INTRODUCTION

The Pinole-Hercules Water Pollution Control Plant (WPCP) Facilities Plan engineering report was prepared to comply with Regional Water Quality Control Board (RWQCB) Order No. R2-2007-0024, Provision C.2.c. Task 2.

The Pinole-Hercules WPCP currently operates under Order No. R2-2007-0024 (Order) and NPDES Permit No. CA0037796, which was adopted by the RWQCB on March 14, 2007. The permit became effective on June 1, 2007. Provision C.2.c. of the Order mandates corrective measures to upgrade the WPCP to increase dry and wet weather treatment capacity, eliminate blending of partially treated wastewater transported to the deep water outfall 001, and to prevent discharge through the shallow water outfall 002. The RWQCB has set a compliance time schedule, as shown in Table 2-1, so that all facilities are completed and on line by June 1, 2016. Accordingly, Task 2 which requires an engineering report that describes the WPCP upgrades that will increase the treatment capacity of the facility, and shall also include a complete antidegradation analysis that fully addresses consistency with the State Water Resources Control Board Resolution 68-16, and 40 CFR 131.12 must be submitted by June 1, 2009. The antidegradation analysis and financial analysis will be submitted as separate reports.

TABLE 2-1. RWQCB COMPLIANCE TIME SCHEDULE

Task	Compliance Date
1. Submit a Collection System Master Plan	June 1, 2008
2. Submit an Engineering Report identifying proposed plant upgrades	June 1, 2009
3. Submit certified EIR for project identified in Task 2	August 1, 2010
4. Secure funding for WPCP upgrades	August 1, 2011
5. Start design of WPCP facilities	August 1, 2012
6. Complete final design of WPCP facilities	August 1, 2013
7. Commence construction of WPCP facilities	June 1, 2014
8. Complete construction of WPCP facilities	November 1, 2015
9. Ensure WPCP facilities are online and operational	June 1, 2016
10. Status report of collection system projects and WPCP upgrades	Annually (due February 1)

The engineering report provides background information on the Pinole-Hercules Joint Power Authority's (JPA) efforts to comply with RWQCB Order No. R2-2007-0024, Provision C.2.c. Task 2; provides background information on the existing wastewater treatment plant; presents two treatment and disposal options; determines the apparent best project and required WPCP upgrades; and discusses future planning considerations. For the apparent best project, the JPA is continuing to refine the WPCP site layout to take advantage of construction staging and cost reducing opportunities. This report may be amended to reflect those opportunities.

SECTION THREE
BACKGROUND

The existing Pinole-Hercules WPCP is owned and operated by the City of Pinole under a joint use agreement with the City of Hercules. The agreement creates a governing body, the joint powers authority (JPA), which includes officials from both cities. The JPA has been meeting over several years to discuss various options for upgrading the wastewater treatment plant to comply with the current RWQCB permit requirements.

In 2007, the JPA retained Brown and Caldwell to evaluate plant upgrades and disposal options at the existing WPCP and Carollo Engineers to evaluate sending wastewater generated by the Cities of Pinole and Hercules to West County Wastewater District (WCWD) for treatment and disposal to bring the WPCP into compliance. Treatment and disposal options included six (6) options for upgrading the existing Pinole-Hercules WPCP and disposal system and two (2) options for conveying raw wastewater to WCWD for treatment and disposal. The eight options include the following:

- Option 1: Full Tertiary Facilities – The option consists of adding full tertiary facilities using either (1a) membrane bioreactors (MBR) or (1b) tertiary filters; increasing the wet and dry capacities of the WPCP through upgrades; abandoning the existing outfall pipeline to Rodeo Sanitary District (RSD); and obtaining a new permitted shallow water outfall to either Pinole Creek or San Pablo Bay.
- Option 2: New Upsized Land Outfall – The option consists of constructing a new, upsized land outfall from the WPCP to RSD to handle 100 percent of the future peak wastewater flows; increasing the wet and dry capacities of the WPCP through minor upgrades; and abandoning the existing land outfall.
- Option 3: Rehabilitated Land Outfall and Smaller Tertiary Facility – The option consists of rehabilitating the existing land outfall to continue to convey secondary effluent to the deep water outfall at RSD; increasing the wet and dry capacities of the WPCP through minor upgrades; constructing a smaller tertiary facility (as compared to Option 1) using either (3a) MBR or (3b) tertiary filters, to treat wet weather flows; and obtaining a new permitted shallow water outfall to discharge tertiary effluent to either Pinole Creek or San Pablo Bay.
- Option 4: Primary Effluent Flow Equalization – The option consists of increasing the wet and dry capacities of the WPCP through minor upgrades; constructing a 4 million gallon storage facility to equalize primary effluent flow to the secondary treatment facilities; abandoning the existing shallow water outfall; and continuing to discharge secondary effluent through the existing land outfall and deep water outfall at RSD.
- Option 5: All Flows to WCWD – The option consists of decommissioning the existing WPCP; diverting all existing flows through a new pipeline to the WCWD facilities; expanding the WCWD treatment plant; and abandoning the existing land outfall pipeline to RSD.
- Option 6: City of Hercules Only to WCWD – The option consists of diverting and transporting wastewater flows generated by the City of Hercules to the WCWD; expanding the WCWD treatment plant to handle additional wet weather flows; operating the WPCP to

solely treat wastewater flows generated by the City of Pinole; constructing minor upgrades at the WPCP; and upgrading the existing land outfall to RSD.

Dodson Psomas, as an independent third party, was retained by the JPA in 2008 to conduct a peer review of the engineering studies prepared by Brown and Caldwell and Carollo on the various options. The purpose of the peer review was to offer opinions as to reasonableness of assumptions and approach and to assist the JPA on reaching a decision on which option(s) to pursue. Each option as well as its associated construction cost (at the conceptual planning level) was reviewed. Significant considerations indicated in the peer review study were:

- Option 2, downsize the new 36-inch land outfall to 24-inch and retain the existing 24-inch land outfall to provide redundancy and reliability for the outfall system.
- Option 4, assume 2.7 million gallons of storage based on assumptions used for Option 1a, Full Tertiary Facilities Membrane Bioreactors, where flow equalization was also indicated.

The peer review study recommended that the JPA proceed with a more detailed engineering report that evaluates not more than two options and develops a predesign for the selected option. The options suggested for further study were the revised Option 2 (New 24-inch Land Outfall) and revised Option 4 (Flow Equalization, 2.7 million gallons of storage).

On December 10, 2008, City of Pinole representatives on the JPA recommended that additional engineering studies are required to meet the RWQCB deadline. On December 16, 2008, the Pinole City Council authorized this engineering report to further evaluate the revised Option 2 and revised Option 4, and recommend the apparent best project and required WPCP upgrades.

SECTION 4
EXISTING FACILITIES

The Pinole-Hercules Water Pollution Control Plant (WPCP) is located at the end of Tennent Avenue in the City of Pinole. Wastewater from the City of Pinole and Hercules is treated at this site and pumped to a joint outfall with Rodeo Sanitary District. Figure 4-1 is a site map showing the location of existing facilities, Figure 4-2 shows the layout of the existing WPCP and Figure 4-3 is a wastewater flow diagram of the existing treatment system.

Existing Plant Loadings

Historic plant loadings for Pinole have shown extreme variation for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS). Between 2005 and 2008 BOD samples have ranged as high as 3,048 milligrams per liter (mg/l) TSS and 2,500 mg/l BOD. The City hired two environmental compliance officers in 2005 to monitor commercial and industrial dischargers. This effort was beneficial in reducing BOD and TSS, however, loadings were still unusually high with extreme variations in loadings for a predominately residential community. Additional efforts were focused on sampling procurement including sampling location, pipeline cleaning and equipment maintenance. Since the beginning of June 2008, the extreme variations in samples and the overall loads have shown a significant reduction. Table 4-1 shows the current combined loadings for both Pinole and Hercules.

TABLE 4-1 CURRENT FLOWS AND LOADINGS

Parameter	Combined Influent
Average Dry Weather flow (mgd)	3.0
Peak Wet Weather flow (mgd)	22
Influent BOD (lb/day)	7,300
Influent TSS (lb/day)	8,000

Headworks

Flow from Pinole and Hercules enters the headworks and is conveyed to a mechanical screen with a capacity of 6 million gallons per day (mgd). Wet weather flow in excess of 6 mgd pass through a manually cleaned bar screen to the influent pump station wet well. Ferrous chloride is added to the combined influent for odor control and digester gas hydrogen sulfide reduction.

Influent Pumping Station

The influent pump station has four vertical mixed flow sewage pumps with a firm capacity of 15 mgd. All four influent pumps are driven by variable speed electric motors. Flow from the influent pump station passes through a magnetic flow meter to the primary clarifier distribution box.

ALIGNMENT FOR EXISTING 24–INCH LAND OUTFALL

PIPELINE IMPROVEMENT FOR EXISTING 24–INCH LAND OUTFALL (UNDER CONSTRUCTION)

DODSON PSOMAS

File Info. FIG_4-1.DWG HJH 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

SITE MAP

Scale: NONE

Figure No.: 4–1

DODSON PSOMAS

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CITY OF PINOLE CALIFORNIA 1903

CITY OF PINOLE

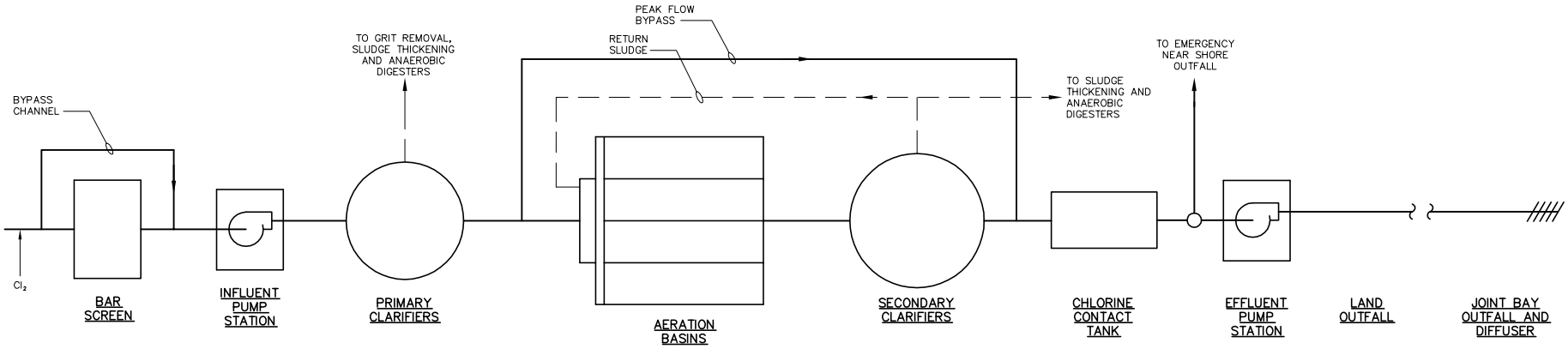
PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

WPCP EXISTING SITE PLAN

Scale 1"=30'

Figure No. 4-2



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CITY OF PINOLE

PINOLE – HERCULES WASTEWATER TREATMENT PLANT

EXISTING FLOW DIAGRAM

FIGURE NO. 4-3

JOB NO. 6PIN0203

Primary Treatment

Wastewater pumped to the primary clarifier flow distribution box is distributed to three primary clarifiers. Settleable organic and inorganic material are removed from the flow stream by gravity settling. Floatable material is also removed. Settled organic and inorganic material are conveyed to the solids handling area where the inorganic material (grit) is removed by a centrifugal separator. After removing the inorganic material, the organic material is thickened in a gravity thickener and conveyed to the anaerobic digesters. Floatable material is conveyed directly to the anaerobic digesters.

Primary Clarifier No. 1

The three primary clarifiers have a capacity of approximately 12 mgd at an overflow rate of 2,500 gpd/ft of surface area. Hydraulically the clarifiers have handled flow in excess of 20 mgd during unusual wet weather events. At flows above 12 mgd, minimum organic solids are captured in the primary clarifiers and are carried over to the secondary treatment system.

Secondary Treatment Process

The secondary treatment process is a biological process referred to as the activated sludge process. Flow from the primary clarifiers contains soluble organic material and fine suspended organic material. This flow is combined with microorganisms in the aeration basins. The combined flow is referred to as mixed liquor. The aeration basins are aerated by fine bubble diffusers to maintain dissolved oxygen within the basin. This environment promotes consumption of the soluble organic material and incorporation of the fine suspended organic material into biological floc. The microorganisms oxidize the organic material and produce more microorganisms.

The capacity of the aeration tank is based on several factors including detention time, organic loading, and the amount of microorganisms that can be maintained in the system. With both aeration basins in service, they have a capacity to reliably treat an influent organic load (BOD) of approximately 7,200 to 8,500 pounds per day (lbs/day). With existing influent BOD load of 7,300 lbs/day the aeration tanks are near capacity. Taking one of the aeration tanks out of service would severely strain the ability to treat the existing organic load.

The secondary clarifiers separate out the microorganisms from the mixed liquor and return them to the aeration tanks. Similar to the primary clarifier, separation of the microorganisms is by gravity settling. The capacity of the secondary clarifiers is governed by overflow rate. Unlike the primary clarifiers, the secondary clarifiers cannot be hydraulically overloaded because the microorganisms will be washed out of the system and the secondary treatment system will fail. The wet weather capacity of the five existing secondary clarifiers is approximately 8.6 mgd without chemical enhancement. Because of the limited secondary treatment capacity, peak flows above the secondary system capacity bypass secondary treatment and are blended with the secondary treated sewage before flowing to the chlorine contact tank for disinfection.

Because the biological oxidation of organic matter produces more microorganisms, not all of the microorganisms are returned to the aeration tanks. The waste activated sludge (WAS) goes to the solids handling area for thickening and then to the anaerobic digesters.

The disinfection system uses chlorine (sodium hypochlorite) to disinfect effluent. Chlorine is added to the effluent flow before it enters the chlorine contact tank. After the chlorine contact tank sodium bisulfite is added to remove the chlorine before it reaches the effluent pump station.

The capacity of the disinfection system is based on chlorine concentration and contact time. The existing chlorine contact tank provides about 24 minutes detention time at 3 mgd, but less than 4 minutes at 20 mgd. In order to meet Regional Board requirements, high chemical usage is required during high wet weather flows.

Effluent Disposal

Effluent Pump Station

Disinfected and dechlorinated effluent is pumped to the deep water outfall shared with Rodeo Sanitary District. The effluent pump station has three vertical turbine pumps with a firm capacity of approximately 10.5 mgd. Wet weather flow above 10.5 mgd is diverted to the near shore outfall at the Pinole Treatment Plant site.

The deep water outfall is approximately 3600 feet off shore and approximately 18 feet below mean lower low water. The diffuser section is 120 feet in length with 15 pairs of 2.5 inch diffuser ports. Recent inspection indicates that two of the ports are plugged and that erosion has enlarged some of the ports. The 1994 Effluent Outfall Dilution Analysis prepared by Brown and Caldwell indicated the existing diffuser meets or exceeds the minimum initial dilution of 45 to 1 under all discharge conditions.

Solids Treatment

Anaerobic Digesters

Primary solids and secondary solids (waste activated sludge) are treated by anaerobic digestion in three anaerobic digesters. Primary solids and grit are conveyed to the solids handling area where grit is removed by a vortex type system. Grit is washed and dewatered and hauled to a landfill. After the grit is removed, the primary solids are sent to a gravity belt thickener where they are co-thickened with waste activated sludge prior to being conveyed to the anaerobic digesters. Digested sludge is returned to the solids handling area where it is dewatered by centrifuge and hauled to landfill.

The anaerobic solids treatment system has recently (2008) been upgraded with the addition of a fourth anaerobic digester. This recent upgrade provides solids treatment capacity for the projected 2030 loads.

SECTION FIVE
PIPELINE CONVEYANCE

As part of the treatment plant upgrades discussed in Section Six, Treatment Plant Upgrade, a new land outfall pipeline from the WPCP to the deep-water outfall located at RSD is required. This section discusses the proposed routing options developed and evaluated for the new land outfall and determines an apparent best route. The pipeline conveyance analysis was performed on a conceptual level. There was no detailed information about location of existing utilities and structures or soils information, so the route may require refinement upon further detailed analysis. Pipeline construction was assumed to be within the road right-of-way by means of open cut construction except at the railroad track and creek crossings where jack and bore or directional drilling methods would be used. Environmental constraints related to biological resources, cultural resources, and land use are summarized from the report "Draft Constraints and Opportunities Analysis: Pinole-Hercules Water Pollution Control Plant" (hereinafter referred to as "environmental constraints report") prepared by EDAW in November 2008, a copy of which is included in the Appendix.

Options

Two options were developed to convey treated effluent from the WPCP to the deep water outfall located at RSD. The options are shown in Figure 5-1.

Option A: The pipeline is routed beneath the Union Pacific Railroad (UPRR) tracks, along Railroad Avenue parallel to the existing 24-inch land outfall, continues on Railroad Avenue, and then heads south on Sycamore Avenue, northeast on San Pablo Avenue, north on Parker Avenue, east on San Pablo Avenue, and turns north, again crossing the UPRR tracks before entering the RSD treatment plant site.

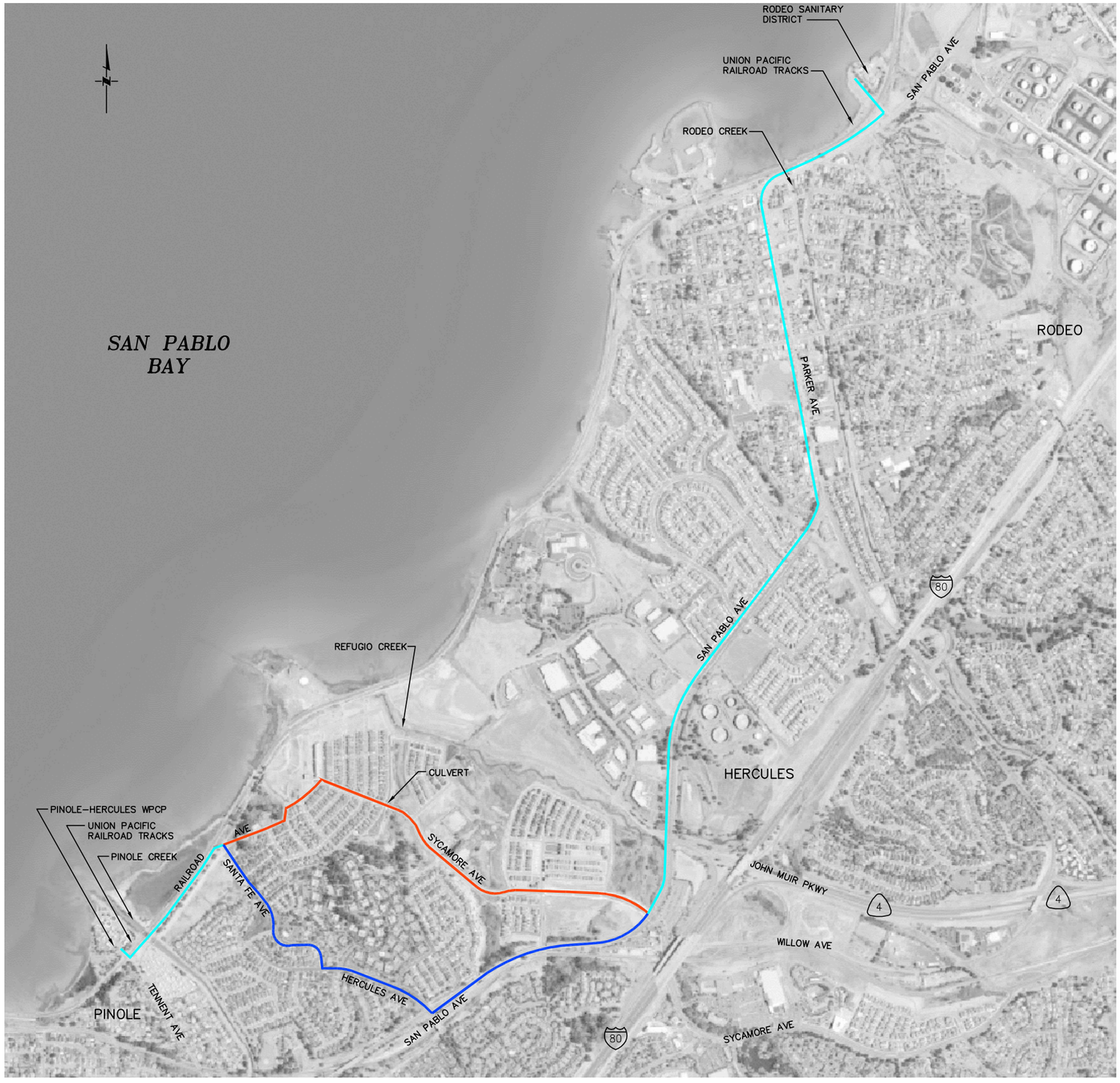
Option B: The pipeline is routed beneath the UPRR tracks, along Railroad Avenue parallel to the existing 24-inch land outfall, continues south on Santa Fe Avenue and south on Hercules Avenue, then heads east on San Pablo Avenue, north on Parker Avenue, east on San Pablo Avenue, and turns north, again crossing the UPRR tracks before entering the RSD treatment plant site.

Discussion

Although Option A and Option B coincide for a large portion of the pipeline route, there are factors to take into consideration for the area between the intersection of Railroad Avenue and Santa Fe Avenue to the intersection of Sycamore Avenue and San Pablo Avenue. Following is a discussion regarding the two routes in this area.

Culvert

Option A is approximately 1.2 miles in length. Near Taraya Way, there is a large culvert (see Figure 5-1) which appears to convey flow from a tributary to Refugio



ALIGNMENT FOR NEW LAND OUTFALL, COMMON TO OPTION A AND OPTION B

ALIGNMENT FOR NEW LAND OUTFALL, OPTION A (APPROX 1.2 MILES)

ALIGNMENT FOR NEW LAND OUTFALL, OPTION B (APPROX 1.3 MILES)

DODSON PSOMAS

File Info. FIG_5-1 HJH 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
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CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

NEW LAND OUTFALL ROUTING OPTIONS

Scale NONE

Figure No. 5–1

Creek running beneath Sycamore Avenue. The route passes through some residential area, but there is also a fair amount of open space adjacent to the road. On Sycamore Avenue near Front Street there is some commercial development and the road widens and includes a shoulder.

Option B is approximately 1.3 miles in length of which 0.6 miles are on San Pablo Avenue. Although the total distance of Option B is not much longer than Option A, a large segment of the pipeline is located on San Pablo Avenue which is a busy thoroughfare and would require traffic control. Option B winds through an entirely residential area.

For the portion of pipeline where Option A and Option B coincide, some of the non-economic factors to consider are discussed below.

Biological Resources

Because the pipeline will be crossing three creeks (Pinole Creek, Refugio Creek, and Rodeo Creek), there is the potential that a Section 1602 Streambed Alteration Agreement with the California Department of Fish and Game (DFG) may be required. Section 1602 states that any person, state or local governmental agency, or public utility must notify DFG before beginning any activity that will substantially divert or obstruct the natural flow of any river, stream or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in California. Although it is anticipated that the pipeline construction will not cause and/or create any of the situations addressed in Section 1602, DFG recommends that a notification be submitted.

The portion of pipeline that runs east along Railroad Avenue is located adjacent to an area classified as Northern Coastal Salt Marsh, a sensitive habitat for the salt marsh harvest mouse which is currently listed as endangered under the federal Endangered Species Act. If construction activities temporarily or permanently impact the salt marsh harvest mouse habitat or occur in areas where salt marsh harvest mouse could be present, consultation with the U.S. Fish and Wildlife Service (USFWS) would be required.

In addition, the California red-legged frog, a threatened species under the federal Endangered Species Act, has been documented in a tributary of Refugio Creek within a half mile of the pipeline creek crossing on San Pablo Avenue. Any disturbance to red-legged frog habitats also requires consultation with the USFWS.

Land Use and Planning

Two portions of the pipeline route, Railroad Avenue near the WPCP and San Pablo Avenue near RSD, are in close proximity to the San Pablo Bay shoreline. If work must be performed within 100 feet of the shoreline, a permit from the San Francisco Bay Conservation and Development Commission (BCDC), an entity which regulates a number of activities within and adjacent to San Pablo Bay, is required.

Pipeline construction is subject to and must be consistent with the Contra Costa County, City of Pinole, and City of Hercules General Plans. Because the pipeline crosses under and runs parallel to the railroad tracks, coordination with UPRR would be required to ensure compliance with right-of-way procedures, safety measures, and other planning guidelines.

Cultural Resources

The San Pablo Bay shoreline is highly sensitive for containing early Native American archaeological resources such as subsurface traces of prehistoric activities and/or human remains. Native American populations tended to settle and engage in subsistence activities along and in the vicinity of waterways. Many shell mound sites have been located in the general area; however, none have been identified in the immediate vicinity of the pipeline route. These findings suggest that similar and previously undocumented sites could be encountered during construction activities.

The advantages and disadvantages of the two routing options are summarized in Table 5-1.

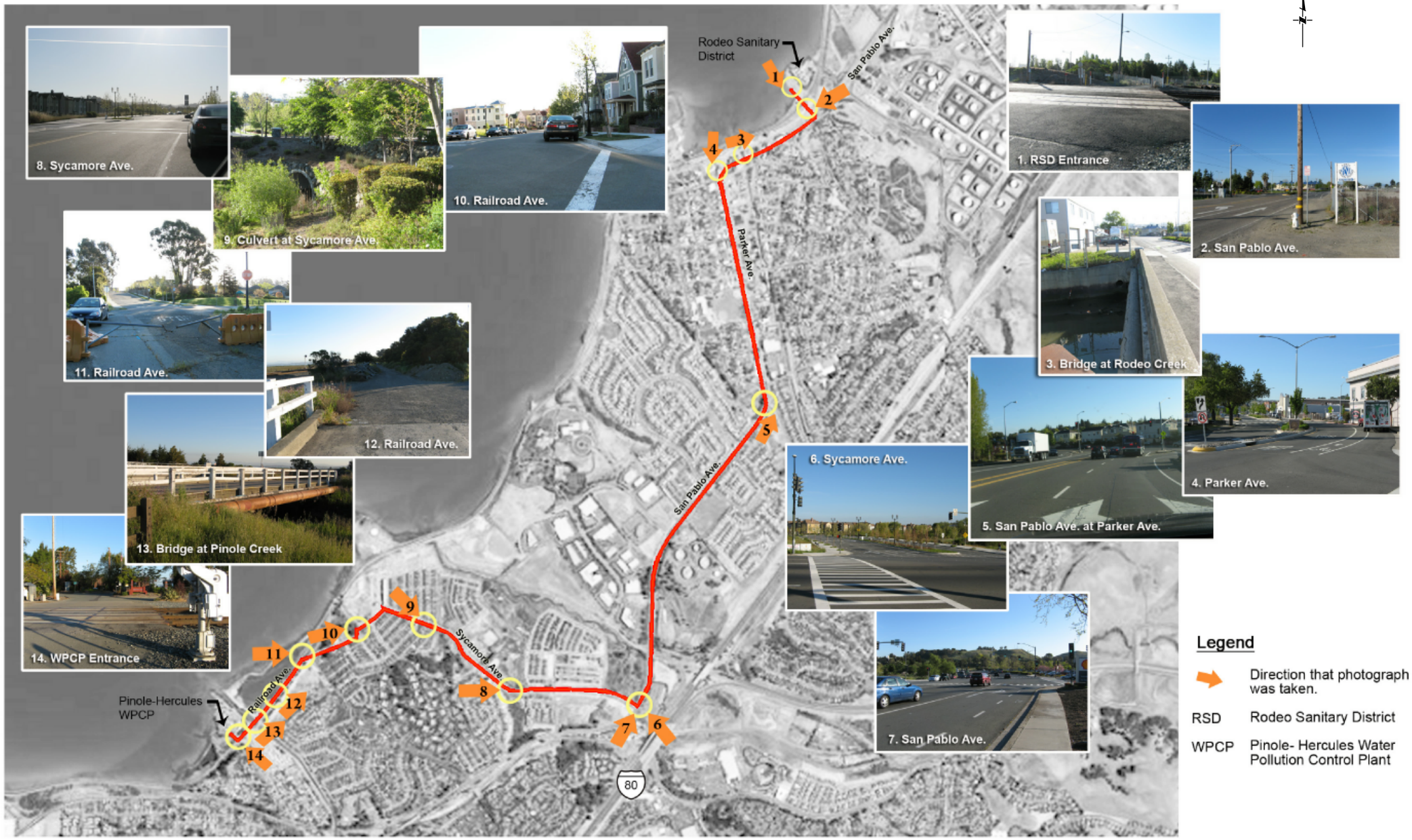
TABLE 5-1. CONVEYANCE OPTIONS SUMMARY

Option	Advantages	Disadvantages
A. WPCP to RSD via Sycamore Avenue	• Shorter route • Shorter length of pipeline on San Pablo Avenue • Wider road with shoulder on portion of Sycamore Avenue	• Large culvert to cross at Sycamore Avenue near Taraya Terrace • Railroad track and creek crossings • Potential archaeological resources
B. WPCP to RSD via Santa Fe and Hercules Avenue	• No culvert to cross	• Longer route • Longer length of pipeline on San Pablo Avenue • Railroad track and creek crossings • Potential archaeological resources

Apparent Best Conveyance Option

Based on the pipeline route analysis, Option A, WPCP to RSD via Sycamore Avenue, is the apparent best route, primarily due to its shorter length and reduced length of piping on San Pablo Avenue. Figure 5-2 shows in greater detail the surrounding areas along the route.

After the pipeline leaves the WPCP site, it crosses beneath the UPRR tracks and then turns east onto Railroad Avenue. Railroad Avenue is a paved road up to Pinole Creek after which it becomes a dirt road that is inaccessible to vehicular traffic. There is a bridge crossing Pinole Creek at Railroad Avenue which has pipes, including the existing 24-inch land outfall pipeline, supported off of its side. The new land outfall pipeline could also be supported off the side of the bridge or could be installed by directional drilling under the channel. The pipeline would continue east on the unpaved Railroad Avenue. At Santa Fe Avenue, Railroad Avenue becomes paved again and winds through a residential area. The pipeline would turn south on Sycamore Avenue which is also a predominantly residential area. Near Taraya Way, there is a large culvert which appears to convey flow from a tributary to Refugio Creek running beneath Sycamore Avenue. The pipeline would either have to cross over the culvert within the roadway or be located on the side of the bridge. Continuing south on Sycamore Avenue, the road widens. Heading north on San Pablo Avenue, a major thoroughfare that is multiple lanes wide, there is a



Legend

- Direction that photograph was taken.
- RSD — Rodeo Sanitary District
- WPCP — Pinole- Hercules Water Pollution Control Plant

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File Info. FIG_5-2.DWG DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
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CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

GENERAL

PROPOSED LAND OUTFALL ROUTE

Scale NNOE

Figure No. 5–2

steep hill which peaks near Linus Pauling Drive. The pipeline would turn north on Parker Avenue, which is the beginning of the commercial area in downtown Rodeo. Heading east on San Pablo Avenue, there is a bridge which crosses Rodeo Creek which also currently has some pipes supported off of its side. The new outfall pipeline could be supported off the side of the bridge or directionally drilled beneath the creek. From San Pablo Avenue, the pipeline would turn north into RSD's driveway, crossing under UPRR tracks again, and head through RSD's treatment plant to the joint deep water outfall.

SECTION SIX
TREATMENT PLANT UPGRADE

Based on Regional Board requirements and previous evaluation of potential options, two options have been identified for detailed study, evaluation and selection. The two options are identified as follows:

- Option 2 – New Land Outfall
- Option 4 – Flow Equalization

The Regional Board in Order No. R2-2007-0024 dated March 14, 2007 requires corrective measures to eliminate blending of primary and secondary effluent prior to discharge to the deep water outfall and prevention of discharge to the near shore outfall. The conventional activated sludge treatment process at the existing treatment plant complies with the following effluent limitations shown in Table 6-1.

TABLE 6-1. EFFLUENT LIMITATIONS FOR CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Carbonaceous Biochemical Oxygen Demand 5-day ($CBOD_5$ @ 20°C)	Mg/L	25	40	--	--	--
$CBOD_5$ percent removal[1]	%	85	--	--	--	--
Total Suspended Solids (TSS)	Mg/L	30	45	--	--	--
TSS percent removal[1]	%	85	--	--	--	--
pH[2]	Standard units (s.u.)	--	--	--	6.0	9.0
Oil and Grease	Mg/L	10	--	20	--	--
Chlorine Residual[3]	Mg/L	--	--	--	--	0.0

In addition, the existing treatment plant consistently meets its total coliform bacteria limitation of 240 MPN per 100 ml in any five consecutive samples with a maximum MPN of 10,000 for any single sample. The existing plant also meets limitations on toxic pollutants and acute toxicity.

The treatment plant upgrades will continue to use the conventional activated sludge process to address Regional Board requirements and to provide the Cities of Pinole and Hercules adequate treatment capacity of wastewater flow and loadings projected to the year 2030.

Wastewater Flow and Loadings

Current wastewater flows and loadings were analyzed and projected loads were developed by the Cities of Pinole and Hercules based on each City's plans for future development to the year 2030. Estimated combined flow was 3.93 mgd which is slightly less than the existing Regional Board permitted plant capacity of 4.06 mgd. Each plant upgrade option was developed based on bringing the plant up to the permitted capacity of 4.06 mgd. Based on a per capita flow of 75 gallons, the plant will be able to treat an equivalent population of slightly more than 54,000. A BOD loading of slightly more than 0.20 lbs per capita results in 11,000 lbs of BOD per day which is consistent with previous studies.

Wet weather flows have exceeded the capacity of the treatment plant and have resulted in blending of primary and secondary effluent and use of the near shore outfall. Reliable capacity of the influent pumping station is approximately 15 mgd. Plant personnel have indicated that they have pumped up to 20 mgd with all pumps operating. Individual influent meters for Pinole and Hercules are limited to 10 mgd and 10.4 mgd respectively. Each meter recorded maximum flow during the December 30 - January 1 storm of 2005/2006. It was speculated that flow into the plant may have reached 22 mgd.

Both Pinole and Hercules have an ongoing infiltration/inflow (I/I) reduction program to reduce peak flows to the treatment plant. Design flows and loadings shown in Table 6-2 assume that Pinole and Hercules will continue their I/I reduction programs and that peak wet weather flows into the plant will be maintained below 20 mgd.

TABLE 6-2. DESIGN FLOWS AND LOADINGS

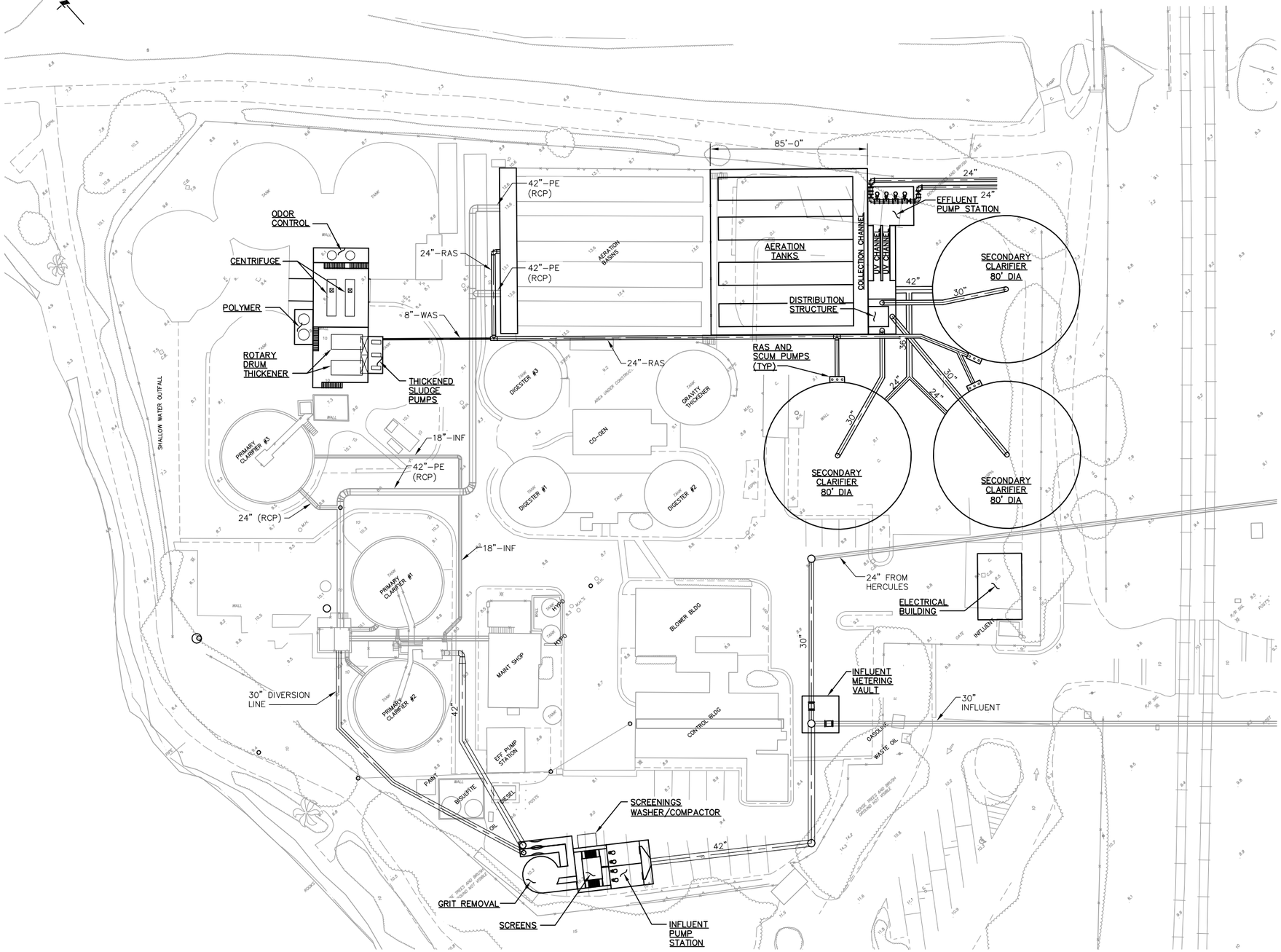
Parameter	Combined Influent
Average Dry Weather Flow, mgd	4.06
Peak Wet Weather Flow, mgd	20.00
Peak Day Flow, mgd (with I/I Reduction)	14.60
Average BOD Loading, lbs/day	11,000
Average TSS Loading, lbs/day	12,500

Option 2 – New Land Outfall

Under this option, peak wet weather flow up to 20 mgd will receive secondary treatment and will be pumped through parallel 24-inch forcemains to the deep water outfall shared with Rodeo Sanitary District. The layout of the new facilities on the existing Pinole site is shown on Figure 6-1.

Influent Sewer

The existing Pinole and Hercules influent sewers will be routed to a new headworks located south of the Control Building. Flow from Hercules will be routed in a 30-inch pipeline east of the



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File Info. FIG_6-1.DWG DSW 5/2009

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CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

OPTION 2
SITE PLAN

Scale 1"=30'-0"

Figure No. 6-1

Control Building to a point where it intersects the Pinole influent sewer. At this location a new metering vault with parshall flumes will be constructed. Combined flow will be conveyed to a new headworks facility. The existing 30-inch influent sewer under the Control Building will be abandoned. The new 42-inch sewer will be set low enough at the metering structure to insure free flow through the meters. Influent sampling for Pinole and Hercules will be relocated to the new metering vault.

Headworks

The new headworks will include four submersible wastewater pumps in a divided wet well. Discharge from the submersible pump can be directed to either of two mechanical bar screens each rated for 20 mgd. Screenings will be sluiced to a washer compactor and discharged to a dumpster for hauling to landfill. Flow from the screens will be conveyed to a vortex type grit removal system. Grit will be washed, dewatered and discharged to a dumpster for hauling to landfill. Flow out of the vortex grit removal system will be conveyed to a parshall flume for metering and then on to the existing primary distribution structure. When flow reaches approximately 10 mgd it will begin to overflow the parshall flume metering channel into the diversion channel where it is metered by a parshall flume and conveyed to the primary effluent pipeline and on to the aeration tanks.

Primary Treatment

Flow up to 12 mgd will be conveyed from the new headworks to the existing primary distribution box where it will be equally distributed to the three existing primary clarifiers. Flow from primary clarifiers No. 1 and No. 2 discharges to the existing diversion box (east half) which contains an overflow weir for blending primary effluent with secondary effluent (west half). The overflow weir and the west half of the diversion box will be abandoned. Flow in excess of 12 mgd is diverted at the headworks and conveyed to the east half of the primary diversion structure. From the primary diversion structure the entire plant flow is conveyed to the aeration tanks.

Primary sludge is currently pumped to the solids handling area for grit removal and sludge thickening. With the new headworks and grit removal, primary sludge can be thickened in the primary clarifier and pumped directly to the anaerobic digesters. The existing sludge pumps will be replaced by variable speed progressive cavity pumps which will allow for optimum thickening of the primary sludge. Floatables (scum) from the primary clarifiers will be pumped directly to the anaerobic digesters.

Aeration Tanks

The existing aeration basins which consist of two, two pass tanks will be converted to four, single pass tanks and lengthened by approximately 85 feet to provide a total aeration volume of 220,000 cubic feet and a detention time of 7 hours at the design flow of 4.06 mgd and one tank out of service. The aeration tanks will continue to use a fine bubble diffuser and two new 1200 cfm blowers will be added.

The influent ends of the aeration tanks will be modified so that return activated sludge can be blended with primary effluent or conveyed directly to the front of the aeration basin. The feed distribution system will be designed to utilize an anoxic zone, contact stabilization plug flow, or step feed.

Secondary Clarifiers

Three new secondary clarifiers will be constructed with a diameter of 80 feet and a sidewater depth of 16 feet. The new secondary clarifiers will be center feed with vacuum sludge pickup arms. Two vertical solids handling sludge pumps will be provided at each secondary clarifier to return activated sludge to the aeration tanks. Waste activated sludge and secondary scum will be conveyed to the solids handling area for thickening before going to the anaerobic digesters.

Two secondary clarifiers are required up to a flow of approximately 13 mgd and three secondary clarifiers are required for flows above 13 mgd.

Disinfection

Flow from the secondary clarifiers is conveyed to two UV disinfection channels constructed at the east end of the aeration tanks. The UV disinfection system is designed to meet a disinfection limit of 240 total coliform per 100 milliliters based on a 5 day median at 20 mgd with a UV transmittance of 55%. The existing chlorine contact tank disinfection and dechlorination systems will be abandoned.

Effluent Pumping

Flow from the UV channels enters the effluent pump station wet well where four variable speed, vertical multistage centrifugal turbine pumps convey peak flow through two 24-inch forcemains to the existing 30-inch outfall and diffuser.

Three pumps are required to pump the peak wet weather flow of 20 mgd. Each forcemain will have a flow meter to measure plant effluent flow. The existing effluent pumping station will be abandoned.

Forcemain and Land Outfall

A parallel 24-inch forcemain and land outfall will be constructed from the Pinole plant site to the connection to the 30-inch marine outfall and diffuser located at the Rodeo Sanitary District. Most of the new forcemain and land outfall routing will parallel the existing 24-inch pipeline except the routing will follow Railroad Avenue to Sycamore Avenue and then up to San Pablo Avenue from where it will parallel the existing 24-inch pipe to the Rodeo plant.

Outfall Diffuser

The 2005 outfall survey prepared by Underwater Resources indicated that the port diameter had increased due to corrosion and several ports were plugged. Diffuser improvements will include installation of 3-inch elastomer check valves on each diffuser port. The elastomer check valves will be held in place by stainless steel bands around the existing outfall pipe. The elastomer check valves will provide enhanced jet velocity and improved initial dilution.

Solids Handling

As shown in Figure 6-1, the existing secondary clarifiers will be demolished and solids handling will be relocated. The new solids handling facility will include waste activated sludge thickening utilizing rotary drum thickeners. Waste activated sludge will be thickened to approximately four percent and sent to the anaerobic digesters. Digested sludge will be returned from the anaerobic digesters to the solids handling facility where it will be dewatered by centrifuge and hauled to landfill.

The solids building will be approximately 30 feet by 70 feet with the rotary drum thickeners located at grade and the dewatering centrifuges located fifteen feet above grade so that dewatered sludge can be dropped directly into a sludge truck or dumpster. The solids building will be enclosed and ventilated with odor control facilities for exhaust air.

Anaerobic Digestion

The anaerobic digestion facility has recently (2008) been upgraded with the addition of a fourth digester, new sludge pumping mixing and heating systems. The recent upgrades provide anaerobic digestion capacity for the projected 2030 loads. No additional work is anticipated in the anaerobic digestion area.

Electrical Building

A new electrical building to house a new plant electrical service and distribution panels will be constructed. The new electrical building will house the motor control center for the new secondary treatment facilities, UV disinfection system, and effluent pump station. The new electrical building will also house a 750 kW standby generator to power the new secondary facilities and effluent pump station.

Non-Economic Factors

Since the treatment plant upgrades are proposed to be confined to areas currently within the property boundaries of the existing facilities, there are minimal to no potential impacts to sensitive biological resources such as sensitive habitats and special-status species.

If work must be performed within 100 feet of the shoreline, a permit from the San Francisco Bay BCDC, an entity which regulates a number of activities within and adjacent to San Pablo Bay, is required.

The option proposes that flows exceeding 11.9 MGD bypass primary treatment. The environmental constraints report indicated that the RWQCB may not approve the flow regime because current Environmental Protection Agency (EPA) Policy on Peak Wet Weather Discharges from Municipal Sewage Treatment Facilities (January 2006) specifies that all flows must at least have primary clarification. However, further research clarifies that under the policy, "…all flows that will be diverted from the secondary treatment units in peak wet weather events receive a minimum of primary treatment…" In this option, flows that bypass primary treatment are diverted to secondary treatment facilities and are therefore, not in conflict with the EPA policy.

Future regulations may be met if expanded facilities are required. Although there is no additional space on the WPCP site, Bay Park, which is located adjacent to the WPCP, is situated on land owned by the WPCP. Any facility expansions required could be constructed at Bay Park.

Plant operation and maintenance should be similar to that of the existing facility. The processes are the same although the facilities are expanded in capacity. There may be less maintenance since the number of secondary clarifiers and associated equipment are being reduced. Staff will require training on the operation and maintenance of UV since the existing facility currently utilizes chlorine for disinfection. The UV system will create a higher energy demand and decrease the chemical demand.

Construction phasing is required to ensure continuous and effective operation of the WPCP. Coordination for construction of the new secondary clarifiers is necessary since the units are to be sited where the existing solids handling facilities are located. Temporary belt thickeners or temporary installation of new solids handling equipment would be utilized when the existing solids handling facilities are demolished and the new secondary clarifiers are constructed. After the new secondary clarifiers are built, the existing ones would be demolished and the new solids handling facility constructed. Tie-ins for pipelines and structures would require treatment plant shutdowns, preferably performed in the summer months when flows are reduced.

Cost

The estimated construction cost for Option 2 in 2009 dollars is $40,495,000. The RWQCB mandates that the facilities are completed and on-line by 2016. Thus, escalating the present cost by 2.5% per year to when construction is anticipated to occur, the estimated construction cost in 2015 dollars is $46,961,000. A summary of the cost by facility is outlined in Table 6-3. Detailed cost breakdowns for each facility by specification section are included in the Appendix. The estimate includes 15% for Contractor overhead and profit, 25% for engineering and administration, and a 25% contingency. The contingency is lower than the typical 30-35% contingency used for planning level estimates because budget costs for most of the major equipment and structures were obtained from the manufacturer and/or supplier.

TABLE 6-3. OPINION OF PROBABLE COST SUMMARY – OPTION 2 (NEW LAND OUTFALL)

Description	Total	
	2009	2015*
General Costs	$2,643,620	$3,065,789
Site Work, Site Piping, and Demolition	$4,346,860	$5,041,025
Headworks	$2,649,941	$3,073,119
Primary Treatment	$227,640	$263,993
Electrical Building	$1,151,640	$1,335,549
Secondary System	$10,937,723	$12,684,405
Solids Handling	$3,031,075	$3,515,118
Outfall	$7,407,275	$8,590,168
Estimated Construction Cost	**$32,395,774**	**$37,569,165**
Engineering and Administration (25%)	$8,098,943	$9,392,291
Total Project Cost	**$40,494,717**	**$46,961,457**
TOTAL PROJECT COST, ROUNDED	**$40,495,000**	**$46,961,000**

*2.5% Escalation per year.

Option 4 – Flow Equalization

Option 4 will reduce the peak hourly flow (20 mgd) through the biological process units to the peak day flow (14.6 mgd) by diverting flow to an underground equalizing storage facility. Option 4 biological treatment capacity will be 14.6 mgd. Flow above 14.6 mgd will be stored and then returned to the treatment process when flow drops below 14.6 mgd. The equalizing

storage facility will be empty except during severe storm events. During the peak storm event, the equalizing storage facility will be filled and emptied within a 24 hour period. Layout of facilities for Option 4 are shown in Figure 6-2.

Influent Sewer

The existing Pinole and Hercules influent sewers will be routed to a new headworks located south of the Control Building. Flow from Hercules will be routed in a 30-inch pipeline east of the Control Building to a point where it intersects the Pinole influent sewer. At this location a new metering vault with parshall flumes will be constructed. Combined flow will be conveyed to a new headworks facility. The existing 30-inch influent sewer under the Control Building will be abandoned. The new 42-inch sewer will be set low enough at the metering structure to insure free flow through the meters. Influent sampling for Pinole and Hercules will be relocated to the new metering vault.

Headworks

The new headworks will include four submersible wastewater pumps in a divided wet well. Discharge from the submersible pump can be directed to either of two mechanical bar screens each rated for 20 mgd. Screenings will be sluiced to a washer compactor and discharged to a dumpster for hauling to landfill. Flow from the screens will be conveyed to a vortex type grit removal system. Grit will be washed, dewatered and discharged to a dumpster for hauling to landfill. Flow out of the vortex grit removal system will be conveyed to a parshall flume for metering and then on to a flow distribution structure. Flow up to 12 mgd will be conveyed to the existing primary distribution structure. Flows above 12 mgd up to approximately 15 mgd will be conveyed to the primary effluent pipeline and on to the aeration tanks. Flows above 15 mgd will be conveyed to the underground equalizing storage facility.

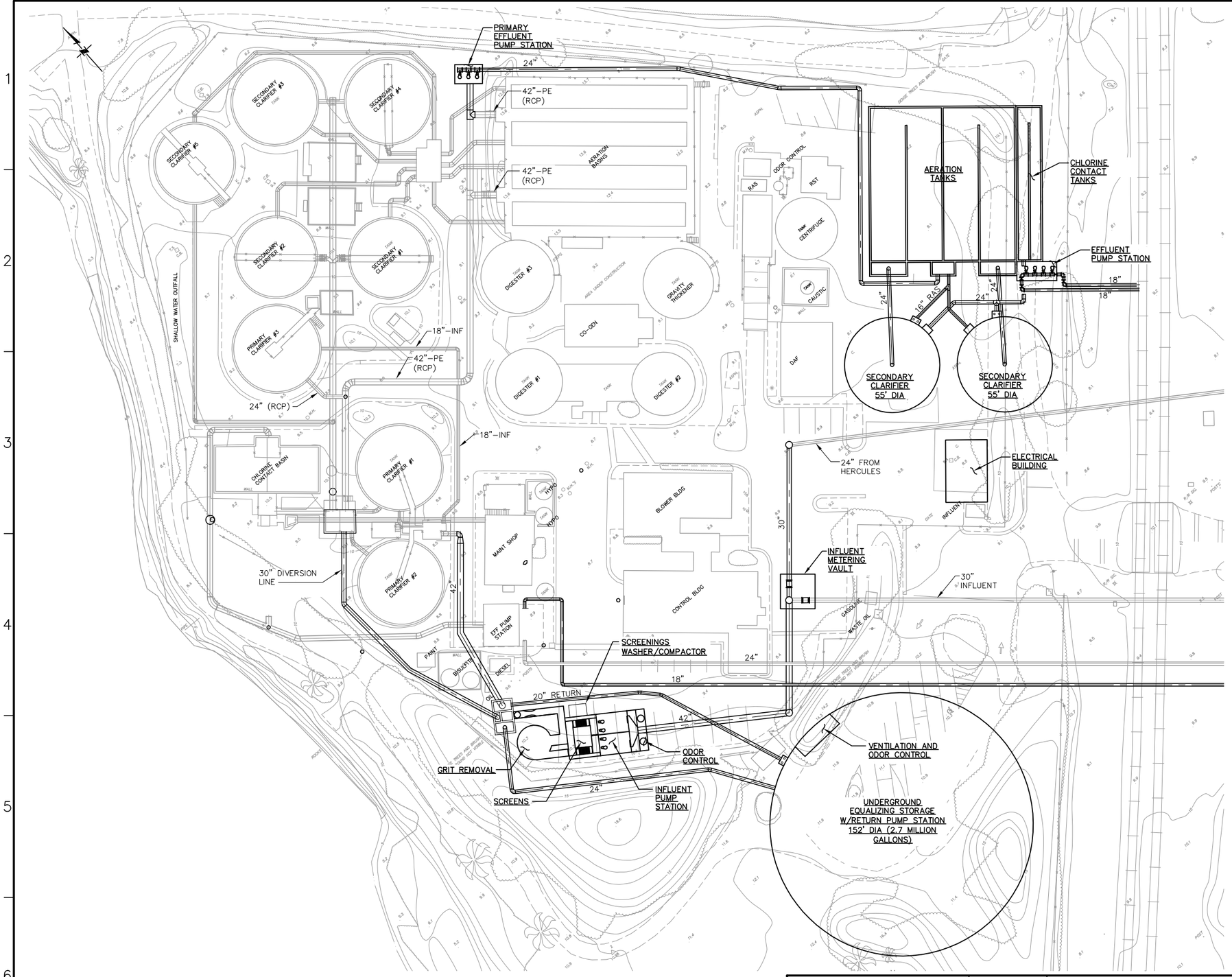
Flow Equalizing Storage

The flow equalizing storage facility will be a buried concrete tank 152 feet in diameter with a bottom elevation approximately 30 feet below existing grade. The top of the tank will be at grade and can be utilized for parking or be covered with soil and landscaped. The bottom of the tank will be 6 feet of concrete to prevent floatation.

Flow from the equalizing storage will be returned to the primary clarifier distribution structure when plant influent flow falls below 12 mgd. When the equalizing storage tank is emptied, any settled solids will be flushed to the return pumps using four high pressure water monitors. During the wash down operation the storage tank will be ventilated with the ventilation air passing through odor control units before release to the atmosphere.

Primary Treatment

Flow up to 12 mgd will be conveyed from the new headworks to the existing primary distribution box where it will be equally distributed to the three existing primary clarifiers. Flow from primary clarifiers No. 1 and No. 2 discharge to the existing diversion box (east half) which contains an overflow weir for blending primary effluent with secondary effluent (west half). The overflow weir and the west half of the diversion box will be abandoned. Flow in excess of 12 mgd up to 15 mgd is diverted at the headworks and conveyed to the east half of the primary diversion structure. From the primary diversion structure flow up to 15 mgd is conveyed to the secondary treatment system.



DODSON PSOMAS

File Info. FIG_6-2.DWG DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

OPTION 4 SITE PLAN

Scale 1"=30'

Figure No. 6–2

Primary sludge is currently pumped to the solids handling area for grit removal and sludge thickening. With the new headworks and grit removal, primary sludge can be thickened in the primary clarifier and pumped directly to the anaerobic digesters. The existing sludge pumps will be replaced by variable speed progressive cavity pumps which will allow for optimum thickening of the primary sludge. Floatables (scum) from the primary clarifiers will be pumped directly to the anaerobic digesters.

Aeration Tanks

Secondary treatment using the activated sludge process will be divided into two process trains. The existing aeration tanks and secondary clarifiers will form one train with the capacity to treat 8.6 mgd and a new secondary train will be constructed to treat 6.4 mgd. Primary effluent will be pumped with a new primary effluent pumping station to the new secondary treatment train.

The existing aeration tanks and clarifiers will not be modified. The existing aeration tanks will be able to treat flows up to 8.6 mgd. The new secondary treatment system will include two, two pass aeration basins similar to the existing except with a length of 83 feet instead of 100 feet. The new aeration basins will be able to treat flows up to 6.4 mgd.

Secondary Clarifiers

The existing secondary clarifiers will remain in service along with the return activated sludge pumping system. Return activated sludge from the existing secondary clarifiers will be returned to the existing aeration plant.

Two new secondary clarifiers will be constructed with a diameter of 55 feet and a sidewater depth of 14 feet. The new secondary clarifiers will be center feed with vacuum sludge pickup arms. Two vertical solids handling sludge pumps will be provided at each secondary clarifier to return activated sludge to the new aeration tanks. Waste activated sludge and secondary scum will be conveyed to the solids handling area for thickening before going to the anaerobic digesters.

Disinfection

Flow from the existing secondary clarifiers will go to the existing chlorine contact tank for disinfection and dechlorination.

Flow from the new secondary clarifiers will go to a new chlorine contact tank and dechlorination facility constructed as part of the aeration basin.

Effluent Pump Station

The existing effluent pump station will be retained to pump final effluent from the existing process train up to 8.6 mgd. The existing overflow weir to the near shore outfall will be removed and the outfall plugged. A parallel 18-inch forcemain will be constructed from the existing effluent pump station to the 30-inch outfall at Rodeo Sanitary District.

A new effluent pump station will be constructed for the 6.4 mgd from the new secondary treatment train. The new pump station will have three variable speed multistage centrifugal pumps rated at 3.2 mgd each. Dual 18-inch forcemains will connect to the 18-inch forcemain and 24-inch forcemain from the existing effluent pump station. A valve vault will be provided at the intertie to facilitate selection and isolation of individual forcemains.

Forcemain and Land Outfall

A parallel 18-inch forcemain and land outfall will be constructed from the Pinole plant site to the connection to the 30-inch marine outfall and diffuser located at the Rodeo Sanitary District. Most of the new forcemain and land outfall routing will parallel the existing 24-inch pipeline except the routing will follow Railroad Avenue to Sycamore Avenue and then up to San Pablo Avenue from where it will parallel the existing 24-inch pipe to the Rodeo plant.

Outfall Diffuser

The 2005 outfall survey prepared by Underwater Resources indicated that the port diameter had increased due to corrosion and several ports were plugged. Diffuser improvements will include installation of 3-inch elastomer check valves on each diffuser port. The elastomer check valves will be held in place by stainless steel bands around the existing outfall pipe. The elastomer check valves will provide enhanced jet velocity and improved initial dilution.

Solids Handling

The existing solids handling facilities for thickening waste activated sludge and dewatering digested sludge will be retained. The existing grit removal system and dissolve air flotation thickener will be abandoned.

Anaerobic Digestion

The anaerobic digestion facility has recently (2008) been upgraded with the addition of a fourth digester, new sludge pumping mixing and heating systems. The recent upgrades provide anaerobic digestion capacity for the projected 2030 loads. No additional work is anticipated in the anaerobic digestion area.

Electrical Building

A new electrical building to house a new plant electrical service and distribution panels will be constructed. The new electrical building will house the motor control center for the new secondary treatment facilities and effluent pump station. The new electrical building will also house a standby generator to power the new secondary facilities and effluent pump station.

Non-Economic factors

Since the treatment plant upgrades are proposed to be confined to areas currently within the property boundaries of the existing facilities, there are minimal to no potential impacts to sensitive biological resources such as sensitive habitats and special-status species.

Installation of the flow equalization tank at Bay Park requires removal of the existing paved parking lot, a portion of the grass area and some trees within the park. Following construction, the top of the tank will serve as a parking lot. Grass will be restored to the remaining disturbed areas. There is a wetland area on the west side of the grass area adjacent to the shoreline; however, it will not be disturbed. Therefore, biological impacts for the tank construction would be minimal.

If work must be performed within 100 feet of the shoreline, a permit from the San Francisco BCDC, an entity which regulates a number of activities within and adjacent to San Pablo Bay, is required.

Future regulations may be difficult to meet if expanded facilities are required. There is no additional space on the WPCP site and space at Bay Park is limited because of the flow equalization tank.

Plant operation and maintenance will be more complex and require greater staff effort than the existing facility. The site will essentially have two different treatment plants operating following primary treatment. There is a greater number of structures and equipment to maintain. If flow conditions change, there is a greater likelihood with two treatment plants operating that there may be a process upset which compromises plant reliability.

The existing facility uses chlorine for disinfection. Chemical demand will increase due to an increased flow being treated.

Construction should have minimal impact on the existing operations of the WPCP as no existing process facilities are to be demolished. The only structures anticipated to be demolished are the corporation yard. Tie-ins for pipelines and structures would require treatment plant shutdowns, preferably performed in the summer months when flows are reduced. Construction of the storage facility will temporarily impact the park's availability for use by the public. As Bay Park is constructed on land owned by the WPCP, there should be minimal permitting and/or property rights issues.

Cost

The estimated construction cost for Option 4 in 2009 dollars is $42,485,000. The RWQCB mandates that the facilities are completed and on-line by 2016. Thus, escalating the present cost by 2.5% per year to when construction is anticipated to occur, the estimated construction cost in 2015 dollars is $49,269,000. A summary of the cost by facility is outlined in Table 6-4. Detailed cost breakdowns for each facility by specification section are included in the Appendix. The estimate includes 15% for Contractor overhead and profit, 25% for engineering and administration, and a 25% contingency. The contingency is lower than the typical 30-35% contingency used for planning level estimates because budget costs for most of the major equipment and structures were obtained from the manufacturer and/or supplier.

TABLE 6-4. OPINION OF PROBABLE COST SUMMARY – OPTION 4 (FLOW EQUALIZATION)

Description	Total	
	2009	2015*
General Costs	$2,705,360	$3,137,388
Site Work, Site Piping, and Demolition	$3,895,360	$4,517,423
Headworks	$2,758,301	$3,198,784
Primary Treatment	$227,640	$263,993
Primary Effluent Pump Station	$601,860	$697,973
Electrical Building	$1,125,320	$1,305,026
Secondary System	$7,457,800	$8,648,762
Solids Handling	$1,032,500	$1,197,383
Storage Tank	$8,389,500	$9,729,248
Outfall	$6,826,569	$7,916,727
Estimated Construction Cost	**$35,020,210**	**$40,612,707**
Engineering and Administration (25%)	$8,755,052	$10,153,177
Total Project Cost	**$43,775,262**	**$50,765,883**
TOTAL PROJECT COST, ROUNDED	**$43,775,000**	**$ 50,766,000**

*2.5% Escalation per year.

Summary

Table 6-5 provides a matrix summarizing the factors to consider for the two options, including cost, reliability, environmental constraints, operation, maintenance, and construction. Relative values for the factors are shown in the table.

TABLE 6-5. SUMMARY COMPARISON OF OPTIONS

Factor	Option 2	Option 4
Cost	+	-
Reliability	+	-
Operation and Maintenance	+	-
Future Regulations	+	-
Environmental Constraints	0	0
Permitting	0	0
Energy and Chemical Demand	0	0
Constructability	-	+

0: Neutral, both options are relatively equal
+: Relatively more advantages
-: Relatively more disadvantages

Apparent Best Option

Based on the summary matrix in Table 6-5 which shows that Option 2 has relatively more advantages than Option 4, the apparent best option to implement is Option 2, New Land Outfall.

SECTION SEVEN
PROJECT IMPLEMENTATION

The evaluation conducted in this report indicates Option 2 – New Land Outfall as the apparent best option. The site plan and Design Data are shown in Figure 7-1. The JPA is continuing to refine the WPCP site layout and land outfall alignment to take advantage of construction staging and cost reducing opportunities. Figure 7-2 shows the Liquid Flow Diagram along with the plant hydraulic profile. Figure 7-3 shows the Solids Handling Flow Diagram and Figure 7-4 shows the preferred alignment for the new forcemain.

Option 2 will meet the discharge conditions set forth in Regional Water Quality Control Board Order No. R2-2007-0024 adopted on March 14, 2007. Option 2 addresses the discharge prohibitions of near shore discharge to San Pablo Bay where initial dilution is less than 45 to 1. Option 2 also eliminates blending of primary and secondary effluent discharged to the deep water outfall.

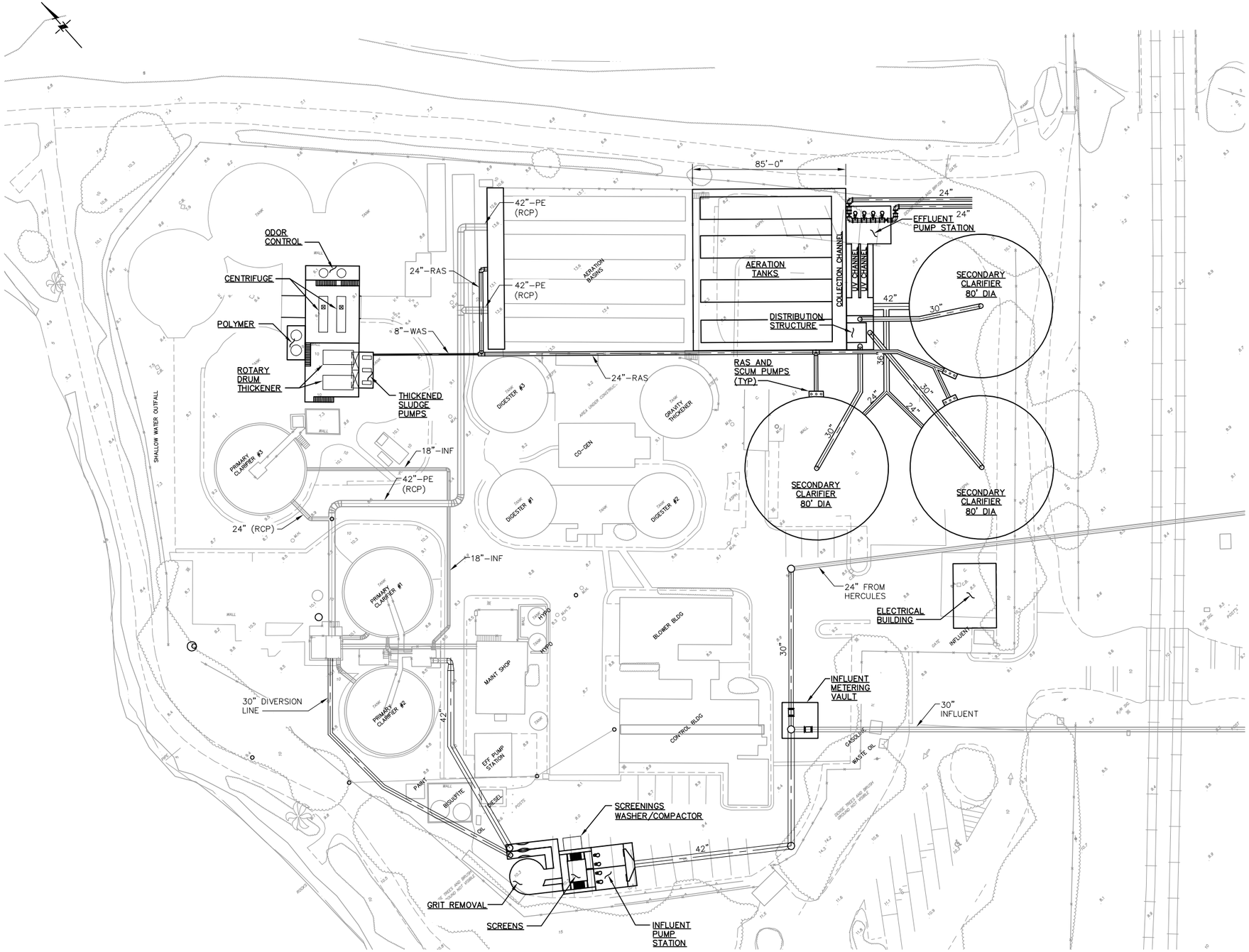
Process units are sized to handle peak wet weather flow of 20 mgd and the total suspended solids and BOD loadings from an average dry weather flow of 4.06 mgd with TSS and BOD concentration of 370 mg/l and 325 mg/l respectively. Option 2 is capable of producing a final effluent of 10 mg/l BOD and 15 mg/l TSS.

The Cities of Pinole and Hercules must comply with the Regional Board's compliance date of November 1, 2015 to complete construction of the necessary facilities to eliminate blending and prevent discharge to the near shore outfall. In order to confirm that the Cities can comply with that date, the following time line has been developed beginning with the construction schedule.

Construction Schedule

The existing Pinole treatment plant must continue to operate uninterrupted during a major upgrade. In order to verify that construction could be accomplished without interruption to the treatment process, the following sequence of construction was developed.

The new headworks which include influent pumping, screening, grit removal and metering will be constructed first. Solids handling equipment including rotary drum thickness and dewatering centrifuges will be ordered early so that they may be temporarily installed to allow demolition of the existing solids handling facilities and construction of the secondary treatment system. Once the new secondary treatment system is on line, the existing secondary clarifiers can be demolished and the permanent solids handling facilities constructed. The sequence and estimated time of construction is shown in Table 7-1.



DESIGN DATA

Design Loadings

Influent Flows and Loading

Average dry weather flow, mgd	4.06
Peak wet weather flow, mgd	20.0
Influent TSS, lbs./day (mg/l)	12,500 (370)
Influent BOD lbs/day (mg/l)	11,000 (325)

Effluent Quality

Effluent BOD, mg/l	10
Effluent suspended solids, mg/l	15

Liquid Treatment Facilities

Influent Pump Station

Type	Submersible
Number	4
Capacity (ea), gpm (mgd)	4,630 (6.7)
Motor size hp (variable speed)	75

Bar Screens

Duty	1
Standby	1
Capacity (ea), mgd	20
Washer/Compactor	1

Grit Chamber

Type	Mechanical Vortex
Number	1
Capacity, mgd	20

Grit Pumps

Type	Recessed Impeller
Number	2
Capacity, (ea), gpm	250

Grit Cyclone

Type	Centrifugal
Number	1

Grit Classifier

Type	Screw Conveyor
Number	1

Influent Metering

Type	Parshall Flume
Influent meter, size (capacity)	18" (12 mgd)
Diversion meter, size (capacity)	12" (8 mgd)

Headworks Odor Control

Type	Biofilter
Air flow rate, cfm	2,000

Primary Treatment

Sedimentation Tanks

Number	3 (existing)
Diameter, ft.	45
Area ft.2 each	1,590
Total area ft.2	4,770
Overflow rate @ 4.06 mgd, gpd/ft	2851
Overflow rate @ 12 mgd, gpd/ ft	22,515

Sludge Pumps

Type	Progressive cavity
Number per tank	2
Capacity, gpm	20–50
Motor	Variable speed
Horsepower	5

Scum Pumps

Existing	

Aeration Basins

Number	4
Length, ft.	190
Width, ft.	20
Water depth, ft.	15
Detention time @ 4.06 mgd (3 basins), hr.	7.5
Loading, lbs. BOD/1,000 ft3/day (3 basins)	42

Blowers

Type	High speed turbo
Number	2
Capacity ea., cfm	1,200
Existing Capacity, (3@ 1,100 cfm) cfm	3,300

Secondary Sedimentation

Tanks

Number	3
Diameter, ft.	80
Side water depth, ft.	16
Area ft2 each	5,026
Overflow rate, gpd/ft2 (2 tanks @ 4.06 mgd)	404
Overflow rate, gpd/ft2 (3 tanks @ 20 mgd)	1,326

Return Activated Sludge Pump

Type	Variable speed vertical solids handling
Number	6
Capacity range, each, gpm	500–1,500

Scum Pumps

Type	Progressive cavity
Capacity	35 gpm

UV Disinfection

Design capacity, mgd	20
UV transmittance	55%
Disinfection limit, MPN (5 day median)	240
Disinfection limit, MPN (maximum)	10,000
Number of channels	2
Total number of UV lamps	448

Effluent Pump Station

Pumps

Type	Variable speed multi–stage vertical turbine
Number	4
Capacity, each, mgd	6.7
Motor horsepower, each	250

Solids Handling

Anaerobic Digester (Existing)

Number	3
No. 1, Vol. gallons	147,530
No. 3, Vol. gallons	233,287
No. 4, Vol. gallons	356,294
Estimated sludge vol., gallons/day	36,271
Estimated detention days	20.3
Volatile solids loading lbs/ft3/day	0.10

Sludge Storage (Existing)

Digester No. 2	
Volume, ft3/gallons	19,723/147,530

Sludge Dewatering

Type	Centrifugal
Capacity, gpm	100
Lbs/hour	1,750

Waste Activated Sludge Thickening

ThickenerType	Rotary drum

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File Info. FIG_7-1.DWG DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

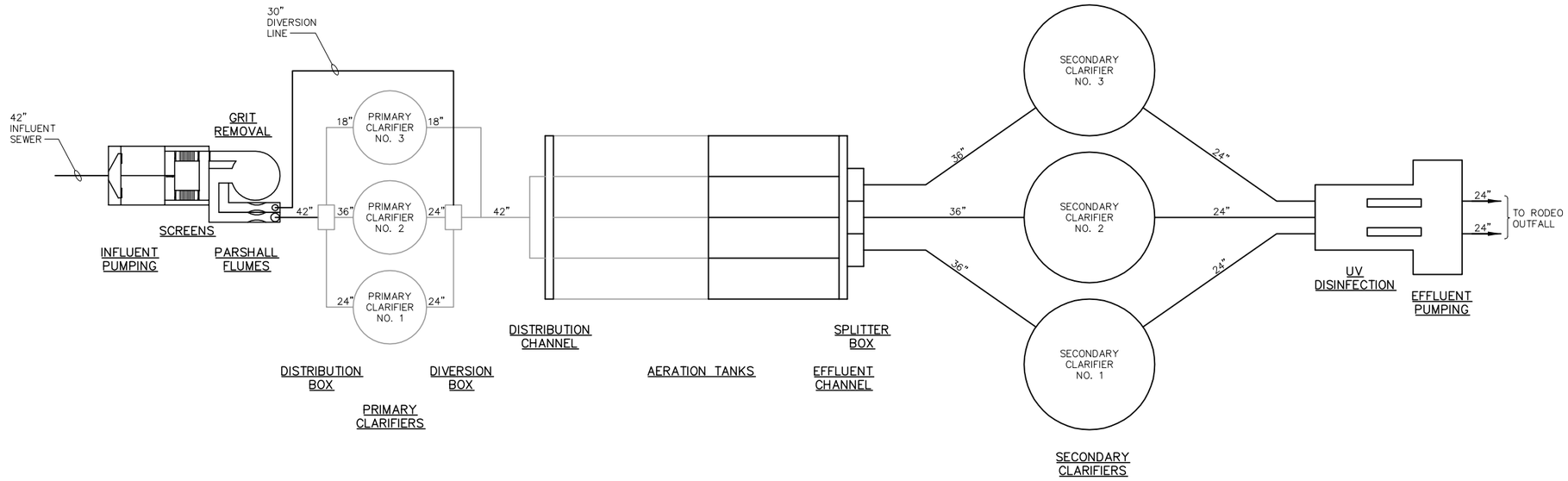
PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

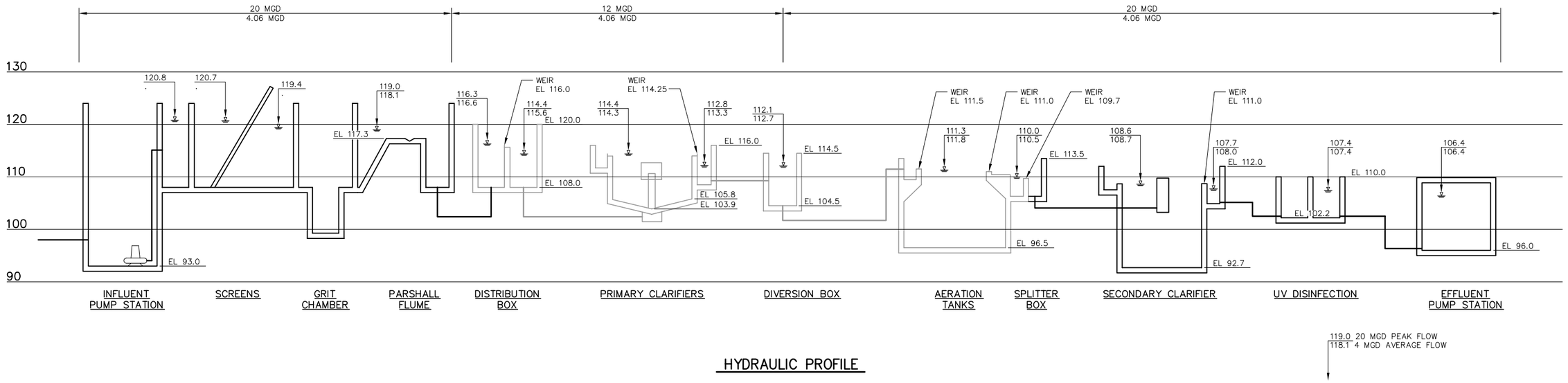
OPTION 2
SITE PLAN AND DESIGN DATA

Scale 1"=30'-0"

Figure No. 7–1



LIQUID FLOW DIAGRAM



HYDRAULIC PROFILE

DODSON PSOMAS

File Info. FIG_7-2.DWG DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

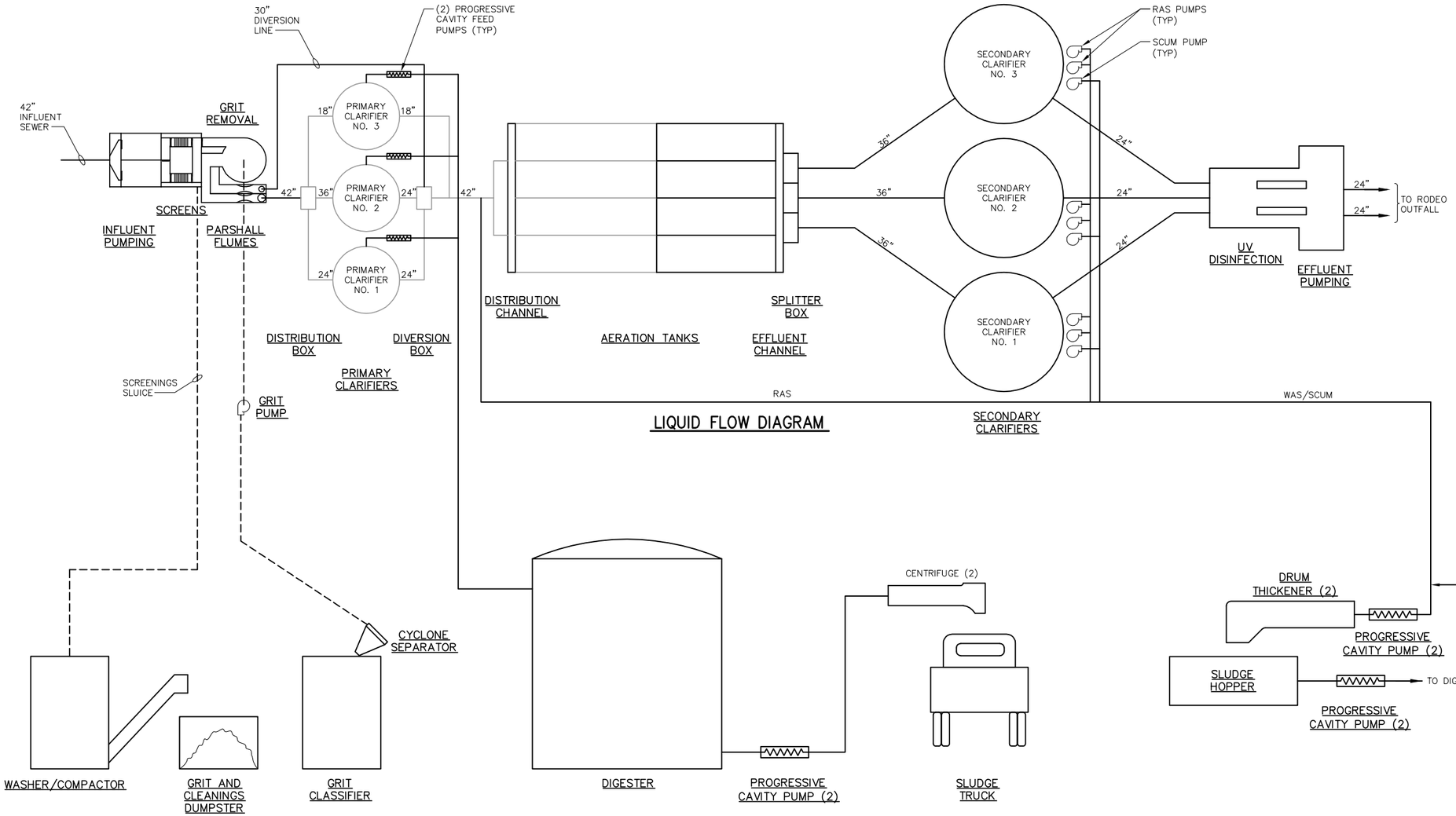
PINOLE–HERCULES WASTEWATER TREATMENT PLANT

GENERAL

OPTION 2
LIQUID FLOW DIAGRAM & HYDRAULIC PROFILE

Scale NONE

Figure No. 7–2



LIQUID FLOW DIAGRAM

SOLIDS HANDLING FLOW DIAGRAM

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File Info. FIG. 7-3 DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

GENERAL

OPTION 2

SOLIDS HANDLING FLOW DIAGRAM

Scale: NONE

Figure No.: 7-3

ALIGNMENT FOR NEW LAND OUTFALL

DODSON PSOMAS

File Info. FIG_7-4.DWG HJH 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

NEW LAND OUTFALL ALIGNMENT

Scale NONE

Figure No. 7–4

TABLE 7-1. CONSTRUCTION SEQUENCE

Item	Time to Construct , Months	Cumulative Time, Months
Construct influent sewers, headworks and install temporary solids dewatering equipment	10	10
Relocate corporation yard, demolish solids handling area and construct secondary treatment facilities, forcemain and diffuser modifications	12	22
Demolish secondary clarifiers and construct permanent solids handling facilities	8	30
TOTAL CONSTRUCTION TIME, MONTHS		**30**

Design, advertising, bidding, and award for construction of the project will require another 18 months. In order to meet the Regional Board's mandated schedule of completing construction of facilities by November 1, 2015, the notice to proceed for design should be issued by November 1, 2011. The only significant difference between the Regional Board and the recommended compliance schedule is that the complexity of the design and the sequence of construction will require a design, bid, and a construction period of approximately four years. This means that the recommended start of design would be November 1, 2011. The schedule differences are shown in Table 7-2.

TABLE 7-2. COMPLIANCE SCHEDULE

Task	Compliance Date	
	Regional Board	Recommended
Engineering Report and Antidegredation Analysis	June 1, 2009	June 1, 2009
Certified Environmental Impact Report	August 1, 2010	August 1, 2010
Secure funding for WPCP upgrades	August 1, 2011	August 1, 2011
Start design of WPCP upgrades	August 1, 2012	November 1, 2011
Complete design of WPCP facilities	August 1, 2013	February 1, 2013
Commence construction of WPCP facilities	June 1, 2014	May 1, 2013
Complete construction of WPCP facilities	November 1, 2015	November 1, 2015

SECTION EIGHT
PLANNING CONSIDERATIONS

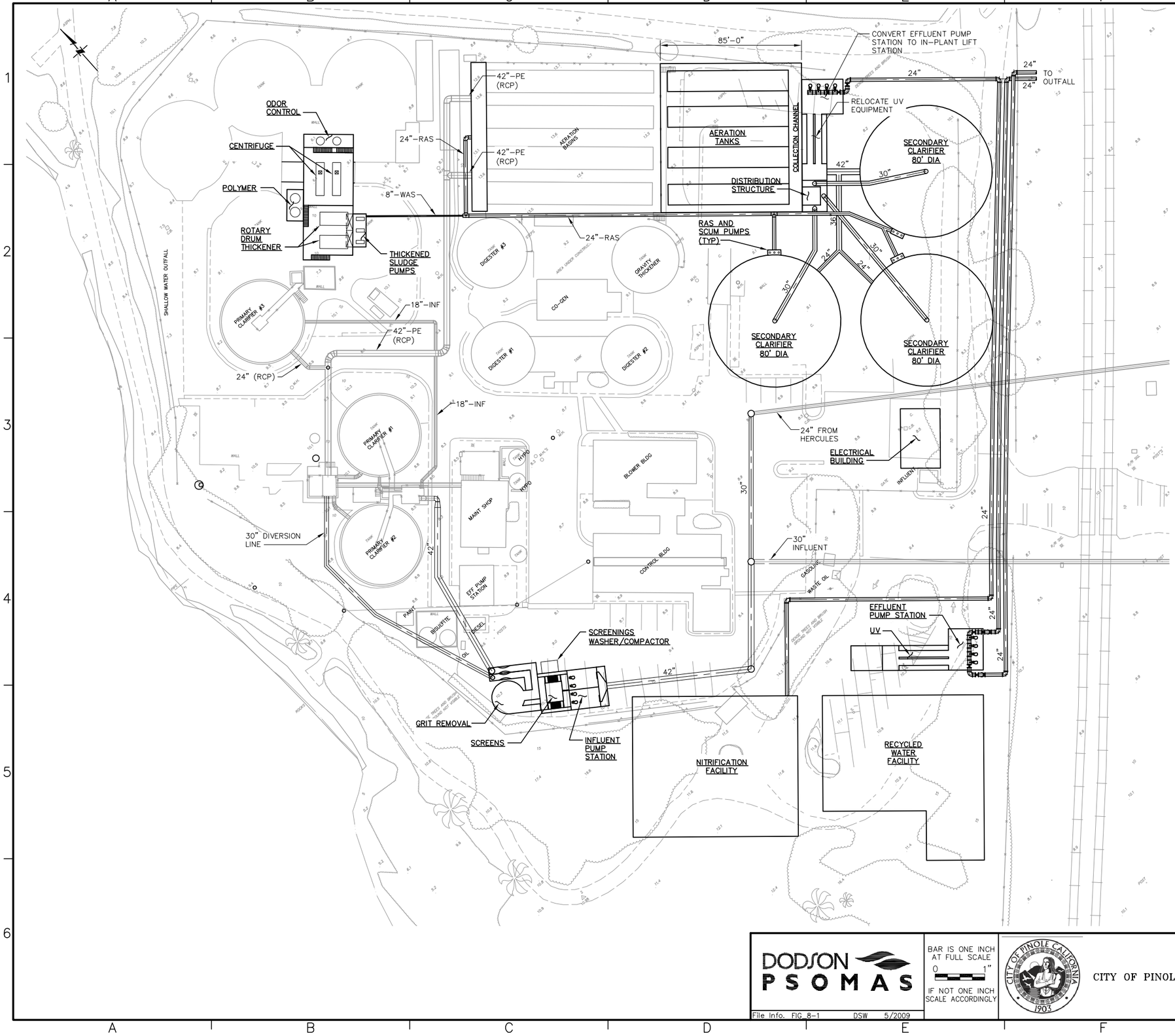
Processes which may be implemented in the future at the WPCP should be taken into consideration for planning purposes.

Nitrification

Regulations are becoming more stringent. Nitrification, or ammonia removal from wastewater, may be required in the future. Additional facilities would be necessary to oxygenate the wastewater to remove ammonia. There is not sufficient space on the existing WPCP site for additional facilities; however, land within Bayfront Park, which is owned by the WPCP, is available. Figure 8-1 shows a potential location for nitrification facilities should the process be required.

Recycled Water

Production of recycled water is an opportunity to utilize secondary effluent and reduce discharge to San Pablo Bay. Recycled water is becoming more attractive to municipalities and processing plants because it offsets potable water use and reduces the threat of severe rationing during droughts. Although recycled water opportunities for the WPCP have been previously considered, there are currently no defined users or plans to implement. However, should the WPCP become a producer of recycled water, tertiary treatment facilities and additional piping to distribute recycled water to its users would be required. There is not sufficient space available on the existing WPCP site; however, land within Bayfront Park, which is owned by the WPCP, is available. Figure 8-1 shows a potential location for tertiary treatment facilities. A recycled water permit would also be required if recycled water is used for irrigation at areas outside the WPCP.



DODSON PSOMAS

File Info. FIG. 8-1 DSW 5/2009

BAR IS ONE INCH AT FULL SCALE
0 1"
IF NOT ONE INCH SCALE ACCORDINGLY

CITY OF PINOLE

PINOLE–HERCULES WASTEWATER TREATMENT PLANT

CIVIL

NITRIFICATION AND RECYCLED WATER FACILITIES

Scale 1"=30'-0"

Figure No. 8-1

APPENDICES

APPENDIX A

ABBREVIATIONS

ABBREVIATIONS

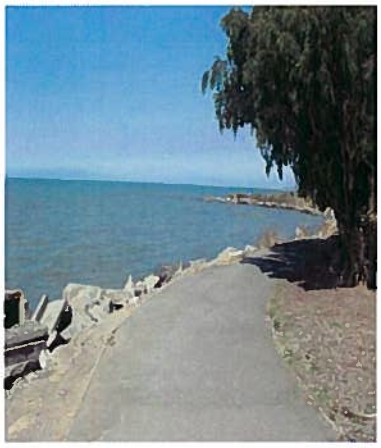
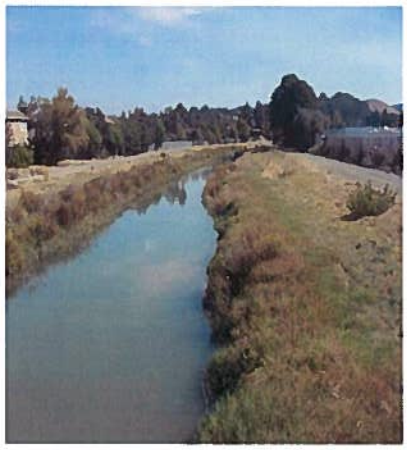
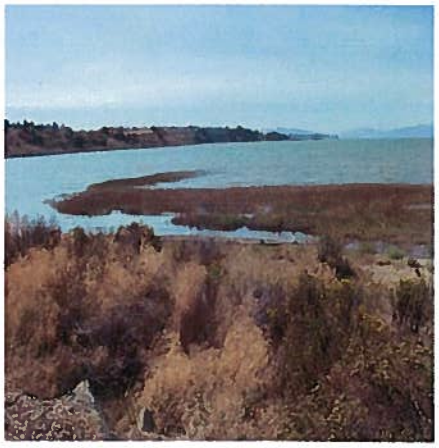
BCDC	Bay Conservation and Development Commission
BOD	Biochemical Oxygen Demand
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand 5-day
cfm	Cubic feet per minute
DFG	Department of Fish and Game
DIA	Diameter
EPA	Environmental Protection Agency
gpd/ft	Gallons per day per foot
I/I	Infiltration/inflow
INF	Influent
JPA	Joint Powers Authority
kW	Kilowatt
lb/day	Pound per day
MBR	Membrane bioreactors
mg/l	Milligrams per liter
mgd	Million gallons per day
MPN	Most Probable Number
PE	Primary effluent
PVC	Polyvinyl chloride
RAS	Return Activated Sludge
RSD	Rodeo Sanitary District
RWQCB	Regional Water Quality Control Board
TSS	Total Suspended Solids
UPRR	Union Pacific Railroad
USFWS	U.S. Fish and Wildlife Service
UV	Ultraviolet
WAS	Waste Activated Sludge
WCWD	West County Wastewater District
WPCP	Water Pollution Control Plant

APPENDIX B

DRAFT CONSTRAINTS AND OPPORTUNITIES ANALYSIS: PINOLE-HERCULES WATER POLLUTION CONTROL PLANT

Draft Constraints and Opportunities Analysis

Pinole-Hercules Water Pollution Control Plant

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1 INTRODUCTION

The Cities of Hercules and Pinole are considering five different water pollution control plant (WPCP) configuration alternatives intended to bring their WPCP facilities into compliance with Regional Water Quality Control Board (RWQCB) requirements for effluent water quality. Under the current configuration, existing facilities cannot handle peak wet weather flow permitted capacity. EDAW and Larry Walker & Associates (LWA) have conducted this constraints analysis comparing the relative complexity of environmental regulatory processes for development of each proposed alternative. EDAW evaluated the potential environmental constraints and available opportunities of each proposed configuration. Environmental constraints relating to biological and cultural resources, water quality and associated permitting, and land use were investigated.

1.1 PURPOSE OF DOCUMENT

This report summarizes findings of the environmental opportunities and constraints analysis conducted by EDAW. The report has been prepared to assist the Cities of Hercules and Pinole in identifying environmental issues related to selection of a WPCP configuration. The Cities of Hercules and Pinole would use this analysis in selecting a WPCP configuration that would undergo further investigation under the California Environmental Quality Act (CEQA). This report is not intended to serve as a complete evaluation of any proposed configuration nor as an exhaustive analysis of any of the environmental issues that would be investigated under CEQA.

1.2 ORGANIZATION OF DOCUMENT

The remainder of this constraints and opportunities analysis describes the five alternative WPCP configurations under consideration; provides an overview of relevant regulatory requirements that could pertain to the project; evaluates each configuration with regard to the range of environmental topics listed above; summarizes the findings; and provides a comparison of the alternatives.

2 PROJECT DESCRIPTION AND ALTERNATIVES

2.1 BACKGROUND

The existing Pinole-Hercules WPCP is owned and operated by the City of Pinole under a joint use agreement with the City of Hercules. The facility treats wastewater from both cities to secondary standards prior to discharge to San Pablo Bay. There are two operational discharge outfalls. One of these (Deepwater Outfall 001) is shared with the Rodeo Sanitary district and is permitted by the RWQCB. The second outfall (Shallow Water Outfall 002) is not permitted and has been used in the past during emergency situations, including wet weather conditions when influent flows are high.

Currently, the Pinole-Hercules WPCP is permitted to treat 4.06 million gallons per day (mgd) average dry weather flow, but facilities cannot handle the peak wet weather flow permitted capacity, which has approached 20 mgd in the past. Because this amount exceeds the capacity of the effluent pipeline to Outfall 001, it has been necessary to blend flows and to discharge to the unpermitted Outfall 002. The RWQCB has indicated that this practice is not in compliance with National Pollutant Discharge and Elimination System (NDPES) permit requirements. In order to meet effluent water quality standards, it is necessary for blending operations to cease, to discontinue use of the unpermitted Outfall 002, and to expand treatment plant capacity. Five alternative WPCP configurations intended to bring facilities into compliance are being considered and are described below.

2.2 CONCEPTUAL PROJECT DESCRIPTION

The proposed alternatives would allow the Pinole-Hercules WPCP to meet effluent water quality standards, cease blending operations, and discontinue the use of unpermitted Outfall 002. In order to meet these objectives, the engineering firms of Brown & Caldwell and Carollo analyzed design alternatives to bring the WPCP into compliance. Feasibility studies were completed to evaluate treatment and disposal opportunities, consisting of upgrades to wastewater treatment and construction of new disposal force mains. Five options comprising one or both of these design alternatives are discussed below.

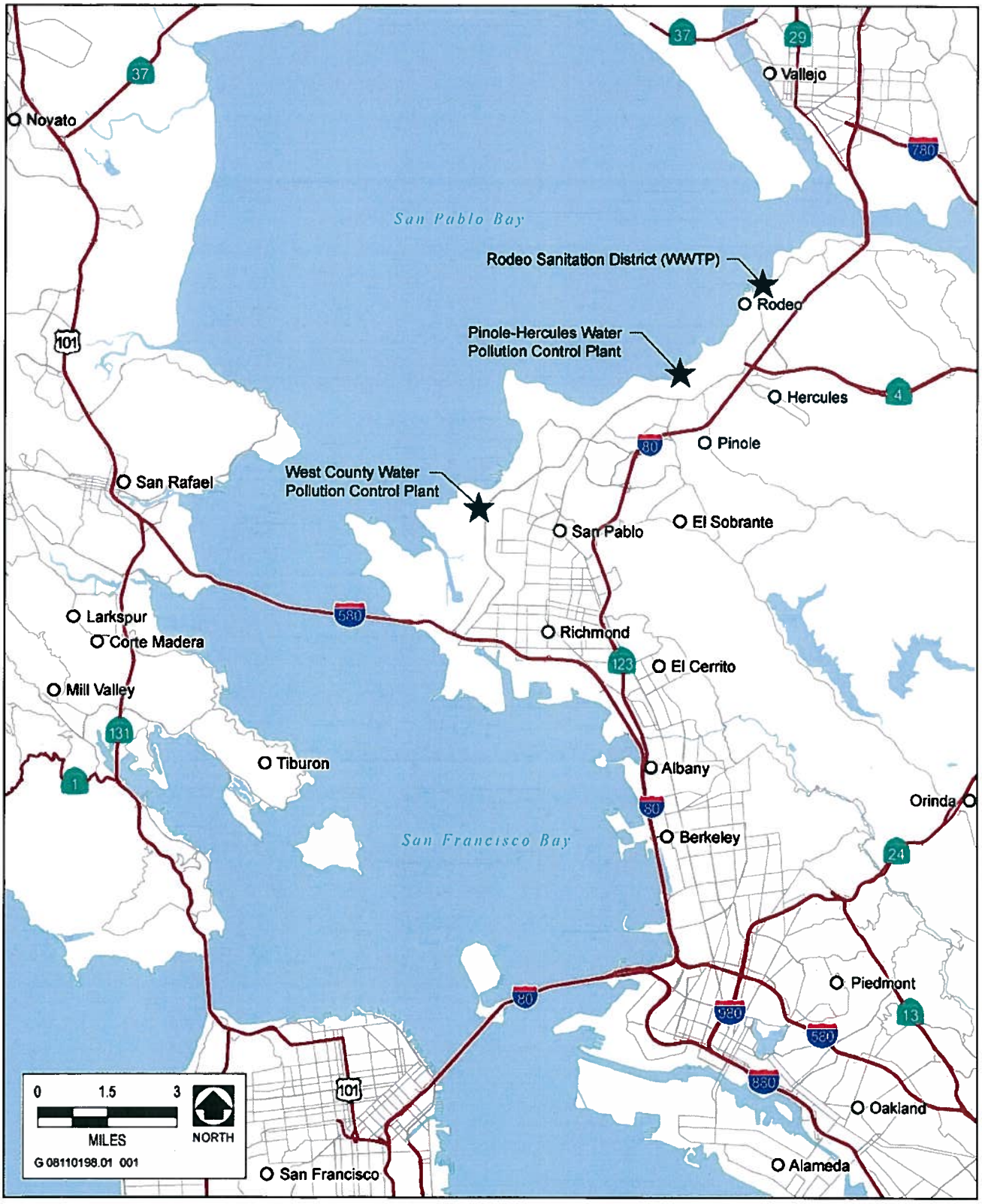
2.3 DESCRIPTION OF ALTERNATIVES

Below is a description of each configuration. Exhibit 1 shows the location of the Pinole-Hercules WPCP, the Rodeo Sanitation District (WWTP), and the West County WPCP. Exhibits 2, 3, and 4 show pipeline routes associated with each alternative.

2.3.1 ALTERNATIVE 1: FULL TERTIARY FACILITIES

Alternative 1 would upgrade the entire Pinole-Hercules WPCP from secondary to tertiary treatment. The current effluent discharge pipeline to the Rodeo Sanitary District would be abandoned and Outfall 001 would no longer be used. Instead, a new permitted outfall would be constructed in Pinole Creek for discharge of tertiary-treated effluent into the creek (Exhibit 2).

Alternative 1 includes upgrading the Pinole-Hercules WPCP to treat all wastewater flows to tertiary recycled water standards through use of tertiary filters or a membrane bioreactor. The plant capacity would be 11.9 mgd based on the surface overflow rate of the primary clarifiers. This capacity is slightly larger than the 10.3 mgd that is currently available. For the tertiary filters, flow in excess of 11.9 mgd would bypass primary treatment and flow directly to the secondary aeration basins. For the membrane bioreactor, equalization basins would be used to modulate flows so the inflows do not exceed 11.9 mgd. Ultraviolet (UV) disinfection would be implemented under both treatment scenarios. All treated, disinfected wastewater would be discharged to Pinole Creek approximately 3,000 upstream of the San Francisco Bay and used to augment streamflow and enhance the riparian values of the waterway. The treatment regime proposed for Alternative 1 would produce a better quality

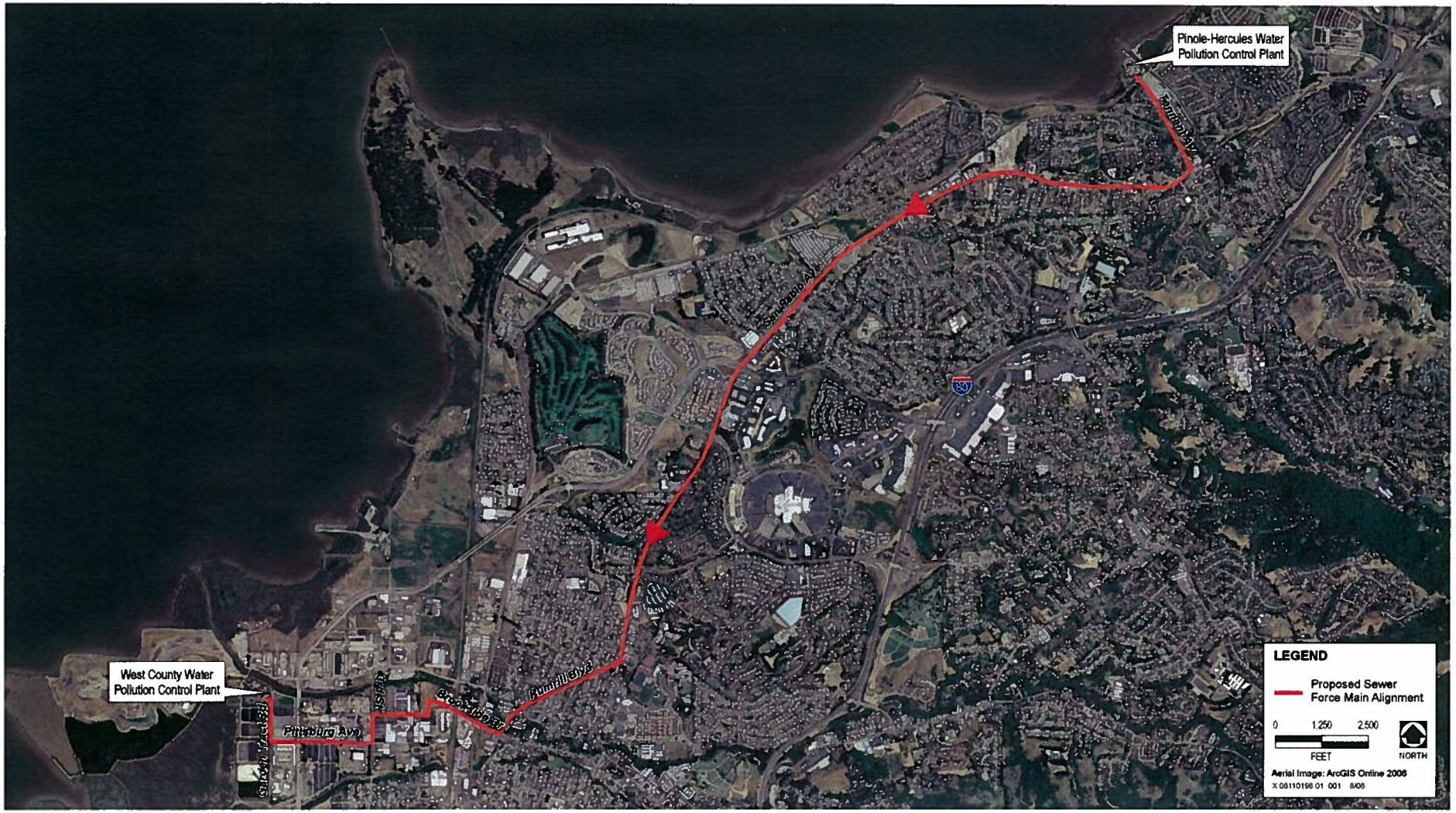


Source: City of Hercules 2008

Regional Project Location Map **Exhibit 1**

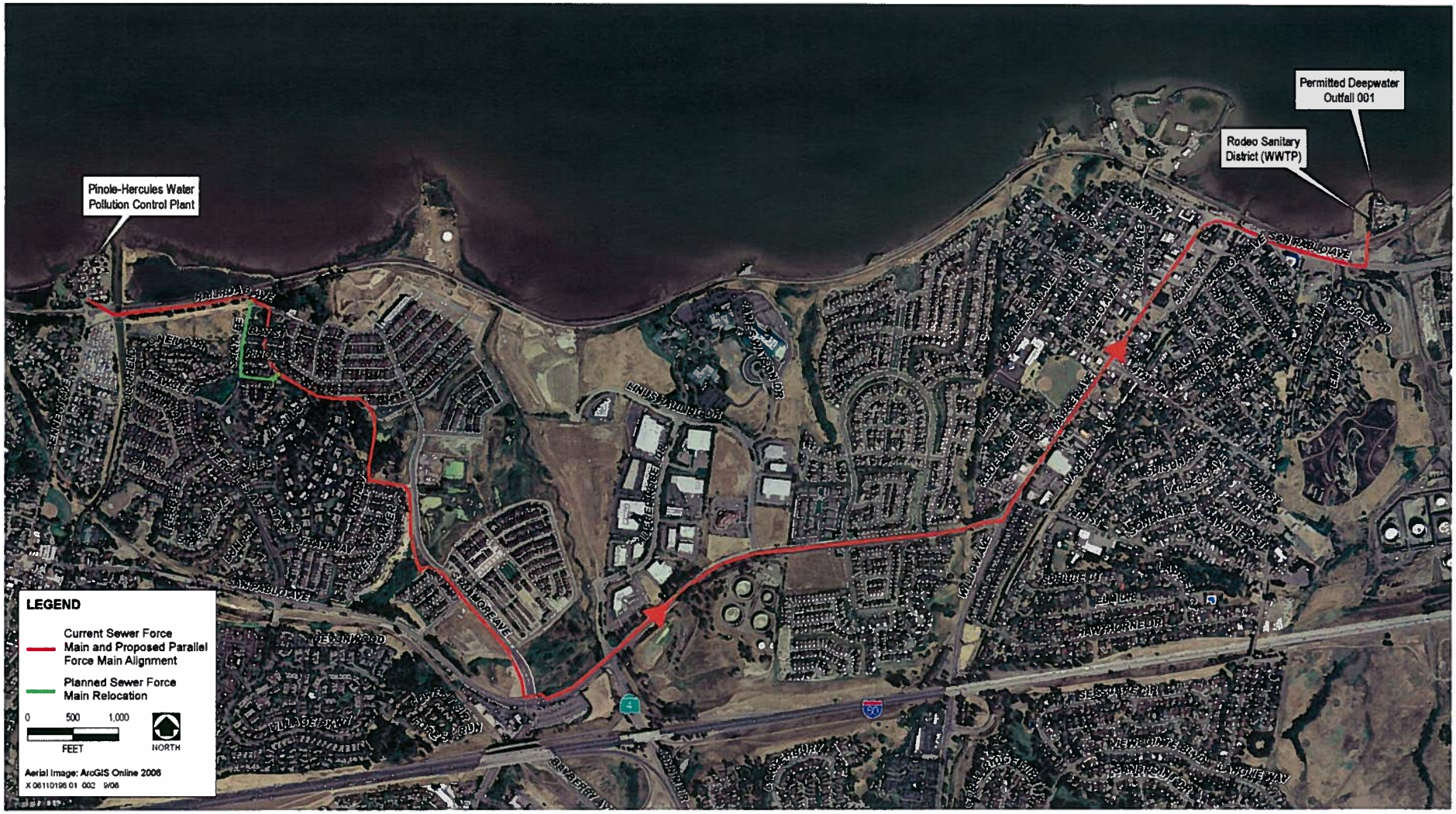
Source: City of Hercules 2008

Pipeline Route Map – Alternatives 1 and 3 **Exhibit 2**



Source: City of Hercules 2008

Pipeline Route Map – Alternatives 2 and 3 **Exhibit 3**



Source: City of Hercules 2008

Pipeline Route Map – Alternatives 4, 5, and 6

Exhibit 4

wastewater than what is currently generated by the Pinole-Hercules WPCP. It would also increase the discharge flowrate, at least during the wet season.

2.3.2 ALTERNATIVE 2: NEW LARGER EFFLUENT PIPE TO RODEO

The Pinole-Hercules WPCP would undergo minor improvements, but would not be upgraded to tertiary treatment. A new, larger capacity pipeline and outfall would be installed from the Pinole-Hercules WPCP to the permitted Outfall 001 at the Rodeo Sanitary District (Exhibit 4). There is a potential that the treated effluent could be purchased for use in industrial cooling tower operations.

Alternative 2 includes upgrading the capacity of the Pinole-Hercules WPCP to 11.9 mgd. Effluent water quality is not expected to change because the WPCP will remain a secondary treatment facility. Inflows greater than 11.9 mgd would bypass primary treatment and be routed directly to the aeration basins for secondary treatment. The plant capacity would be 11.9 mgd based on the surface overflow rate of the primary clarifiers. However, the secondary treatment system and the disinfection system would be sized to handle 20 mgd. The 11.9 mgd capacity is slightly larger than the 10.3 mgd that is currently available. All treated, disinfected wastewater would be discharged to the existing deepwater outfall at Rodeo Sanitary District. A new forcemain would be constructed to ensure delivery of 20 mgd. The diffuser on the existing outfall would be modified to ensure at least 45:1 dilution at all times.

2.3.3 ALTERNATIVE 3: SMALL TERTIARY OR HYBRID SOLUTION

Upgrades at the Pinole-Hercules WPCP would include the addition of a smaller tertiary facility to handle the increased wet weather flows. The existing pipeline to Outfall 001 (Exhibit 4) would be upgraded and continue to be used. Flows from the new small tertiary or hybrid plant would be conveyed to a new pipeline and new outfall in Pinole Creek (Exhibit 2).

Alternative 3 involves increasing the capacity of the Pinole-Hercules WPCP to 20 mgd. The treatment plant upgrades specified for alternative 2 would be implemented to treat 11.9 mgd of the inflows to secondary standards. The secondary water would be discharged through the existing deepwater outfall at Rodeo Sanitary District. The existing effluent pump station and gravity pipe to Rodeo would be upgraded to handle 11.9 mgd. This flowrate represents an increase in discharge through the Rodeo outfall.

Tertiary filters or a membrane bioreactor would be installed to treat the additional 8.1 mgd (20–11.9 mgd) to tertiary recycled water standards. To ensure effective operation of the tertiary filters, all influent flows would undergo secondary treatment. As such, the existing secondary system would be upgraded to treat 20 mgd. The membrane bioreactors would be sized to treat 8.1 mgd. The tertiary water would be discharged to Pinole Creek approximately 1,800 feet upstream of the San Francisco Bay and used to augment streamflow and enhance the riparian values of the waterway. UV disinfection would be utilized for all tertiary flows to Pinole Creek. The treatment regime proposed for alternative 3 would produce approximately the same water quality for deepwater disposal (as currently generated) and a higher water quality for the portions of flow that would be discharged to Pinole Creek.

2.3.4 ALTERNATIVE 4: ALL FLOWS TO WEST COUNTY WASTEWATER DISTRICT FACILITIES

The existing Pinole-Hercules WPCP would be decommissioned and all existing flows would be diverted, via a new pipeline, to the West County Wastewater District facilities (Exhibit 4). The existing effluent pipeline to Outfall 001 would be abandoned.

Alternative 4 would involve transporting all wastewater generated by the Cities of Pinole and Hercules (Cities) to the West County Wastewater District (WCWD) wastewater treatment plant. The Pinole-Hercules WPCP would

be shut down and dismantled. It is expected that wastewater flows from the Cities would be 4 mgd (average dry weather flow) and up to 29 mgd (peak wet weather flow). Wastewater from the Cities would be combined with wastewater from the WCWD service area and undergo secondary treatment by WCWD. The WCWD facilities would have to be expanded from the existing 12.5 mgd (average dry weather flow), 21 mgd (peak wet weather flow) to 14 mgd (average dry weather flow), 110 mgd (peak wet weather flow). Combined flows would be discharged through a deepwater outfall currently used by WCWD and the City of Richmond and operated by the West County Agency. The outfall is located off Port Richmond in the Central San Francisco Bay. The volume of treated wastewater discharged through the West County Agency outfall would increase under alternative 4, but the quality of wastewater in the commingled flows is unclear at this time.

2.3.5 ALTERNATIVE 5: CITY OF HERCULES ONLY TO WEST COUNTY WASTEWATER DISTRICT FACILITIES

Wastewater flows generated by the City of Hercules would be diverted to the West County Wastewater District facilities (Exhibit 3). Wastewater flows generated by the City of Pinole would continue to be treated at the Pinole-Hercules WPCP, which would undergo only minor facility upgrades. The existing pipeline to Outfall 001 would be upgraded (Exhibit 4).

Alternative 5 would involve transporting wastewater generated by the City of Hercules to the WCWD wastewater treatment plant. The Pinole-Hercules WPCP would then be operated solely to treat wastewater generated by the City of Pinole. It is expected that wastewater flows from Hercules would be 2.25 mgd (average dry weather flow) and up to 14.6 mgd (peak wet weather flow). Wastewater from Hercules would be combined with wastewater from the WCWD service area and undergo secondary treatment by WCWD. The existing dry weather capacity of the WCWD facilities (12.5 mgd, average dry weather flow) is sufficient to handle the combined flow. The existing wet season capacity (21 mgd, peak wet weather flow) would be expanded to handle up to 96 mgd. The commingled flows would be discharged through a deepwater outfall currently used by WCWD and the City of Richmond and operated by the West County Agency. The outfall is located off Port Richmond in the Central San Francisco Bay. The volume of treated wastewater discharged through the West County Agency outfall would increase under alternative 5, but it may remain within current permitted limits. The quality of wastewater produced by the commingled flows is unclear at this time.

2.3.6 ALTERNATIVE 6: FLOW EQUALIZATION AT THE EXISTING PLANT

A primary effluent flow equalization tank would be constructed underground in one of three locations: (1) Bayfront Park, (2) on a portion of the privately-owner RV park immediately east of the WPCP, or (3) along the existing road right-of-way next to the Union Pacific Railroad (UPRR) tracks immediately northeast of the WPCP. In order to install the tank at this location, a pipeline would be required to cross Pinole Creek. That pipeline would be suspended underneath the existing bridge, and therefore work in the bed or bank of Pinole Creek would not be required. The Pinole-Hercules WPCP would undergo minor improvements, but would not be upgraded to tertiary treatment. A new, larger capacity pipeline and outfall would be installed from the Pinole-Hercules WPCP to the permitted Outfall 001 at the Rodeo Sanitary District (Exhibit 4).

Alternative 6 includes upgrading the capacity of the Pinole-Hercules WPCP to 11.9 mgd and adding a 4 million gallon flow equalization basin. Inflows greater than 11.9 mgd would receive primary treatment before delivery to the flow equalization facility. The treatment capacity would be 11.9 mgd based on the surface overflow rate of the primary clarifiers, and upgrades to the existing aeration basins, secondary clarifiers, and effluent pumping station. The 11.9 mgd capacity is slightly larger than the 10.3 mgd that is currently available. Effluent water quality is not expected to change because the WPCP will remain a secondary treatment facility. All treated, disinfected wastewater would be discharged to the existing deepwater outfall at Rodeo Sanitary District. Improvements would be made to the land outfall to ensure delivery of 11.9 mgd. The diffuser on the existing outfall would be modified to guarantee at least 45:1 dilution at all times.

3 ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES

3.1 SUMMARY OF REGULATORY SETTING

The following is a brief summary of some of the environmental regulations that apply to one or more of the Pinole-Hercules WPCP configurations.

3.1.1 BIOLOGICAL RESOURCES

FEDERAL ENDANGERED SPECIES ACT

Pursuant to the federal Endangered Species Act (ESA), the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have regulatory authority over federally listed species. Under ESA, a permit to "take" a listed species is required for any federal action that may harm an individual of that species. Take is defined under ESA Section 9 as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Under federal regulation, take is further defined to include habitat modification or degradation where it would be expected to result in death or injury to listed wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Section 7(a)(2) requires federal agencies to consult with USFWS and/or NMFS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. For projects where federal action is not involved and take of a listed species may occur, the project proponent may seek to obtain an incidental take permit under ESA Section 10(a).

SECTION 404 OF THE CLEAN WATER ACT

Section 404 of the federal Clean Water Act (CWA) requires a project applicant to obtain a permit from the United States Army Corps of Engineers (USACE) before engaging in any activity that involves any discharge of dredged or fill material into waters of the United States, including lakes, rivers, streams and their tributaries, and adjacent wetlands. Activities that require a Section 404 permit include, but are not limited to placing fill or riprap, grading, mechanized land clearing, and dredging in waters of the United States. The U.S. Army Corp of Engineers (USACE) administers individual permit decisions and jurisdictional determinations, develops policy and guidance, and enforces section 404 provisions.

CALIFORNIA FISH AND GAME CODE

The California Fish and Game Code, administered by the California Department of Fish and Game (DFG), contains various state regulations relating to fish and wildlife. Section 1602 of the California Fish and Game Code states that it is unlawful for any person, governmental agency, state, local or any public utility to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream or lake, or deposit or dispose of debris, waste, in any river, stream, or lake without first notifying the DFG. Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code prohibit take or possession of fully protected species and do not provide for authorization of incidental take. Raptors are protected under Section 3503.5 of the California Fish and Game Code, which prohibits the destruction of raptors and their active nests.

SUSTAINABLE FISHERIES ACT

In response to growing concern about the status of U.S. fisheries, the Sustainable Fisheries Act of 1996 (Public Law [PL] 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (PL 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect essential fish habitat (EFH). EFH includes those habitats that fish rely on throughout their

life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

San Pablo Bay is within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC). The BCDC is comprised of appointees from local government and state and federal agencies and is responsible for regulating a number of activities within and adjacent to the Bay. Any dredging and disposal activity in the Bay, marshes, and some creeks requires a permit from the BCDC and most work (including grading) on land within 100 feet of the Bay shoreline also requires a permit.

3.1.2 CULTURAL RESOURCES

CALIFORNIA ENVIRONMENTAL QUALITY ACT GUIDELINES: CULTURAL RESOURCES

The most frequently applied legislation designed to protect cultural resources in California consists of the provisions of CEQA that provide for the documentation and protection of significant prehistoric and historic resources. Prior to the approval of discretionary projects and the commencement of agency undertakings, the potential impacts of the project on archaeological and historical resources must be considered (Public Resources Code Sections 21083.2 and 21084.1 and the CEQA Guidelines [California Code of Regulations Title 14, Section 15064.5]).

CEQA uses a broad definition of what constitutes a cultural resource which is outlined in the California Code of Regulations Title 14 Section 4852. Cultural resources can include traces of prehistoric habitation and activities, historic-era sites and materials, and places used for traditional Native American observances or places with special cultural significance. In general, any trace of human activity over 50 years in age is required to be treated as a potential cultural resource. However, as projects can extend over a period of years from planning to implementation stages, minimum age generally accepted for resources to be considered historic for the purposes of CEQA is 45 years.

The significance of an archaeological or historic resource as per the CEQA guidelines is an important consideration in terms of their management. Listing, or eligibility for listing, on the California Register of Historic Resources (CRHR) is the primary consideration in whether or not a resource is subjected to further research and documentation. CEQA states that if a project would result in significant impacts on important historical resources, then alternative plans or mitigation measures must be considered. However, only significant historical resources need to be addressed. The State CEQA Guidelines define a significant historical resource as "a resource listed or eligible for listing on the California Register of Historical Resources" (CRHR) (Public Resources Code Section 5024.1).As a matter of policy, public agencies should avoid damaging effects to historic and archaeological resources, particularly those that are CRHR eligible. When impacts cannot be avoided, their affects can be mitigated through:

- Avoidance during construction phases
- Incorporation of sites into open space
- Capping resources with chemically stable fill
- Deeding a site into a permanent conservation easement
- Data recovery (testing and excavation)

CEQA also provides for a measure of protection for Native American human remains (Guidelines section 15064.5[d]) and for the accidental discovery of cultural resources (Guidelines section 15064.5[e]). These are particularly important provisions in that they take into account the possibility that significant resources not noted as a result of previous research efforts may be present within a project area and need to be treated in a way commensurate with CEQA standards.

3.1.3 LAND USE AND PLANNING

LOCAL AGENCY FORMATION COMMISSION

The Contra Costa County Local Agency Formation Commission (LAFCO), as with all LAFCOs in California, is governed by the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 (Government Code Section 56000 et. seq.). LAFCOs are responsible for reviewing and approving a merger or establishment of a district of limited powers (e.g., sanitary district) as a subsidiary district of a city.

GENERAL PLANS

The pipeline implemented must be consistent with the applicable general plan for the area in which it would be located. General Plans that could apply to one or more of the alternatives include:

- Contra Costa County General Plan
- City of Pinole General Plan
- City of Hercules General Plan
- City of San Pablo General Plan
- City of Richmond General Plan
- North Richmond Shoreline Specific Plan

3.1.4 WATER QUALITY

SUMMARY OF APPLICABLE WATER QUALITY REGULATIONS

Numerous State and federal laws, rules, plans, policies, and programs define the framework for regulating water quality in California. The following discussion focuses on water quality requirements as they apply to treated wastewater generated by the Cities of Pinole and Hercules. If wastewater is sent to the West County Wastewater District Wastewater Treatment Plant for treatment and disposal, the Central San Francisco Bay is designated as the receiving water. If wastewater is sent to the Rodeo Sanitation District outfall or to Pinole Creek for disposal, San Pablo Bay is designated as the receiving water. The federal Clean Water Act and the California Porter-Cologne Water Quality Control Act are the primary water quality laws that govern the discharge of wastewater in California.

CLEAN WATER ACT

The federal Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants to surface waters within the United States. The law authorizes the U.S. Environmental Protection Agency (USEPA) to set point-source effluent limits for industry and publicly owned treatment works (POTWs) and requires states (or USEPA in the event of a state default) to set water quality standards for contaminants in surface waters. The CWA authorizes the USEPA to delegate many permitting, administrative, and enforcement aspects of the law to States. In such cases, the USEPA still retains oversight responsibilities. California administers the CWA through the State Water Resources Control Board (State Water Board) and its nine regional boards (Regional Water Quality Control Boards, or Regional Water Boards). The Central San Francisco Bay and San Pablo Bay are located within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (Region 2). The NPDES Permit program and the requirement to develop total maximum daily loads (TMDLs) for impaired water bodies are particularly relevant to wastewater generated by the Cities of Pinole and Hercules. These programs are discussed in the following paragraphs.

NPDES Permit Program

The CWA requires wastewater dischargers to obtain a permit that establishes effluent limitations and specifies monitoring and reporting requirements. The NPDES program regulates the discharge of waste to waters of the U.S. and requires wastewater dischargers to regulate non-domestic waste discharged to sewers through activities such as pretreatment programs and sewer use ordinances. NPDES permits include the following terms and conditions:

- Effluent discharge limitations
- Prohibitions
- Receiving water limitations
- Compliance monitoring and reporting requirements
- Other special study or compliance provisions

Section 303(d) Impaired Waters List

Section 303(d) of the CWA requires States to develop lists of water bodies (or sections of water bodies) that do not meet water quality standards after implementation of minimum required levels of treatment by point-source dischargers (i.e., municipalities and industries). The intent of the 303(d) list is to identify water bodies that require future development of a total maximum daily load (TMDL) to maintain water quality. Section 303(d) requires States to develop a TMDL for each of the listed pollutants and water bodies.

The most recently approved CWA Section 303(d) list (2006) for California identifies the Central San Francisco Bay and San Pablo Bay as water-quality impaired for a number of constituents. These constituents are identified in Table 1.

Table 1
Constituents Affecting Water Quality of the Central San Francisco Bay and San Pablo Bay (as identified in the 2006 CWA Section 303(d) List)

Pollutant/Stressor	Potential Sources	Receiving Water Affected
Chlordane	Nonpoint Sources	Central San Francisco Bay, San Pablo Bay
DDT	Nonpoint Sources	Central San Francisco Bay, San Pablo Bay
Dieldrin	Nonpoint Sources	Central San Francisco Bay, San Pablo Bay
Dioxin Compounds	Atmospheric Deposition	Central San Francisco Bay, San Pablo Bay
Exotic Species	Ballast Water	Central San Francisco Bay, San Pablo Bay
Furan Compounds	Atmospheric Deposition	Central San Francisco Bay, San Pablo Bay
Mercury	Industrial Point Sources, Municipal Point Sources, Resource Extraction, Atmospheric Deposition, Natural Sources, Nonpoint Sources	Central San Francisco Bay, San Pablo Bay
PCBs	Unknown Nonpoint Source	Central San Francisco Bay, San Pablo Bay
Selenium	Industrial Point Sources, Agriculture, Natural Sources, Exotic Species	Central San Francisco Bay, San Pablo Bay
Nickel	Unknown	San Pablo Bay

Source: State Water Resources Control Board 2007

Total Maximum Daily Loads

A TMDL is the maximum amount of a pollutant that a water body can receive and still meet water quality standards. Typically, a TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources that the water body can receive and still meet water quality standards. The TMDL must include an allocation of allowable loadings to point and non-point sources, with consideration of background

loadings and a margin of safety. Generally, NPDES permit limitations for listed pollutants must be consistent with the waste load allocation (WLA) identified in the TMDL. Table 2 lists the TMDLs in development and those that have been adopted by the USEPA for the San Francisco Bay.

Table 2
TMDL Projects that Affect Watersheds of the Central San Francisco Bay and San Pablo Bay

TMDL Projects in Development
San Francisco Bay PCBs TMDL
North San Francisco Bay Selenium TMDL
TMDLs Adopted by the USEPA
Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks TMDL
San Francisco Bay Mercury TMDL

Source: San Francisco Bay Regional Water Quality Control Board 2008

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Under the Porter-Cologne Act, California must adopt water quality policies, plans, and objectives that ensure beneficial uses of the State are reasonably protected. The law requires the nine regional water boards to adopt water quality control plans and establish water quality objectives, and authorizes the State Water Resources Control Board and regional water boards to issue and enforce permits containing requirements for the discharge of waste to surface waters and land. The water quality standards provisions of the state's water quality control plans (i.e., designation of beneficial uses and adoption of water quality objectives) meet the requirements of section 303 of the federal CWA, which requires the states to adopt water quality standards.

SAN FRANCISCO BAY BASIN PLAN

The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) was originally adopted by the San Francisco Bay Regional Water Quality Control Water Board (Regional Water Board) in 1975 and is amended regularly. The Basin Plan contains descriptions of the legal, technical, and programmatic bases for water quality regulation in the region. The Basin Plan describes the beneficial uses of major surface waters and their tributaries and the corresponding water quality objectives required to protect these beneficial uses. The existing beneficial uses that have been identified for the Central San Francisco Bay and San Pablo Bay are listed in Table 3.

Table 3
Existing Beneficial Uses of Central San Francisco Bay and San Pablo Bay

Beneficial Use	Description
Ocean and Commercial Sport Fishing	Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including organisms for human consumption or bait.
Estuarine Habitat	Uses of water that support estuarine ecosystems, including preservation or enhancement of habitats, vegetation, fish, shellfish, or wildlife.
Industrial Service Supply	Uses of water for industrial activities that do not depend primarily on water quality, including cooling water supply, hydraulic conveyance, and fire protection.
Fish Migration	Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.
Navigation	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.
Preservation of Rare and Endangered Species	Uses of waters that support habitats necessary for the survival and successful maintenance of plant or animal species established under state and/or federal law are rare, threatened, or endangered.

Table 3 Existing Beneficial Uses of Central San Francisco Bay and San Pablo Bay	
Beneficial Use	**Description**
Water Contact Recreation	Uses of water for recreational activities involving body contact with water where ingestion of water is reasonable possible.
Non-contact Water Recreation	Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonable possible.
Shellfish Harvesting	Uses of water that support habitats suitable for the collection of crustaceans and filter-feeding shellfish (e.g., clams, oysters, and mussels) for human consumption, commercial, or sport purposes.
Fish Spawning	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
Wildlife Habitat	Uses of water that support wildlife habitats, including the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.
Source: 2004 Water Quality Control Plan for the San Francisco Bay Basin.	

CALIFORNIA TOXICS RULE AND STATEWIDE IMPLEMENTATION PLAN

The regulations that apply specifically to a set of priority toxic pollutants are discussed in the following paragraphs.

NATIONAL TOXICS RULE AND CALIFORNIA TOXICS RULE

In 1992, pursuant to the CWA, the USEPA promulgated the National Toxics Rule (NTR) to establish numeric criteria for priority toxic pollutants for California. The NTR established water quality standards for 42 pollutants not covered, at that time, under California's statewide water quality regulations. As a result of a court-ordered revocation of California's statewide water quality control plan for priority pollutants in September 1994, the USEPA initiated efforts to promulgate additional numeric water quality criteria for California. In May 2000, the USEPA issued the California Toxics Rule (CTR) that promulgated numeric criteria for priority pollutants. The CTR documentation (FR 65 31682, May 18, 2000) "carried forward" the previously promulgated standards of the NTR, thereby providing a single document listing California's fully adopted and applicable water quality criteria for 126 priority pollutants.

POLICY FOR IMPLEMENTATION OF TOXICS STANDARDS FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA

The *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (commonly referred to as the Statewide Implementation Plan, or SIP) applies to discharges of toxic pollutants into California's inland surface waters, enclosed bays, and estuaries. Effective since April 28, 2000, the policy describes methods for setting effluent limits in NPDES permits for NTR and CTR standards and priority pollutant objectives established in Basin Plans using one of several methods: 1) TMDL waste load allocation procedures, 2) steady-state modeling, and 3) dynamic modeling. The policy also establishes certain monitoring requirements and chronic toxicity control provisions, and includes special provisions for certain types of discharges.

ANTIDEGRADATION POLICIES

Federal and state antidegradation policies that apply to any increase in pollutant load by discharges to the Central San Francisco Bay and San Pablo Bay are described in this section.

Federal Antidegradation Policy

The federal antidegradation policy is designed to protect existing water uses and the level of water quality necessary to protect existing uses, and provide protection for higher quality and national water resources. The federal policy directs States to adopt a statewide antidegradation policy that includes the following primary provisions (40 CFR 131.12):

1. Existing in-stream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

2. Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located.

3. Where high quality waters constitute an outstanding National resource, such as waters of National and States parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

California Antidegradation Policy

The goal of State Water Board Resolution No. 68-16 is to maintain high quality waters where they exist in the State. The resolution includes the following statements.

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

The State Water Board has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy, which is applicable if a discharge that began after November 28, 1975 will lower existing surface water quality.

Recycled Water Regulations

Wastewater recycling in California is regulated under Title 22, Division 4, of the California Code of Regulations. The intent of these regulations is to ensure protection of public health associated with the use of recycled water. The regulations establish acceptable levels of constituents in recycled water for a range of uses, and prescribe means for assurance of reliability in the production of recycled water. Use of recycled water for non-potable uses is common throughout the State and is an effective means of maximizing use of available water resources. The California Department of Public Health (CDPH) has jurisdiction over the distribution and use of recycled wastewater in California but has delegated enforcement of the Title 22 regulations to the Regional Water Boards. The Regional Water Boards are responsible for issuing waste discharge requirements (including discharge prohibitions, user site specifications, monitoring, and reporting programs). However, all recycled water programs and treatment technologies must be reviewed and approved by the CDPH.

Wastewater must be treated to standards set forth by Title 22 as determined by the allowable uses of recycled water. The Title 22 recycled water quality levels, standards, and allowable uses are presented in Table 4. The highest quality is "Disinfected Tertiary Recycled Water" and use of this water is approved for most applications in California.

Table 4
Recycled Water Quality Levels and Designated Appropriate Uses
(as defined in Title 22, Division 4 of the California Code of Regulations)

Recycled Water Quality	Appropriate Uses (partial listing)
Disinfected Secondary-23 Recycled Water Total Coliform – 23 MPN/100 mL (7-day avg.) Total Coliform – 240 MPN/100L (30-day max.)	Landscaping (w/ limited public contact) Nursery stock, sod farms Pasture, fiber crop irrigation Landscape impoundment (w/o fountain) Cooling, air conditioning Some industrial uses
Disinfected Secondary-2.2 Recycled Water Total Coliform – 2.2 MPN/100mL (7-day avg.) Total Coliform – 23 MPN/100mL (30-day max.)	Landscaping (w/ limited public contact) Nursery stock, sod farms Pasture, fiber crop irrigation Above ground food crops Landscape impoundment (w/o fountain) Cooling, air conditioning Some industrial uses
Disinfected Tertiary Recycled Water (Filtered) Total Coliform – 2.2 MPN/100mL (7-day avg.) Total Coliform – 23 MPN/100mL (30-day max.) Total Coliform – 240 MPN/100mL (max.) Turbidity – 2 NTU (24-hr avg.) Turbidity – 10 NTU (max.)	Landscaping Nursery stock, sod farms Pasture, fiber crop irrigation Food crops Landscape, recreational impoundments Cooling, air conditioning Dual plumbed buildings Fire suppression Industrial uses

Source: California Code of Regulations, Title 22, Division 4, Chapter 3, Article 3, 60303 through 60307.

3.1.5 Overview of Potential Biological Constraints

EDAW biologists conducted a reconnaissance-level survey of the project site on September 30, 2008 and examined all five Pinole-Hercules WPCP alternatives. Sensitive biological resources that represent potential biological constraints for one or more of the alternatives include sensitive habitats and special-status species. Special-status species include plant and wildlife species that are listed under the federal ESA and/or California Endangered Species Act (CESA); plant and wildlife species considered candidates for listing or proposed for listing; wildlife species identified by DFG as fully protected and/or species of special concern; and plants considered by California Native Plant Society to be rare, threatened, or endangered.

A search of the California Natural Diversity Database (CNDDB) was conducted for a one-mile radius around the proposed WPCP alternatives. The CNDDB is a statewide inventory, managed by DFG, that is continually updated with the location and condition of the state's rare and declining species and habitats. The CNDDB search contained occurrences for 14 special status species and one sensitive habitat (Exhibit 5) within a mile of the proposed alternatives. Two of these are listed under ESA: salt-marsh harvest mouse (endangered) and California red-legged frog (threatened). There is also limited potential for construction activities to disturb raptors nesting in trees in the project vicinity. Nesting raptors are protected by DFG code and although preconstruction surveys for

raptor nests for all WPCP configurations could be required, this not considered a significant biological constraint because it is unlikely to substantially affect the cost, schedule, or feasibility of the project. General plan policies are also not expected to result in substantial biological constraints because relevant city policies have similar requirements to those associated with state and federal regulations.

The primary sensitive biological resource of concern for the proposed project is wetlands. Pipeline routes that cross streams or that lie within or adjacent to wetlands could require permits from USACE and/or DFG. Configurations that require construction work within 100 feet of San Pablo Bay or along certain creeks under BCDC jurisdiction would require a permit from the BCDC and could also present a potentially significant environmental constraint. In addition, some alternatives may require consultation with USFWS under ESA. Depending on whether formal consultation (should the project be determined likely to adversely affect listed species) or informal consultation (should the project be determined to have no effect) is required, this could represent a biological constraint. The formal consultation process can take more than a year to complete.

Portions of the WPCP alternatives that pass through jurisdictional (or potentially jurisdictional) waters of the United States, habitat for sensitive species, or areas that could trigger the need for a BCDC permit are identified as moderate to highly sensitive in Exhibits 6 and 7.

3.1.6 Overview of Potential Cultural Resources Constraints

EDAW conducted a record search through the Northwest Information Center (NWIC) of the California Historical Resources Information System to determine if any previously-documented prehistoric or historic-era sites, features, or artifacts were present within or in the immediate vicinity of the proposed project. Although no such resources were noted within or near the proposed alternatives, the location of the project near San Pablo Bay and along Pinole Creek places it within a region that is highly sensitive for containing early Native American sites and human interments. Prior to project implementation, the route of the final alternative would need to be subjected to an intensive cultural resources survey to fully identify the presence of traces of prehistoric activities or historic-era buildings and structures.

3.1.7 Assumptions

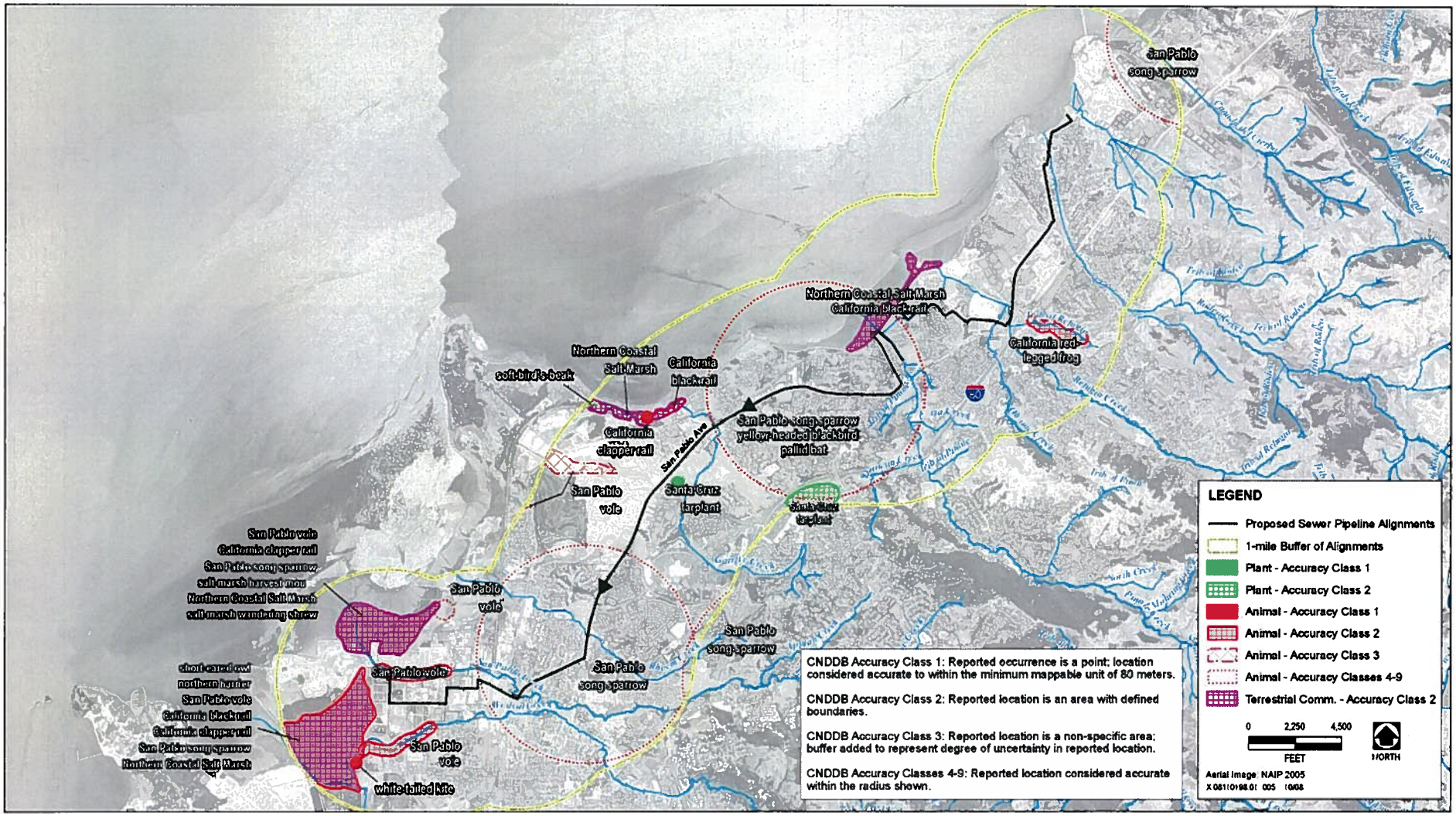
The following evaluation was prepared under a number of assumptions that are important for avoiding and minimizing potential impacts on sensitive biological resources. EDAW assumed the following:

- When pipeline routes correspond with existing roads, construction activities would be restricted to the paved roadway surface to the maximum extent feasible;
- Upgrades of existing WPCP facilities would not include expansion or impacts to areas beyond current property boundaries at existing facilities;
- No construction activity would be required for abandonment of pipelines;
- Best Management Practices related to erosion control and stormwater discharge would be implemented.

3.2 ALTERNATIVE 1

3.2.1 Biological Resources

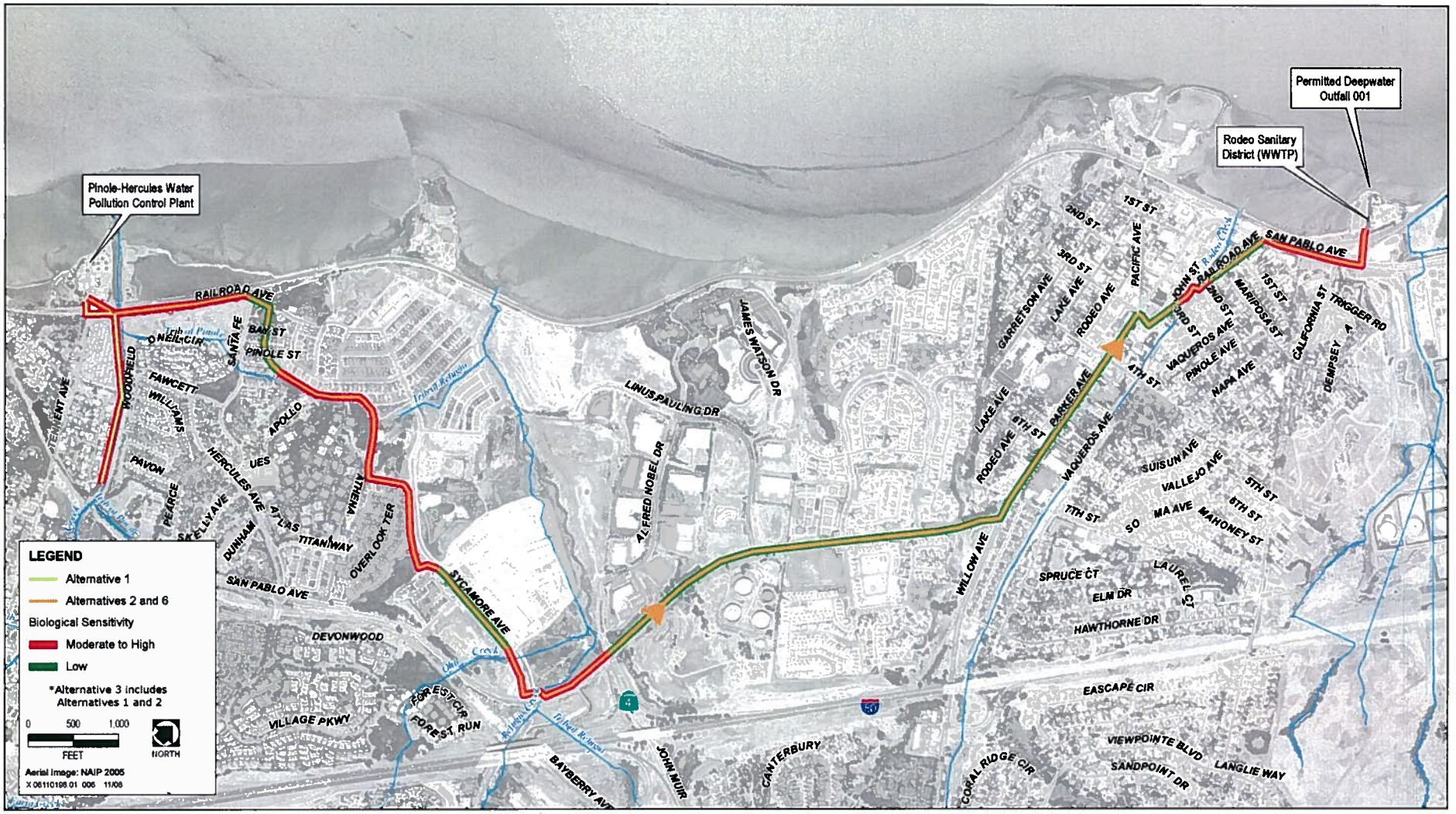
The primary environmental constraints associated with Alternative 1 are potential impacts to Pinole Creek and associated riparian and wetland habitat. Installation of the new outfall into Pinole Creek would require a permit under Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States as well as Section 401 water quality certification. In addition, installation of an outfall into the creek would



Source: City of Hercules 2008

CNDDB Search Results

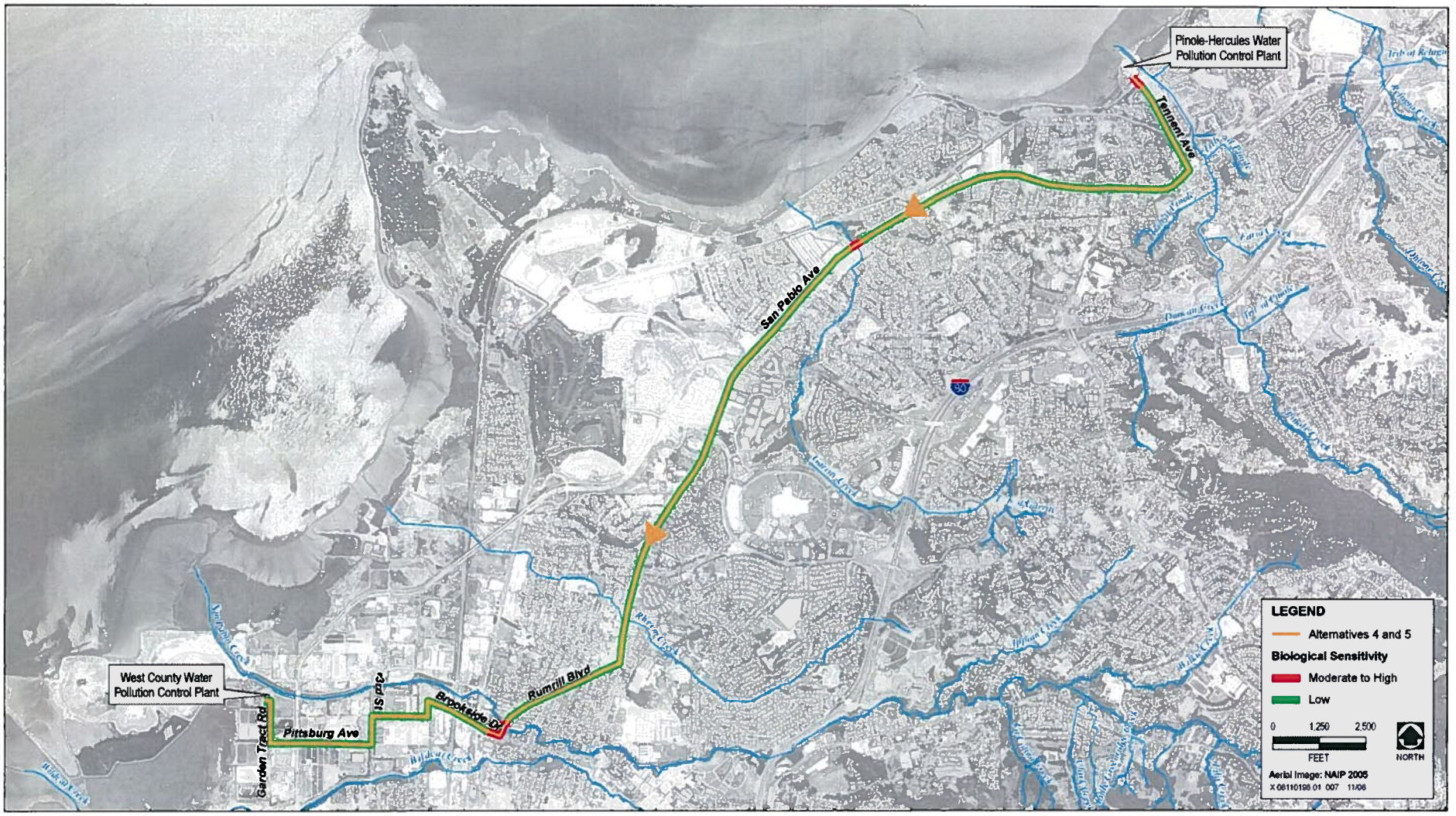
Exhibit 5



Source: City of Hercules 2008

Species and Habitat Sensitivity Map -- Alternatives 1, 2, 3, and 6

Exhibit 6



Source: City of Hercules 2008

Species and Habitat Sensitive Map – Alternatives 4 and 5 **Exhibit 7**

require a Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code. Pinole Creek is also within the jurisdiction of the BCDC and a BCDC permit would likely be required to construct an outfall in Pinole Creek. Any dredging, filling, or grading necessary to upgrade existing WPCP to tertiary standards that would take place within 100 feet of the Bay could also require a BCDC permit.

There are no known occurrences of California red-legged frog in the stretch of Pinole Creek included in this alternative, and the portion of Pinole Creek potentially affected by project implementation has limited potential to support red-legged frogs. However, consultation with USFWS under section 7 of ESA may be necessary because California red-legged frogs have been reported in Pinole Creek approximately 4 miles upstream of the proposed pipeline route. The approximately 1,800-foot portion of Pinole Creek that would potentially be affected by installation of the pipeline does not support extensive riparian vegetation or trees. However, the grasses, weeds, and shrubs along this portion of the creek provide habitat for the San Pablo song sparrow, a California Species of Special Concern. There is also some potential for trees in the vicinity to be used for nesting by raptors. Impacts to these resources could likely be avoided through implementation of appropriate minimization and avoidance measures.

The Pinole Creek watershed has a population of steelhead (*Oncorhynchus mykiss*) of unknown size that are included in the Central California Coastal steelhead evolutionary significant unit (ESU) (FPCW 2008). Central California Coast steelhead are listed as threatened under the Federal ESA (August 18, 1997, 62 FR 43937; FHA 2001). During the spawning season, steelhead have been observed spawning in poor conditions downstream of the Interstate (I)-80 culverts during dry periods. In more favorable flow conditions, steelhead have been recorded far upstream in the upper watershed. A box culvert under I-80 presents a barrier at high and low flow conditions in Pinole Creek, preventing fish from entering the mid and upper watershed, necessitating the use of the lower reaches for spawning and rearing at these times.

Potential construction-related effects on water quality would include increased siltation and turbidity, which could negatively influence all life stages of steelhead. The potential operations-related effects of this alternative would include changes to flow and water quality in Pinole Creek. A primary water quality issue for wastewater treatment plant outfalls is generally the potential for increases in water temperatures in the receiving waters that result from the discharge. The potential increases in temperature could have adverse effects on steelhead adults and juveniles, which require cool water habitat. Because of the potential for effects on this listed species, an ESA Section 7 consultation with NMFS would be required.

Furthermore, use of recycled water for streamflow augmentation may raise public health concerns from local residents, environmentalists, and other people who frequent the area (e.g., bird watchers, joggers, and dog walkers). This type of recycled water use is not common in the San Francisco Bay Area, but is used extensively in Southern California. The closest project to the Pinole-Hercules WPCP that has attempted to discharge treated water into a stream involves the Santa Clara Valley Water District, which began a feasibility study in 2007 to evaluate use of tertiary recycled water to augment summer flows in the Coyote River. Researchers from Stanford University first performed baseline analyses of the existing stream water quality, groundwater quality, and recycled water quality. The Stanford researchers found high concentrations of Perfluorooctanesulfonic acid (PFOs) in the recycled water. Because the concentrations exceeded a threshold level for avian species, the project was postponed. The Santa Clara Valley Water District is planning to renew the project when a new recycled water treatment facility (utilizing microfiltration, reverse osmosis, and UV disinfection) comes online.

3.2.2 CULTURAL RESOURCES

According to the NWIC record search and a reconnaissance survey conducted by an EDAW archaeologist, no previously documented cultural resources have been noted within or in the vicinity of this proposed pipeline alignment. However, much of this proposed alignment (approximately 1,800 feet) is adjacent and parallel to Pinole Creek. Historic maps suggest that the creek no longer flows through its original channel, which has likely been straightened and possibly realigned for development purposes. Despite these impacts, the creek generally

follows its prehistoric or early historic alignment. Since Native American populations in particular tended to settle and engage in subsistence activities along creeks and in the vicinity of other water sources, the vicinity of the present-day channel of Pinole Creek may contain potentially significant (per CEQA) subsurface traces of prehistoric activities and/or human remains.

In addition, the San Pablo Bay shoreline is extremely sensitive for prehistoric resources; many of which have been identified in the general area since the turn of the last century. With easy access to estuarine and marine resources, Native American populations deposited numerous shell mounds along the edges of the Bay and many of these sites have been identified within approximately one mile of the proposed alignment. None have been identified in the immediate vicinity of the pipeline route but their presence in the area suggests that similar and previously undocumented sites could be encountered in subsurface contexts.

3.2.3 LAND USE AND PLANNING

The proposed pipeline that would discharge into Pinole Creek would be subject to Contra Costa County General Plan and the City of Pinole General Plan. The pipeline route would be constructed below, and run parallel to the UPRR, requiring coordination with UPRR to ensure compliance with right-of-way procedures, safety measures, and other planning guidelines. Any construction within 100 feet of the shoreline would require a permit from BCDC.

3.2.4 WATER QUALITY

POTENTIAL REGULATORY AGENCY AND/OR PUBLIC CONCERNS

The Regional Water Board would likely support plans to upgrade the WPCP to tertiary standards. However, the preliminary design for alternative 1 (using tertiary filters) includes bypassing primary treatment when inflows exceed 11.9 mgd. Current EPA Policy on Peak Wet Weather Discharges from Municipal Sewage Treatment Facilities (January 2006) specifies that all flows must have at least primary clarification. The Regional Water Board may not approve the proposed flow regime.

Additional studies would be required to determine the impact and benefits of using the tertiary water for streamflow augmentation. The stream discharge is considered a "shallow water discharge" and these discharges are prohibited in the Basin Plan. This prohibition is "intended to protect beneficial uses in areas that receive very limited, if any, dilution." Exceptions are granted when "a discharge is approved as part of a reclamation project, or it can be demonstrated that net environmental benefits will be derived as a result of the discharge." The discharger must also demonstrate that the wastewater treatment and conveyance system is sufficiently reliable to prevent the discharge of inadequately treated wastewater and prevent negative environmental consequences. However, the Basin Plan does include language stating that recycled water can be used for stream flow augmentation. Per Section 4.16 of the Basin Plan, "The year-round, dependable recycled water resource may also be appropriate for stream flow augmentation to enhance beneficial uses of streams."

REGULATORY AND PERMITTING REQUIREMENTS

NPDES Permit

The existing NPDES Permit (Order No. R2-2007-0024) would have to be amended or reopened to identify a new discharge point, accept a shallow water discharge, approve the increased flows, and recalculate effluent limits. The permit may also require that the existing shallow water outfall be removed or blocked off to prevent future use.

A partial listing of required special studies is presented below.

- ***Anti-Degradation Analysis.*** An Anti-Degradation Analysis would be required. To receive approval for the discharge, this report must demonstrate that the new discharge location and increased flows would be "consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipate beneficial use of such water and will not result in water quality less than that prescribed in the policies," as specified in State Water Resources Control Board Resolution No. 68-16. Anti-Degradation Analyses commonly require hydrodynamic modeling of the discharge under different conditions (e.g., high/low tide, wet season/dry season, peak/low streamflow) in order to assess the maximum impact on the receiving water and its beneficial uses.

- ***Dilution Study.*** A Dilution Study must be completed to determine if a dilution credit is appropriate and would delineate the acute and chronic mixing zones. A mixing zone is the limited volume of receiving water that allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body. The acute mixing zone should be as small as possible to prevent lethality to passing organisms. The chronic mixing zone should be small enough to protect the ecology of the water body as a whole. The Dilution Study would involve modeling the discharge, outfall, and diffuser characteristics under various streamflow conditions.

- ***Beneficial Use Analysis.*** A Beneficial Use Analysis would be required to demonstrate that a net environmental benefit of project implementation would be achieved (i.e., enhancement of riparian habitat outweighs impacts to existing beneficial uses of Pinole Creek or San Francisco Bay).

- ***Reasonable Potential Analysis.*** A Reasonable Potential Analysis would be conducted by the Regional Water Board in order to calculate new effluent limits for the tertiary discharge. With the addition of filters, technology based effluent limits would be assigned based on advanced secondary or tertiary water quality. It is expected that the new limits would include the following: Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) at 10 milligrams/liter (mg/L) (average monthly) and 15 mg/L (maximum daily); Total Coliform at 2.2 most probable number/100 milliliters (MPN/ml) ; and turbidity at 2 Nephelometric Turbidity Units (NTU) (24-hour average). Water quality based effluent limits would be determined from the available assimilative capacity of the receiving water and the application of dilution credits, if warranted.

Recycled Water Permit

It is unclear at this time if a Recycled Water Permit would be required for discharges to Pinole Creek. However, a recycled water permit would be required if the water is used for any purpose other than streamflow augmentation. For instance, a permit would be required if the Cities wanted to hook-up landscape irrigation projects along the recycled water pipeline. The Regional Water Board's General Permit for Recycled Water Use (Order No. 96-011) includes specific operational requirements for the recycled water producer (i.e., the Cities of Pinole and Hercules). Under this Order, the recycled water producer operates its own recycled water permitting program, adding users and monitoring users for compliance with recycled water regulations. A Statewide General Permit for Landscape Irrigation is in development and may be adopted in 2009.

3.3 ALTERNATIVE 2

3.3.1 BIOLOGICAL RESOURCES

Biological constraints associated with alternative 2 include three stream crossings (Ohlone Creek, Refugio Creek, and Rodeo Creek) that are likely to require Section 1602 Streambed Alteration Agreements. In addition, portions of the pipeline run through or adjacent to wetlands that are likely to be considered waters of the United States. These wetlands support marsh vegetation characterized by cattail and blackberry as well as riparian forest. Should any dredging or filling of these wetlands be necessary, a CWA section 404 permit would be required.

Implementation of alternative 2 may also require section 7 consultation with USFWS regarding red-legged frog and salt-marsh harvest mouse. The portion of the pipeline that runs to the northeast along Railroad Avenue is immediately adjacent to an area classified as Northern Coastal Salt Marsh, a sensitive habitat that provides habitat for the salt marsh harvest mouse (listed as endangered under the ESA). Should work on this portion of the pipeline require construction equipment to enter areas where salt-marsh harvest mouse could be present, or involve temporary or permanent effects to salt-marsh harvest mouse habitat, consultation with USFWS would be required. In addition, California red-legged frogs have been documented in a tributary of Refugio creek within a half-mile of the pipeline's crossing of Refugio Creek. Some of the creeks, stock ponds, and marsh habitat along portions of this pipeline route could provide habitat for red-legged frogs, and therefore disturbance of these habitats could require consultation with USFWS.

Two portions of the pipeline route for alternative 2 could involve work within 100 feet of San Pablo Bay. These include the approximately 1,640 feet of pipeline along Railroad Ave at the southwestern end of the pipeline, and the approximately 1,312 feet of pipeline along San Pablo Ave near the northeastern end of the route. The new outfall to be installed next to the permitted outfall at Rodeo would also require a CWA section 404 permit and a CWA section 401 permit.

3.3.2 CULTURAL RESOURCES

As noted in alternative 1, no prehistoric or historic-era cultural resources have been identified within or immediately adjacent to the proposed pipeline route(s). However, this alternative does include up to four stream crossings (Pinole, Ohlone, Refugio, and Rodeo creeks) and a segment of the route parallels Railroad Avenue, only a short distance from the San Pablo Bay shoreline. Historic maps do not clearly show how much (if at all), the channels of Ohlone, Refugio, and Rodeo creeks have been realigned. For the purposes of this investigation, it is assumed that these creeks remain in their prehistoric channels and their banks and immediate vicinities may be sensitive for containing subsurface Native American archaeological materials.

Also, the proposed pipeline route extends adjacent to and immediately to the south of Railroad Avenue southeast of the Pinole-Hercules Water Pollution Control Plant. As noted in alternative 1, the San Pablo Bay shoreline was the focus of intensive prehistoric activities and is extremely sensitive for containing archaeological traces and human remains.

3.3.3 LAND USE AND PLANNING

Pipeline construction from the WPCP to the Rodeo WWTP would be subject to the Contra Costa County General Plan, the City of Pinole General Plan, and the City of Hercules General Plan. The pipeline alignment crosses and runs parallel to UPRR tracks. As discussed above for alternative 1, right-of-way and other UPRR requirements must be considered before construction begins. If avoiding work within 100 feet of San Pablo Bay is not feasible, a BCDC permit would need to be obtained. A BCDC permit would also be required to install the new outfall next to the existing outfall at Rodeo.

3.3.4 WATER QUALITY

POTENTIAL REGULATORY AGENCY AND/OR PUBLIC CONCERNS

The Regional Water Board would support the upgrade in treatment capacity, the forcemain installation, and diffuser modification. However, the preliminary design for alternative 2 includes bypassing primary treatment when inflows exceed 11.9 mgd. Current EPA Policy on Peak Wet Weather Discharges from Municipal Sewage Treatment Facilities (January 2006) specifies that all flows must at least have primary clarification. The Regional Water Board may not approve the proposed flow regime.

Operation of the Pinole-Hercules WPCP and the method of effluent disposal remains the same under alternative 2. As such, there should not be any water quality concerns raised by the public.

REGULATORY AND PERMITTING REQUIREMENTS

NPDES Permit

The existing NPDES Permit (Order No. R2-2007-0024) would have to be amended to approve the increased flowrate and to review/approve the diffuser modifications. The permit may also require that the existing shallow water outfall be removed or blocked off to prevent future use.

A partial listing of required special studies is presented below.

- ***Anti-Degradation Analysis.*** An Anti-Degradation Analysis would be required to address the increased flows at the Rodeo outfall, as specified in State Water Resources Control Board Resolution No. 68-16. Anti-Degradation Analyses commonly require hydrodynamic modeling of the discharge under different conditions (e.g., high/low tide, wet season/dry season) in order to assess the maximum impact on the receiving water and its beneficial uses.

- ***Dilution Study.*** A Dilution Study must be completed to determine a new dilution credit based on diffuser modifications and increased flow. The Dilution Study would involve modeling the discharge, outfall, and diffuser characteristics under various tidal and seasonal conditions.

Recycled Water Permit

A Recycled Water Permit would only be required if the secondary effluent is used for irrigation at areas outside the WPCP.

3.4 ALTERNATIVE 3

3.4.1 BIOLOGICAL RESOURCES

Because alternative 3 includes both a new outfall in Pinole Creek and upgrading the existing pipeline to Rodeo, all constraints described for alternatives 1 and 2 also apply to alternative 3.

3.4.2 CULTURAL RESOURCES

Cultural Resource constraints that would result from implementation of alternative 3 consist of the combined effects described for alternatives 1 and 2.

3.4.3 LAND USE AND PLANNING

Land use and planning constraints described for alternative 2 are identical to constraints for alternative 3.

3.4.4 WATER QUALITY

POTENTIAL REGULATORY AGENCY AND/OR PUBLIC CONCERNS

The Regional Water Board would support plans to upgrade the WPCP and the pipeline to Rodeo Sanitary District. However, additional studies would be required to determine the impact and benefits of using tertiary water for streamflow augmentation. The stream discharge is considered a "shallow water discharge" and these discharges

are prohibited in the Basin Plan. This prohibition is "intended to protect beneficial uses in areas that receive very limited, if any, dilution." Exceptions are granted when "a discharge is approved as part of a reclamation project, or it can be demonstrated that net environmental benefits would be derived as a result of the discharge." The discharger must also demonstrate that the wastewater treatment and conveyance system is sufficiently reliable to prevent the discharge of inadequately treated wastewater and prevent negative environmental consequences. However, the Basin Plan does include language stating that recycled water can be used for stream flow augmentation. Per Section 4.16 of the Basin Plan, "The year-round, dependable recycled water resource may also be appropriate for stream flow augmentation to enhance beneficial uses of streams."

Use of recycled water for streamflow augmentation may raise public health concerns from local residents, environmentalists, and other people who frequent the area (e.g., bird watchers, joggers, and dog walkers). This type of recycled water use is not common in the San Francisco Bay Area, but is used extensively in Southern California. The Santa Clara Valley Water District began a feasibility study in 2007 to evaluate use of tertiary recycled water to augment summer flows in the Coyote River. Researchers from Stanford University first performed baseline analyses of the existing stream water quality, groundwater quality, and recycled water quality. The Stanford researchers found high concentrations of Perfluorooctanesulfonic acid (PFOs) in the recycled water. Because the concentrations exceeded a threshold level for avian species, the project was postponed. The Santa Clara Valley Water District would renew the project when a new recycled water treatment facility (utilizing microfiltration, reverse osmosis, and UV disinfection) comes online.

REGULATORY AND PERMITTING REQUIREMENTS

NPDES Permit

The existing NPDES Permit (Order No. R2-2007-0024) would have to be amended or reopened to identify an additional discharge point, accept a shallow water discharge, approve the increased flows, and recalculate effluent limits based on two different discharge locations. The permit may also require that the existing shallow water outfall be removed or blocked off to prevent future use.

A partial listing of required special studies is presented below.

- ***Anti-Degradation Analysis.*** An Anti-Degradation Analysis would be required to address the increased flows through the Rodeo outfall, as well as the new discharge to Pinole Creek. In order to receive approval for these discharges, the Anti-Degradation Analysis must demonstrate that the new discharge location and increased flows would be "consistent with maximum benefit to the people of the State, would not unreasonably affect present and anticipate beneficial use of such water and would not result in water quality less than that prescribed in the policies," as specified in State Water Resources Control Board Resolution No. 68-16. Anti-Degradation Analyses commonly require hydrodynamic modeling of the discharge under different conditions (e.g., high/low tide, wet season/dry season) in order to assess the maximum impact on the receiving water and its beneficial uses.

- ***Dilution Study.*** A Dilution Study would be required for the Pinole Creek discharge. This study must determine if a dilution credit is appropriate and would delineate the acute and chronic mixing zones. A mixing zone is the limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body. The acute mixing zone should be as small as possible to prevent lethality to passing organisms. The chronic mixing zone should be small enough to protect the ecology of the water body as a whole. The Dilution Study would involve modeling the discharge, outfall, and diffuser characteristics under various streamflow conditions.

- ***Beneficial Use Analysis.*** A Beneficial Use Analysis would be required to demonstrate that a net environmental benefit of project implementation would be achieved (i.e., enhancement of riparian habitat outweighs impacts to existing beneficial uses of Pinole Creek or San Francisco Bay).

- ***Reasonable Potential Analysis.*** A Reasonable Potential Analysis would be conducted by the Regional Water Board in order to calculate new effluent limits for the tertiary discharge. With the addition of filters, technology based effluent limits would be assigned based on advanced secondary or tertiary water quality. It is expected that the new limits would be BOD and TSS at 10 mg/L (average monthly) and 15 mg/L (maximum daily); Total Coliform at 2.2 MPN/100 mL; and turbidity at 2 NTU (24-hour average). Water quality based effluent limits would be determined from the available assimilative capacity of the receiving water and application of dilution credits, if warranted.

Recycled Water Permit

It is unclear if a Recycled Water Permit would be required for discharges to Pinole Creek. However, a recycled water permit would be required if the water is used for any purpose other than streamflow augmentation. For instance, a permit would be required if the Cities wanted to hook-up landscape irrigation projects along the recycled water pipeline. The Regional Water Board's General Permit for Recycled Water Use (Order No. 96-011) includes specific operational requirements for the recycled water producer (i.e., the Cities of Pinole and Hercules). Under this Order, the recycled water producer operates its own recycled water permitting program, adding users and monitoring users for compliance with recycled water regulations. A Statewide General Permit for Landscape Irrigation is in development and may be adopted in 2009.

3.5 ALTERNATIVE 4

3.5.1 BIOLOGICAL RESOURCES

The primary biological constraint associated with the new pipeline route from the Pinole-Hercules WPCP to the West County Wastewater District facilities proposed in alternative 4 is three stream crossings (Garrity, Rheem, and San Pablo Creeks) along the pipeline route. Because the majority of this route follows San Pablo Ave (a multi-lane parkway) and follows secondary roads for most of the remaining route, there are few biological constraints for this alternative.

3.5.2 CULTURAL RESOURCES

Potential constraints to alternative 4 are similar to those noted for alternative 2 and 3 since this alternative proposes up the three stream crossings (Garrity, Rheem, and San Pablo creeks). As with Pinole, Ohlone, Refugio, and Rodeo creeks, these channels may have been realigned but historic maps are unclear as to the extent of any realignment. Consequently, it is assumed that their channels are largely unchanged from prehistoric or early historic times and that these crossings have some potential for impacting previously undocumented subsurface archaeological materials or human remains.

3.5.3 LAND USE AND PLANNING

The force main alignment from the WPCP to the West County Water Pollution Control Plant would be subject to the Contra Costa County General Plan, the City of Pinole General Plan, the City of San Pablo General Plan, the City of Richmond General Plan, and the North Richmond Shoreline Specific Plan. In addition, encroachment and right-of-way requirements by both UPRR and the Burlington Northern Santa Fe Railway would need to be met. Currently, the West County Wastewater District does not include the Cities of Pinole and Hercules, which are bound by the City of Pinole and Hercules Sanitary Service District. An agreement between the sanitary service districts through the Contra Costa County LAFCOs would be required.

3.5.4 WATER QUALITY

POTENTIAL REGULATORY AGENCY AND/OR PUBLIC CONCERNS

The Regional Water Board has been supportive of regionalized wastewater treatment facilities and the use of shared outfalls. The approach is appealing to the Water Board because it reduces the number of discharge points in the San Francisco Bay and reduces the number of NPDES Permits that must be issued and controlled. Alternative 4 is a more "conventional" approach to wastewater treatment and handling and could therefore be approved and permitted more quickly than alternatives 1 and 3.

Conveyance of the Cities' wastewater to WCWD would not create any public exposure to wastewater and the level of treatment by WCWD would be comparable to the current treatment regime at the Pinole-Hercules WPCP. As such, there should not be any water quality concerns raised by the public.

REGULATORY AND PERMITTING REQUIREMENTS

NPDES Permit

The existing NPDES Permit for West County Agency (Order No. R2-2008-0003) would have to be reopened to assess influent/effluent quality, approve the increased flowrates, and revise the effluent limits. The existing NPDES Permit for the Pinole-Hercules WPCP would have to be amended in order to prescribe facility shutdown procedures. These procedures would include dismantling the plant and blocking off the existing shallow water outfall to prevent future use. Once the WPCP is shutdown and wastewater flows are successfully handled by WCWD, the permit would be terminated.

A partial listing of required special studies is presented below.

- ***Anti-Degradation Analysis.*** An Anti-Degradation Analysis would be required to address increased flows and changed water quality discharged through the West County Agency outfall. In order to receive permit approval, the Anti-Degradation Analysis must demonstrate that the increased flows and changed water quality would be "consistent with maximum benefit to the people of the State, would not unreasonably affect present and anticipate beneficial use of such water and would not result in water quality less than that prescribed in the policies," as specified in State Water Resources Control Board Resolution No. 68-16. Anti-Degradation Analyses commonly require hydrodynamic modeling of the discharge under different conditions (e.g., high/low tide, wet season/dry season) in order to assess the maximum impact on the receiving water and its beneficial uses.

- ***Dilution Study.*** A Dilution Study must be completed to determine a new dilution credit based on increased flows at the West County Agency outfall. The Dilution Study would involve modeling the discharge, outfall, and diffuser characteristics under various tidal and seasonal conditions.

- ***Reasonable Potential Analysis.*** A Reasonable Potential Analysis would be conducted by the Regional Water Board in order to calculate new effluent limits for the combined discharge at the West County Agency outfall. Technology based effluent limits would remain the same as specified in the current West County Agency permit. Water quality based effluent limits would be determined from the available assimilative capacity of the receiving water and application of dilution credits, if warranted.

Recycled Water Permit

A Recycled Water Permit for the Cities of Pinole and Hercules would not be required. Any permit requirements associated with recycling of the commingled wastewater would be the responsibility of WCWD, unless the Regional Water Board requires the Cities to become Co-permittees.

3.6 ALTERNATIVE 5

3.6.1 BIOLOGICAL RESOURCES

Alternative 5 includes upgrading the existing pipeline that runs from the Pinole-Hercules WPCP to the Outfall 001 at the Rodeo Sanitary District as well as installing a new pipeline from the Pinole-Hercules WPCP to the West County Wastewater District facilities. Therefore, the biological constraints identified for this alternative include those described in both alternatives 2 and 4.

3.6.2 CULTURAL RESOURCES

As with alternatives 1–4, the NWIC record search did not reveal the presence of any documented prehistoric or historic-era cultural resources within or in the immediate vicinity of the pipeline route. This alternative does include several creek crossings and portions are close to the shores of San Pablo Bay. Consequently, these areas would be sensitive for containing previously unrecorded sites, features, and artifacts as was noted for alternatives 1–4.

3.6.3 LAND USE AND PLANNING

Land use and planning constraints for alternative 5 would include constraints described for both alternatives 2 and 4.

3.6.4 WATER QUALITY

POTENTIAL REGULATORY AGENCY AND/OR PUBLIC CONCERNS

The Regional Water Board has been supportive of regionalized wastewater treatment facilities and the use of shared outfalls. The approach is appealing to the Water Board because it reduces the number of discharge points in the San Francisco Bay and the number of NPDES Permits that must be issued and controlled. However, under alternative 5 the number of discharge points and NPDES permits does not change because the City of Pinole would still operate their own WPCP.

Conveyance of the City of Hercules wastewater to WCWD would not create any public exposure to wastewater and the level of treatment by WCWD would be comparable to the current treatment regime at the Pinole-Hercules WPCP. As such, there should not be any water quality concerns raised by the public.

REGULATORY AND PERMITTING REQUIREMENTS

NPDES Permit

The existing NPDES Permit for West County Agency (Order No. R2-2008-0003) would have to be reopened to assess influent/effluent quality, approve the increased flowrates, and revise the effluent limits. The City of Pinole may be able to operate the WPCP under its current NPDES Permit. However, the permit may be amended to remove the City of Hercules references and requirements.

A partial listing of required special studies is presented below.

- ***Anti-Degradation Analysis.*** An Anti-Degradation Analysis would be required to address the water quality changes for the discharge through the West County Agency outfall. In order to receive permit approval, the Anti-Degradation Analysis must demonstrate that the changed water quality would be "consistent with maximum benefit to the people of the State, would not unreasonably affect present and anticipate beneficial

use of such water and would not result in water quality less than that prescribed in the policies," as specified in State Water Resources Control Board Resolution No. 68-16. Anti-Degradation Analyses commonly require hydrodynamic modeling of the discharge under different conditions (e.g., high/low tide, wet season/dry season) in order to assess the maximum impact on the receiving water and its beneficial uses.

- ***Reasonable Potential Analysis.*** A Reasonable Potential Analysis would be conducted by the Regional Water Board in order to calculate new effluent limits for the combined discharge at the West County Agency outfall. Technology based effluent limits would remain the same as specified in the current West County Agency permit. Water quality based effluent limits would be determined from the available assimilative capacity of the receiving water and application of dilution credits, if warranted.

Recycled Water Permit

A Recycled Water Permit for the City of Hercules would not be required. Any permit requirements associated with recycling of the commingled wastewater would be the responsibility of WCWD, unless the Regional Water Board requires the City to become a Co-permittee. A Recycled Water Permit for the City of Pinole would not be required unless Pinole wishes to apply recycled water outside the WPCP grounds.

3.7 ALTERNATIVE 6

3.7.1 BIOLOGICAL RESOURCES

Installation of the flow equalization tank at Bay Park would require temporary removal of the existing paved parking lot and a portion of the grass area. The grass and pavement would be returned to pre-construction conditions following installation of the tank. The wetland area on the far side of the grass (adjacent to the shoreline) would not be disturbed. Therefore, biological impacts would be minimal.

Installation of the flow equalization tank underneath a portion of the RV park would have no impact on biological resources.

Installation of the flow equalization tank underneath the access road next to the UPRR tracks would require a pipeline crossing Pinole Creek. However, because the pipeline would be suspended underneath the existing bridge, no work in the bed or bank of the Creek would be required, and therefore impacts to biological resources would be minimal. The wetland east of this proposed tank location would be separated from the proposed construction site by a raised term and a bicycle path. The raised berm would prevent any adverse impacts to jurisdictional wetlands.

Biological resources impacts associated with installing the new parallel pipeline to the Rodeo Sanitary District WWTP and installing the new outfall would be the same under this alternative as previously described for Alternative 2.

3.7.2 CULTURAL RESOURCES

As with alternatives 1–5, the NWIC record search did not reveal the presence of any documented prehistoric or historic-era cultural resources within or in the immediate vicinity of the pipeline route. This alternative does include several creek crossings and portions are close to the shores of San Pablo Bay. Consequently, these areas would be sensitive for containing previously unrecorded sites, features, and artifacts as was noted for alternatives 1–5.

3.7.3 LAND USE AND PLANNING

Land use and planning constraints for alternative 6 would include the same constraints described for alternative 2.

3.7.4 WATER QUALITY

POTENTIAL REGULATORY AGENCY AND/OR PUBLIC CONCERNS

The Regional Water Board would likely support the upgrade in treatment capacity, installation of the flow equalization basin, land outfall improvements, and diffuser modification.

Operation of the Pinole-Hercules WPCP and the method of effluent disposal remains the same under Alternative 6. As such, there should not be any water quality concerns raised by the public.

REGULATORY AND PERMITTING REQUIREMENTS

NPDES Permit

The existing NPDES Permit (Order No. R2-2007-0024) would have to be amended to approve the increased flowrate and to review/approve the diffuser modifications. The permit may also require that the existing shallow water outfall be removed or blocked off to prevent future use.

A partial listing of required special studies is presented below.

- ***Anti-Degradation Analysis.*** An Anti-Degradation Analysis would be required to address the increased flows at the Rodeo outfall, as specified in State Water Resources Control Board Resolution No. 68-16. Anti-Degradation Analyses commonly require hydrodynamic modeling of the discharge under different conditions (e.g., high/low tide, wet season/dry season) in order to assess the maximum impact on the receiving water and its beneficial uses.

- ***Dilution Study.*** A Dilution Study must be completed to determine a new dilution credit based on diffuser modifications and increased flow. The Dilution Study would involve modeling the discharge, outfall, and diffuser characteristics under various tidal and seasonal conditions.

- ***Design Storm/Peak Wet Weather Flow Handling Assessment.*** The Regional Water Board may require an assessment of the WPCP's ability to handle peak wet weather flows under the new treatment/equalization regime. In particular, the assessment would include detailed information on the design storm and frequency, along a prediction of when and if blending will still be required.

Recycled Water Permit

A Recycled Water Permit would only be required if the secondary effluent is used for irrigation at areas outside the WPCP.

4 SUMMARY OF FINDINGS

4.1 ALTERNATIVE 1

The primary biological concern with alternative 1 would be potential impacts to Pinole Creek and associated riparian and wetland habitat. Implementation of this pipeline route would require a permit under Section 404 of the Clean Water Act, Section 401 water quality certification, a Streambed Alteration Agreement under Section 1602, a BCDC permit, and consultation with USFWS under section 7 for impacts to red-legged frogs. Impacts to the San Pablo song sparrow and nesting raptors could likely be mitigated to a less-than-significant level.

The alternative 1 pipeline alignment does not include previously documented cultural resources; however, shell mounds have been documented within 1 mile of the proposed pipeline route. Because Native American populations tended to settle and engage in activity near water sources, undocumented cultural sites could be encountered.

Construction would occur within the City of Pinole. Compliance with UPRR, the Contra Costa County General Plan, and the City of Pinole General Plan would be required.

Wastewater discharge water quality would improve and flowrates would increase under implementation of alternative 1. Stream discharge is considered a "shallow water discharge," and is prohibited by the Basin Plan; however, exceptions can be granted. Approval by the RWQCB would be required, as well as several special studies, including: an Anti-Degradation Analysis, Dilution Study, Beneficial Use Analysis, and a Reasonable Potential Analysis. If discharge would be used for any purpose other than streamflow augmentation, a Recycled Water Permit would be required.

4.2 ALTERNATIVE 2

Alternative 2 would require three stream crossings, and potentially run through or adjacent to wetlands. Red-legged frogs and salt-marsh harvest mouse habitat and Northern Coastal Salt Marsh may be disturbed as a result of implementation. Implementation of this pipeline route could require a permit under Section 404 of the Clean Water Act, Section 401 water quality certification, a Streambed Alteration Agreement under Section 1602, and a BCDC permit, and consultation with USFWS under section 7.

Similarly to alternative 1, the alternative 2 pipeline alignment does not include previously documented cultural resources; however, shell mounds have been documented within 1 mile of the proposed pipeline route. As discussed above, Native American population tended to settle and engage in activities near water sources. This pipeline alignment is located near the San Pablo Bay shoreline and several creeks in areas that may contain cultural resources.

Construction would occur within the City of Pinole, the City of Hercules, and the City of Rodeo. Compliance with UPRR, the Contra Costa County General Plan, the City of Pinole General Plan, and the City of Hercules General Plan would be required.

It is likely that the RWQCB would not approve the proposed flow regime outlined in alternative 2. Approval by the RWQCB would be required, as well as an Anti-Degradation Analysis and Dilution Study. If effluent is used for irrigation practices, a Recycled Water Permit would be required.

4.3 ALTERNATIVE 3

Biological resources, cultural resources, and land use and planning constraints resulting from implementation of alternative 3 would include the same effects described in alternative 1 and alternative 2.

Under alternative 3, the water quality of discharge from Outfall 001 would remain approximately the same as currently generated. Discharge into Pinole creek would have a higher level of water quality than discharge from Outfall 001. As discussed above under alternative 1, stream discharge is considered a "shallow water discharge," and is prohibited by the Basin Plan; however, exceptions can be granted. Approval by the RWQCB would be required, as well as several special studies, including: an Anti-Degradation Analysis, Dilution Study, Beneficial Use Analysis, and a Reasonable Potential Analysis. If discharge would be used for any purpose other than streamflow augmentation, a Recycled Water Permit would be required.

4.4 ALTERNATIVE 4

The alternative 4 pipeline alignment is located primarily within existing roads. There are two stream crossings, however, there are few biological constraints associated with this alternative.

Cultural resources may be found within stream crossings associated with the alternative 4 pipeline alignment.

Construction would occur within the City of Pinole, the City of San Pablo, and the City of Richmond. Compliance with UPRR, Burlington Northern Santa Fe Railway, the Contra Costa County General Plan, City of Pinole General Plan, the City of San Pablo General Plan, the City of Richmond General Plan, and the North Richmond Shoreline Specific Plan. An agreement under the Contra Costa County LAFCO would be required for sanitary service district augmentation.

Wastewater discharge flow would increase at the West County Wastewater District, although it is unknown if water quality would be affected by implementation of alternative 4. Approval by the RWQCB would be required, as well as several special studies, including: an Anti-Degradation Analysis, Dilution Study, and a Reasonable Potential Analysis. If discharge would be used for any purpose other than streamflow augmentation, a Recycled Water Permit would be required.

4.5 ALTERNATIVE 5

Biological resources, cultural resources, and land use and planning constraints resulting from implementation of alternative 5, would be the combination of effects described in alternative 2 and alternative 4.

Wastewater discharge flow would increase at the West County Wastewater District, although it is unknown if water quality would be affected by implementation of alternative 5. Approval by the RWQCB would be required, as well as several special studies, including: an Anti-Degradation Analysis, and a Reasonable Potential Analysis. If discharge would be used for any purpose other than streamflow augmentation, a Recycled Water Permit would be required.

4.6 ALTERNATIVE 6

Alternative 6 would require three stream crossings, and potentially run through or adjacent to wetlands. Red-legged frogs and salt-marsh harvest mouse habitat and Northern Coastal Salt Marsh may be disturbed as a result of implementation. Implementation of this pipeline route could require a permit under Section 404 of the Clean Water Act, Section 401 water quality certification, a Streambed Alteration Agreement under Section 1602, and consultation with USFWS under section 7.

Construction would occur within the City of Pinole, the City of Hercules, and the City of Rodeo. Compliance with UPRR, the Contra Costa County General Plan, the City of Pinole General Plan, and the City of Hercules General Plan would be required. A BCDC permit would be required.

Approval by the RWQCB would be required, as well as an Anti-Degradation Analysis and Dilution Study. If effluent is used for irrigation practices, a Recycled Water Permit would be required.

4.7 CONCLUSION

Alternative 3 presents the greatest environmental constraints, and alternative 4 presents the least environmental constraints of the 5 pipeline routes analyzed. All alternatives would require surveys for cultural resources and sensitive habitats; however, many potential impacts could be reduced to a less than significant level. The greatest amount of coordination with governing entities would be required under implementation of alternative 5, whereas alternative 1 would require the least.

Although exceptions are granted, an outfall into Pinole Creek, as described for alternatives 1 and 3, is considered to be a "shallow water discharge," and would be prohibited under the Basin Plan. The RWQCB would likely be the most supportive of alternatives 4 and 5, and encourages regionalized wastewater treatment facilities and the use of shared outfalls. Alternative 5 would require the least amount of regulatory and permitting requirements of all potential alignments.

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APPENDIX C

OPTION 2 DETAILED COST SUMMARY

OPINION OF PROBABLE COST SUMMARY
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Total	
	2009	2015*
General Costs	$2,643,620	$3,065,789
Site Work, Site Piping, and Demolition	$4,346,860	$5,041,025
Headworks	$2,649,941	$3,073,119
Primary Treatment	$227,640	$263,993
Electrical Building	$1,151,640	$1,335,549
Secondary System	$10,937,723	$12,684,405
Solids Handling	$3,031,075	$3,515,118
Outfall	$7,407,275	$8,590,168
Estimated Construction Cost	**$32,395,774**	**$37,569,165**
Engineering and Administration (25%)	$8,098,943	$9,392,291
Total Project Cost	$40,494,717	$46,961,457
TOTAL PROJECT COST, ROUNDED	**$ 40,495,000**	**$ 46,961,000**

*2.5% Escalation per year.

GENERAL COSTS
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 1 - General Requirements								
Mobilization/Demobilization (5%)	1	LS					1,144,500	1,144,500
Bonds and Insurance (2%)	1	LS					448,800	448,800
Construction Sequencing and Constraints	1	LS					100,000	100,000
Permits, Surveying, Testing, etc	1	LS					75,000	75,000
Field Office, Equipment and Services	1	LS					120,000	120,000
Total Division 1								**1,888,300**
SUBTOTAL - GENERAL COSTS								**1,888,300**
Contractor's Overhead & Profit (15%)								283,245
Construction Contingencies (25%)								472,075
ESTIMATED CONSTRUCTION COST (2009)								**$2,643,620**

SITE WORK, SITE PIPING, AND DEMOLITION
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02050 Demolition								
Demolition	1	LS					1,450,000	1,450,000
02100 Site Preparation								
Clearing and grubbing	1	LS					45,000	45,000
02140 Dewatering								
Dewatering	1	LS					80,000	80,000
02200 Earthwork								
Metering Vault								
Excavation	1	LS					30,000	30,000
Shoring	1	LS					25,000	25,000
02513 Pavement and Base								
AC Pavement	15,000	SF	3	45,000	2	30,000	5	75,000
(Base included in other sections)								
Total Division 2								**1,705,000**
Division 3 - Concrete								
03300 Cast In Place Concrete								
Thrust Blocks	50	CY					700	35,000
Metering Vault								0
Vertical walls	110	CY					900	99,000
Slabs on Grad	22	CY					700	15,400
Suspended slabs	15	CY					1,000	15,000
Total Division 3								**164,400**
Division 4 - Masonry (Not Used)								
Division 5 - Metals (Not Used)								
Division 6 - Woods and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					50,000	50,000
Total Division 9								**50,000**
Division 10 - Specialties (Not Used)								
Division 11- Equipment (Not Used)								
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								

SITE WORK, SITE PIPING, AND DEMOLITION
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 15 - Mechanical								
15050 Piping, General								
30" Influent	90	LF					375	33,750
42" Influent	160	LF					500	80,000
42" to Primary Clarifiers	110	LF					500	55,000
30" Diversion Line	170	LF					375	63,750
30" to Secondary Clarifiers	225	LF					375	84,375
24" to UV Disinfection	50	LF					250	12,500
36" to UV Disinfection	50	LF					400	20,000
42" to UV Disinfection	20	LF					500	10,000
24" RAS	330	LF					250	82,500
8" WAS	50	LF					100	5,000
6" Secondary Scum Line	400	LF					100	40,000
4" Water supply from effluent PS to screenings washer/compactor	600	LF					100	60,000
12" Thickened Sludge to Digesters	75	LF					175	13,125
12" Digested Sludge to Centrifuge	100	LF					175	17,500
Total Division 15								**577,500**
Division 16 - Electrical								
16050 Electrical General								
Duct Banks	1	LS					80000	80,000
Site Network	1	LS					20000	20,000
SCADA Upgrades	1	LS					400000	400,000
Lighting Panels & Transformers	1	LS					48000	48,000
Wiring & Specialties	1	LS					60000	60,000
Total Division 16								**608,000**
SUBTOTAL - SITE WORK, SITE PIPING, AND DEMOLITION								**3,104,900**
Contractor's Overhead & Profit (15%)								465,735
Construction Contingencies (25%)								776,225
ESTIMATED CONSTRUCTION COST (2009)								**$ 4,346,860**

HEADWORKS
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02200 Earthwork								
Headworks Pump Station								
Excavation	700	CY	0	0	20	14,000	20	14,000
Aggregate Base	50	CY	20	1,000	5	250	25	1,300
Backfill and Compaction	365	CY	0	0	15	5,475	15	5,500
Bar Screens								
Excavation	95	CY	0	0	20	1,900	20	1,900
Aggregate Base	25	CY	20	500	5	125	25	600
Backfill and Compaction	25	CY	0	0	15	375	15	400
Grit Removal								
Excavation	225	CY	0	0	20	4,500	20	4,500
Aggregate Base	30	CY	20	600	5	150	25	800
Backfill and Compaction	210	CY	0	0	15	3,156	15	3,200
02390 Shoring								
Headworks Shoring	3,750	SF					12	45,000
Total Division 2								**77,200**
Division 3 - Concrete								
03300 Cast-In-Place Concrete								
Headworks Pump Station								
Vertical walls	198	CY					900	178,200
Slabs on Grad	32	CY					700	22,400
Suspended slabs	27	CY					1,000	26,670
Bar Screens								
Vertical walls	108	CY					900	97,200
Slabs on Grad	24	CY					700	16,800
Suspended slabs	0	CY					1,000	0
Grit Removal								
Vertical walls	128	CY					900	115,020
Slabs on Grad	46	CY					700	32,025
Suspended slabs	0	CY					1,000	0
03600 Grout								
Grout	1	LS					10,000	10,000
Total Division 3								**498,315**
Division 4 - Masonry (Not Used)								
Division 5 - Metals								
05070 Miscellaneous Metals								
Miscellaneous Metals	1	LS					10,000	10,000
Metal Grating	1	LS					15,000	15,000
05120 Aluminum Handrailing								
Handrailing	1	LS					14,000	14,000
05511 Metal Stairs								
Metal Stairs	1	LS					15,000	15,000
Total Division 5								**54,000**
Division 6 - Wood and Plastics (Not Used)								

HEADWORKS
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					10,000	10,000
Total Division 9								**10,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11170 Washer/Compactor								
Washer/Compactor	1	LS					90,000	90,000
11212 Pumps								
Influent Pumps	4	EA					33,600	134,400
11291 Gates								
Gates	8	EA					14,400	115,200
11320 Grit Removal Equipment								
Grit Removal Equipment	1	LS					147,600	147,600
11330 Bar Screens								
Mechanical Bar Screens	2	EA					174,000	348,000
Total Division 11								**835,200**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction								
13250 Odor Control Unit								
Odor Control Unit	1	LS					120,000	120,000
Total Division 13								**120,000**
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15050 - Piping, General								
Piping	1	LS					55,100	55,100
15100- Valves, General								
Piping	1	LS					35,000	35,000
Total Division 15								**90,100**

HEADWORKS
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 16 - Electrical								
16050 Electrical, General								
Conduit Wiring	1	LS					13,000	13,000
MCC / VFDs	1	LS					150,000	150,000
Control Panels & Programming	1	LS					45,000	45,000
Total Division 16								**208,000**
SUBTOTAL - HEADWORKS								**1,892,815**
Contractor's Overhead and Profit (15%)								283,922
Construction Contingencies (25%)								473,204
ESTIMATED CONSTRUCTION COST (2009)								**$ 2,649,941**

PRIMARY TREATMENT
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work (Not Used)								
Division 3 - Concrete (Not Used)								
Division 4 - Masonry (Not Used)								
Division 5 - Metals (Not Used)								
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					3,000	3,000
Total Division 9								**3,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11212 Pumps								
Progressive Cavity Pumps	6	EA					17,400	104,400
Total Division 11								**104,400**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15070 Miscellaneous Piping and Valves								
Miscellaneous Piping and Valves	6	EA					6,500	39,000
Total Division 15								**39,000**
Division 16 - Electrical								
16050 Electrical, General								
Pump Electrical	6	EA					2,700	16,200
Total Division 16								**16,200**
SUBTOTAL - PRIMARY TREATMENT								**162,600**
Contractor's Overhead & Profit (15%)								24,390
Construction Contingencies (25%)								40,650
ESTIMATED CONSTRUCTION COST (2009)								**$ 227,640**

ELECTRICAL BUILDING
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Division 10								
Construction of Electrical Building								
Electrical Building	1	LS					264,000	264,000
Total Divisions 2 - Division 10								**264,000**
Division 11 - Equipment								
11080 Generator								
Generator	1	LS					413,600	413,600
Total Division 11								**413,600**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical (Not Used)								
Division 16 - Electrical								
16050 Electrical, General								
Generator Switchboard	1	LS					100,000	100,000
New Service	1	LS					45,000	45,000
Total Division 16								**145,000**
SUBTOTAL - ELECTRICAL BUILDING								**822,600**
Contractor's Overhead & Profit (15%)								123,390
Construction Contingencies (25%)								205,650
ESTIMATED CONSTRUCTION COST (2009)								**$ 1,151,640**

SECONDARY SYSTEM
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02200 Earthwork								
Aeration Tanks, UV Disinfection, Effluent Pump Station								
Excavation	6,906	CY	0	0	20	138,125	20	138,100
Aggregate Base	406	CY	20	8,100	5	2,031	25	10,200
Backfill and Compaction	2,075	CY	0	0	15	31,125	15	31,100
3 Secondary Clarifier Tanks								
Excavation	16,575	CY	0	0	20	331,500	20	331,500
Aggregate Base	980	CY	20	19,600	5	4,900	25	24,500
Backfill and Compaction	4,975	CY	0	0	15	74,625	15	74,600
02390 Shoring								
Secondary system shoring	12,600	SF					12	151,200
Total Division 2								**761,200**
Division 3 - Concrete								
03300 Cast-In-Place Concrete								
Aeration Tank Influent Distribution Channel								
Vertical walls	145	CY					900	130,500
Slabs on Grad	75	CY					700	52,500
Suspended slabs	0	CY					1,000	0
Aeration Tanks								
Vertical walls	660	CY					900	593,703
Slabs on Grad	605	CY					700	423,500
Suspended slabs	75	CY					1,000	75,000
Distribution Structure								
Vertical walls	15	CY					900	13,500
Slabs on Grad	15	CY					700	10,500
Suspended slabs	10	CY					1,000	10,000
UV Disinfection								
Vertical walls	65	CY					900	58,356
Slabs on Grad	25	CY					700	17,500
Suspended slabs	0	CY					1,000	0
Pump Station								
Vertical walls	55	CY					900	49,500
Slabs on Grad	20	CY					700	14,000
Suspended slabs	15	CY					1,000	15,000
3 Secondary Clarifiers								
Vertical walls	845	CY					900	760,500
Slabs on Grad	1,300	CY					700	910,000
Suspended slabs	0	CY					1,000	0
03600 Grout								
Grout	1	LS					35,000	35,000
Total Division 3								**3,169,059**
Division 4 - Masonry (Not Used)								

SECONDARY SYSTEM
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 5 - Metals								
05070 Miscellaneous Metals								
Miscellaneous Metals	1	LS					55,000	55,000
Metal Grating	1	LS					65,000	65,000
Weirs and Baffles	1	LS					45,000	45,000
05120 Aluminum Handrailing								
Handrailing	1	LS					67,000	67,000
Total Division 5								**232,000**
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					25,000	25,000
Total Division 9								**25,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11052 Automatic Samplers								
Sampler	1	LS					8,400	8,400
11212 Pumps								
RAS Pumps	6	EA					42,000	252,000
Scum Pumps	3	EA					14,400	43,200
WAS Pumps	2	EA					14,400	28,800
Effluent Pumps	4	EA					60,000	240,000
11260 UV Disinfection Equipment								
UV Disinfection Equipment	1	LS					1,110,000	1,110,000
11291 Gates								
Gates	1	LS					72,000	72,000
11375 Aeration Equipment								
Aeration Blower	2	EA					96,000	192,000
Aeration Diffusers	1	LS					175,000	175,000
11225 Clarifiers								
Clarifiers	3	EA					190,000	570,000
Total Division 11								**2,691,400**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								

SECONDARY SYSTEM
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 15 - Mechanical								
15033 Automatic Backwash Strainer								
Auto Backwash Strainer	2	EA					42,000	84,000
15050 Piping, General								
Piping	1	LS					180,000	180,000
15070 Miscellaneous Piping Specialties								
Piping	1	LS					45,000	45,000
15100 Valves, General								
Piping	1	LS					60,000	60,000
Total Division 15								**369,000**
Division 16 - Electrical								
16050 Electrical, General								
RAS/WAS Pumps	1	LS					78,000	78,000
Effluent Pumps	1	LS					257,000	257,000
UV System	1	LS					16,000	16,000
Blowers	1	LS					39,000	39,000
Scum Pumps	3	EA					5,000	15,000
Instrumentation/ Control	1	LS					160,000	160,000
Total Division 16								**565,000**
SUBTOTAL - SECONDARY SYSTEM								**7,812,659**
Contractor's Overhead & Profit (15%)								1,171,899
Construction Contingencies (25%)								1,953,165
ESTIMATED CONSTRUCTION COST (2009)								**$ 10,937,723**

SOLIDS HANDLING
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02200 Earthwork								
Solids Handling Building								
Excavation	238	CY	0	0	20	4,750	20	4,800
Aggregate Base	125	CY	20	2,500	5	625	25	3,100
Total Division 2								**7,900**
Division 3 - Concrete								
03300 Cast-In-Place Concrete								
Solids Handling Building								
Vertical walls	100	CY					1,000	100,000
Slabs on Grad	88	CY					800	70,400
Suspended slabs	90	CY					1,200	108,360
03600 Grout								
Grout	1	LS					15,000	15,000
Total Division 3								**293,760**
Division 4 - Masonry (Not Used)								
Division 5 - Metals								
05020 Structural Steel Building								
Sludge Handling Building	1	LS					135,000	135,000
05070 Miscellaneous Metals								
Miscellaneous Metals	1	LS					50,000	50,000
Grating	1	LS					20,000	20,000
05120 Aluminum Handrailing								
Handrailing	1	LS					15,000	15,000
05511 Metal Stairs								
Metal Stairs	1	LS					45,000	45,000
Total Division 5								**265,000**
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					35,000	35,000
Total Division 9								**35,000**
Division 10 - Specialties (Not Used)								

SOLIDS HANDLING
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 11 - Equipment								
11212 Pumps								
Chemical Pumps	2	EA					7,200	14,400
Progressive Cavity Pumps	3	EA					30,000	90,000
11240 Chemical Feed Equipment								
Chemical Feed Equipment	1	LS					16,800	16,800
Polymer Mix/Feed Units	1	LS					18,000	18,000
11350 Sludge Handling and Treatment Equipment								
Rotary Drum Thickeners	2	EA					222,000	444,000
Sludge Centrifuges	1	LS					540,000	540,000
Sludge Centrifuges (relocate)	1	LS					160,000	160,000
Total Division 11								**1,283,200**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction								
13205 Fiberglass Reinforced Plastic Tanks								
Polyethylene Tanks	2	EA					15,000	30,000
13250 Odor Control Unit								
Odor Control Unit	1	LS					168,000	168,000
Total Division 13								**198,000**
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15070 Miscellaneous Piping Specialties								
Miscellaneous Piping	1	LS					95,000	95,000
15081 Ductwork								
Fiberglass Ducts	1	LS					30,000	30,000
15831 Ventilation Fans								
Ventilation Fans	1	LS					28,000	28,000
Total Division 15								**153,000**
Division 16 - Electrical								
16050 Electrical, General								
Conduit and Wire	1	LS					19,000	19,000
MCC	1	LS					81,000	81,000
Controls and Programming	1	LS					45,000	45,000
Building Electrical	1	LS					44,000	44,000
Total Division 16								**189,000**
SUBTOTAL - SOLIDS HANDLING								**2,424,860**
Contractor's Overhead & Profit (15%)								363,729
Construction Contingencies (25%)								606,215
ESTIMATED CONSTRUCTION COST (2009)								**$ 3,031,075**

OUTFALL
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 1 - General Requirements								
Traffic Maintenance and Control	1	LS					90,000	90,000
Total Division 1								**90,000**
Division 2 - Site Work								
02050 Demolition								
Sawcut and removal of AC pavement	140,000	SF			2	280,000	2	280,000
02100 Site Preparation								
Clearing and grubbing	1	LS					35,000	35,000
02140 Dewatering								
Dewatering	1	LS					65,000	65,000
02200 Earthwork								
Pipeline								
24" Pinole WWTP to Rodeo Outfall								
Open cut trenching and disposal	25,900	CY	0	0	20	518,000	20	518,000
Aggregate Base	22,100	CY	20	442,000	5	110,500	25	552,500
Backfill and compaction	22,100	CY	0	0	15	331,500	15	331,500
Boring and Jacking								
Pit excavation	400	CY	0	0	20	8,000	20	8,000
Backfill and compaction	400	CY	20	8,000	5	2,000	25	10,000
Dredging	25	CY	0	0	6,000	150,000	6,000	150,000
02224 Pipe Boring and Jacking								
Boring and Jacking	200	LF			350	70,000	350	70,000
02390 Shoring								
Shoring	5,600	SF					12	67,200
02513 Pavement and Base								
AC Pavement	140,000	SF	3	420,000	2	280,000	5	700,000
Base (included in Section 02200)								
02580 Traffic Stripes and Pavement Markings								
Striping and Pavement Markings	1	LS					25,000	25,000
Total Division 2								**2,812,200**
Division 3 - Concrete								
03400 Precast Concrete Structures								
Transition Manhole	1	EA	15,000	15,000	5,000	5,000	20,000	20,000
03600 Grout								
Grout	1	LS					7,500	7,500
Total Division 3								**27,500**
Division 4 - Masonry (Not Used)								

OUTFALL
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 5 - Metals								
05030 Hot Dip Galvanizing								
Price included in Div 15								
05060 Pipe Welding								
Price included in Div 15								
05070 Miscellaneous Metals								
Manhole cover	1	EA	300	300	50	50	350	350
Supports for creek crossings	1	LS					15,000	15,000
Saddle clamp to attach duckbill valves to outfall ports	15	EA	2,500	37,500	3,000	45,000	5,500	82,500
Total Division 5								**97,850**
Division 6 - Wood and Plastics								
06607 Polywrap								
Protective Coatings for DIP fittings	1,200	LF	3	3,600	1	1,200	4	4,800
Total Division 6								**4,800**
Division 7 - Thermal and Moisture Protection								
07920 Sealants and Caulking								
Protective Coatings for transition MH	1	LS					1,000	1,000
Total Division 7								**1,000**
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Pipe coating (DI fittings) (included in Section 15061)								0
Total Division 9								
Division 10 - Specialties (Not Used)								
Division 11 - Equipment (Not Used)								
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								

OUTFALL
OPINION OF PROBABLE COST
NEW LAND OUTFALL OPTION 2
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 15 - Mechanical								
15050 Piping, General								
Megalug Pipe restraints								
24" Megalug	120	EA	880	105,600	50	6,000	930	111,600
24" Harness	200	EA	1,870	374,000	50	10,000	1,920	384,000
15061 Ductile Iron Pipe								
Fittings								
90º - 24"	8	EA	4,400	35,200	275	2,200	4675	37,400
45º - 24"	15	EA	3,300	49,500	275	4,125	3575	53,625
22.5º - 24"	20	EA	3,300	66,000	275	5,500	3575	71,500
11.25º - 24"	40	EA	3,300	132,000	275	11,000	3575	143,000
Tee - 24"	1	EA	6,820	6,820	275	275	7095	7,095
15062 Steel Pipe								
32" casing pipe for jack and bore	150	LF	150	22,500	incl in Section 02224		175	26,250
15064 Polyvinyl Chloride (PVC) Pipe								
24" C905 (DR18) from Pinole WWTP to RSD Outfall	20,000	LF	56	1,128,000	45	900,000	101	2,028,000
15100 Valves, General								
15105 Check Valves								
3" duckbill on outfall ports	30	EA	750	22,500	250	7,500	1,000	30,000
Total Division 15								**2,892,470**
Division 16 - Electrical (Not Used)								
SUBTOTAL - OUTFALL								**5,925,820**
Contractor's Overhead & Profit (15%)								888,873
Construction Contingencies (25%)								1,481,455
ESTIMATED CONSTRUCTION COST (2009)								**$ 7,407,275**

APPENDIX D

OPTION 4 DETAILED COST SUMMARY

OPINION OF PROBABLE COST SUMMARY
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Total 2009	Total 2015*
General Costs	$2,705,360	$3,137,388
Site Work, Site Piping, and Demolition	$3,895,360	$4,517,423
Headworks	$2,758,301	$3,198,784
Primary Treatment	$227,640	$263,993
Primary Effluent Pump Station	$601,860	$697,973
Electrical Building	$1,125,320	$1,305,026
Secondary System	$7,457,800	$8,648,762
Solids Handling	$1,032,500	$1,197,383
Storage Tank	$8,389,500	$9,729,248
Outfall	$6,826,569	$7,916,727
Estimated Construction Cost	**$35,020,210**	**$40,612,707**
Engineering and Administration (25%)	$8,755,052	$10,153,177
Total Project Cost	$43,775,262	$50,765,883
TOTAL PROJECT COST, ROUNDED	**$ 43,775,000**	**$ 50,766,000**

*2.5% Escalation per year.

GENERAL COSTS
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 1 - General Requirements								
Mobilization/Demobilization (5%)	1	LS					1,176,200	1,176,200
Bonds and Insurance (2%)	1	LS					461,200	461,200
Construction Sequencing and Constraints	1	LS					100,000	100,000
Permits, Surveying, Testing, etc	1	LS					75,000	75,000
Field Office, Equipment and Services	1	LS					120,000	120,000
Total Division 1								**1,932,400**
SUBTOTAL - GENERAL COSTS								**1,932,400**
Contractor's Overhead & Profit (15%)								289,860
Construction Contingencies (25%)								483,100
ESTIMATED CONSTRUCTION COST (2009)								**$2,705,360**

SITE WORK, SITE PIPING, AND DEMOLITION
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02050 Demolition								
Demolition	1	LS					750,000	750,000
02100 Site Preparation								
Clearing and grubbing	1	LS					60,000	60,000
02140 Dewatering								
Dewatering	1	LS					100,000	100,000
02200 Earthwork								
Metering Vault								
Excavation	1	LS					30,000	30,000
Shoring	1	LS					25,000	25,000
02513 Pavement and Base								
AC Pavement	21,000	SF	3	63,000	2	42,000	5	105,000
(Base included in other sections)								
02970 Landscaping								
Restore grass, trees, and irrigation at park	1	LS					75,000	75,000
Total Division 2								**1,145,000**
Division 3 - Concrete								
03300 Cast In Place Concrete								
Thrust Blocks	60	CY					700	42,000
Metering Vault								0
Vertical walls	110	CY					900	99,000
Slabs on Grad	22	CY					700	15,400
Suspended slabs	15	CY					1,000	15,000
Precast Forcemain Intertie Vault	1	LS					80,000	80,000
Total Division 3								**251,400**
Division 4 - Masonry (Not Used)								
Division 5 - Metals (Not Used)								
Division 6 - Woods and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					50,000	50,000
Total Division 9								**50,000**
Division 10 - Specialties (Not Used)								
Division 11- Equipment (Not Used)								
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								

SITE WORK, SITE PIPING, AND DEMOLITION
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15050 Piping, General								
30" Influent	90	LF					375	33,750
42" Influent	160	LF					500	80,000
42" to Primary Clarifiers	110	LF					500	55,000
30" Diversion Line	170	LF					375	63,750
4" Water supply from effluent PS to screenings washer/compactor	600	LF					100	60,000
24" To Storage Tank	195	LF					250	48,750
20" Return From Storage Tank	165	LF					220	36,300
42" To Primary Effluent Pump Station	18	LF					400	7,200
24" To Aeration Tanks	395	LF					250	98,750
24" To Secondary Clarifiers	112	LF					250	28,000
16" RAS	60	LF					200	12,000
24" RAS	90	LF					250	22,500
18" Effluent ForceMain from existing PS to Intertie Vault	600	LF					220	132,000
Intertie Vault Valve and Piping	1	LS					50000	50,000
Total Division 15								**728,000**
Division 16 - Electrical								
16050 Electrical General								
Duct Banks	1	LS					80000	80,000
Site Network	1	LS					20000	20,000
SCADA Upgrades	1	LS					400000	400,000
Lighting Panels & Transformers	1	LS					48000	48,000
Wiring & Specialties	1	LS					60000	60,000
Total Division 16								**608,000**
SUBTOTAL - SITE WORK, SITE PIPING, AND DEMOLITION								**2,782,400**
Contractor's Overhead & Profit (15%)								417,360
Construction Contingencies (25%)								695,600
ESTIMATED CONSTRUCTION COST (2009)								**$ 3,895,360**

HEADWORKS
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02200 Earthwork								
Headworks Pump Station								
Excavation	700	CY	0	0	20	14,000	20	14,000
Aggregate Base	50	CY	20	1,000	5	250	25	1,300
Backfill and Compaction	365	CY	0	0	15	5,475	15	5,500
Bar Screens								
Excavation	95	CY	0	0	20	1,900	20	1,900
Aggregate Base	25	CY	20	500	5	125	25	600
Backfill and Compaction	25	CY	0	0	15	375	15	400
Grit Removal								
Excavation	225	CY	0	0	20	4,500	20	4,500
Aggregate Base	30	CY	20	600	5	150	25	800
Backfill and Compaction	210	CY	0	0	15	3,156	15	3,200
Distribution Structure								
Excavation	114	CY	0	0	20	2,280	20	2,300
Aggregate Base	28	CY	20	600	5	140	25	700
Backfill and Compaction	60	CY	0	0	15	900	15	900
02390 Shoring								
Headworks Shoring	4,250	SF					12	51,000
Total Division 2								**87,100**
Division 3 - Concrete								
03300 Cast-In-Place Concrete								
Headworks Pump Station								
Vertical walls	198	CY					900	178,200
Slabs on Grad	32	CY					700	22,400
Suspended slabs	27	CY					1,000	26,670
Bar Screens								
Vertical walls	108	CY					900	97,200
Slabs on Grad	24	CY					700	16,800
Suspended slabs	0	CY					1,000	0
Grit Removal								
Vertical walls	128	CY					900	115,020
Slabs on Grad	46	CY					700	32,025
Suspended slabs	0	CY					1,000	0
Distribution Structure								
Vertical walls	50	CY					900	45,000
Slabs on Grad	15	CY					700	10,500
Suspended slabs	12	CY					1,000	12,000
03600 Grout								
Grout	1	LS					10,000	10,000
Total Division 3								**565,815**
Division 4 - Masonry (Not Used)								
Division 5 - Metals								
05070 Miscellaneous Metals								
Miscellaneous Metals	1	LS					10,000	10,000
Metal Grating	1	LS					15,000	15,000
05120 Aluminum Handrailing								
Handrailing	1	LS					14,000	14,000

HEADWORKS
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
05511 Metal Stairs								
Metal Stairs	1	LS					15,000	15,000
Total Division 5								**54,000**
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					10,000	10,000
Total Division 9								**10,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11170 Washer/Compactor								
Washer/Compactor	1	LS					90,000	90,000
11212 Pumps								
Influent Pumps	4	EA					33,600	134,400
11291 Gates								
Gates	8	EA					14,400	115,200
11320 Grit Removal Equipment								
Grit Removal Equipment	1	LS					147,600	147,600
11330 Bar Screens								
Mechanical Bar Screens	2	EA					174,000	348,000
Total Division 11								**835,200**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction								
13250 Odor Control Unit								
Odor Control Unit	1	LS					120,000	120,000
Total Division 13								**120,000**
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15050 - Piping, General								
Piping	1	LS					55,100	55,100
15100- Valves, General								
Piping	1	LS					35,000	35,000
Total Division 15								**90,100**

HEADWORKS
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 16 - Electrical								
16050 Electrical, General								
Conduit Wiring	1	LS					13,000	13,000
MCC / VFDs	1	LS					150,000	150,000
Control Panels & Programming	1	LS					45,000	45,000
Total Division 16								**208,000**
SUBTOTAL - HEADWORKS								**1,970,215**
Contractor's Overhead and Profit (15%)								295,532
Construction Contingencies (25%)								492,554
ESTIMATED CONSTRUCTION COST (2009)								**$ 2,758,301**

PRIMARY TREATMENT
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work (Not Used)								
Division 3 - Concrete (Not Used)								
Division 4 - Masonry (Not Used)								
Division 5 - Metals (Not Used)								
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					3,000	3,000
Total Division 9								**3,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11212 Pumps								
Progressive Cavity Pumps	6	EA					17,400	104,400
Total Division 11								**104,400**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15070 Miscellaneous Piping and Valves								
Miscellaneous Piping and Valves	6	EA					6,500	39,000
Total Division 15								**39,000**
Division 16 - Electrical								
16050 Electrical, General								
Pump Electrical	6	EA					2,700	16,200
Total Division 16								**16,200**
SUBTOTAL - PRIMARY TREATMENT								**162,600**
Contractor's Overhead & Profit (15%)								24,390
Construction Contingencies (25%)								40,650
ESTIMATED CONSTRUCTION COST (2009)								**$ 227,640**

PRIMARY EFFLUENT PUMP STATION
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
Primary Effluent Pump Station								
Excavation	310	CY	0	0	20	6,200	20	6,200
Aggregate Base	24	CY	20	500	5	120	25	600
Backfill and Compaction	192	CY	0	0	15	2,880	15	2,900
02390 Shoring								
Shoring	1,550	SF					12	18,600
Total Division 2								**28,300**
Division 3 - Concrete								
Primary Effluent Pump Station								
Vertical walls	53	CY					900	47,700
Slabs on Grad	22	CY					700	15,400
Suspended slabs	15	CY					1,000	15,000
03600 Grout								
Grout	1	LS					1,000	1,000
Total Division 3								**79,100**
Division 4 - Masonry (Not Used)								
Division 5 - Metals								
05500 Miscellaneous Metals								
Miscellaneous Metals	1	LS					15,000	15,000
Total Division 5								**15,000**
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					7,500	7,500
Total Division 9								**7,500**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11212 Pumps								
Effluent Pumps	3	EA					30,000	90,000
Total Division 11								**90,000**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								

PRIMARY EFFLUENT PUMP STATION
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
15070 Miscellaneous Piping and Valves								
Miscellaneous Piping and Valves	3	EA					10,000	30,000
Total Division 15								**30,000**
Division 16 - Electrical								
16050 Electrical, General								
Pump Electrical	1	LS					180,000	180,000
Total Division 16								**180,000**
SUBTOTAL - PRIMARY TREATMENT								**429,900**
Contractor's Overhead & Profit (15%)								64,485
Construction Contingencies (25%)								107,475
ESTIMATED CONSTRUCTION COST (2009)								**$ 601,860**

ELECTRICAL BUILDING
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Division 10								
Construction of Electrical Building								
Electrical Building	1	LS					264,000	264,000
Total Divisions 2 - Division 10								**264,000**
Division 11 - Equipment								
11080 Generator								
Generator	1	LS					394,800	394,800
Total Division 11								**394,800**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical (Not Used)								
Division 16 - Electrical								
16050 Electrical, General								
Generator Switchboard	1	LS					100,000	100,000
New Service	1	LS					45,000	45,000
Total Division 16								**145,000**
SUBTOTAL - ELECTRICAL BUILDING								**803,800**
Contractor's Overhead & Profit (15%)								120,570
Construction Contingencies (25%)								200,950
ESTIMATED CONSTRUCTION COST (2009)								**$ 1,125,320**

STORAGE TANK
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02200 Earthwork								
Storage Tank								
Excavation	22,170	CY	0	0	20	443,400	20	443,400
Aggregate Base	900	CY	20	18,000	5	4,500	25	22,500
Backfill and Compaction	3,290	CY	0	0	15	49,350	15	49,400
02390 Shoring								
Secondary system shoring	14,250	SF					12	171,000
Total Division 2								**686,300**
Division 3 - Concrete								
03300 Cast-In-Place Concrete								
Storage Tank								
Vertical walls	450	CY					900	405,000
Slabs on Grad	4,357	CY					600	2,614,200
Suspended slabs	1,494	CY					1,000	1,494,000
Columns								
Columns	86	CY					1,000	86,000
03600 Grout								
Grout	1	LS					5,000	5,000
Total Division 3								**4,604,200**
Division 4 - Masonry (Not Used)								
Division 5 - Metals (not used)								
05070 Miscellaneous Metals								
Miscellaneous Metals	1	LS					20,000	20,000
Total Division 5								**20,000**
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					25,000	25,000
Total Division 9								**25,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11212 Pumps								
Return Pumps	2	EA					42,000	84,000
Total Division 11								**84,000**
Division 12 - Furnishings (Not Used)								

STORAGE TANK
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 13 - Special Construction								
13250 Odor Control Unit								
Odor Control Unit	1	LS					168,000	168,000
Total Division 13								**168,000**
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15050 Piping, General								
Piping	1	LS					180,000	180,000
15070 Miscellaneous Piping Specialties								
Piping	1	LS					45,000	45,000
15100 Valves, General								
Piping	1	LS					60,000	60,000
Total Division 15								**285,000**
Division 16 - Electrical								
16050 Electrical, General								
Return Pumps	1	LS					45,000	45,000
Instrumentation/ Control	1	LS					75,000	75,000
Total Division 16								**120,000**
SUBTOTAL - SECONDARY SYSTEM								**5,992,500**
Contractor's Overhead & Profit (15%)								898,875
Construction Contingencies (25%)								1,498,125
ESTIMATED CONSTRUCTION COST (2009)								**$ 8,389,500**

SECONDARY SYSTEM
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work								
02200 Earthwork								
Aeration Tanks, Chlorine Contact, Effluent Pump Station								
Excavation	6,750	CY	0	0	20	135,000	20	135,000
Aggregate Base	450	CY	20	9,000	5	2,250	25	11,300
Backfill and Compaction	1,240	CY	0	0	15	18,600	15	18,600
2 Secondary Clarifier Tanks								
Excavation	6,500	CY	0	0	20	130,000	20	130,000
Aggregate Base	370	CY	20	7,400	5	1,850	25	9,300
Backfill and Compaction	3,200	CY	0	0	15	48,000	15	48,000
02390 Shoring								
Secondary system shoring	10,000	SF					12	120,000
Total Division 2								**472,200**
Division 3 - Concrete								
03300 Cast-In-Place Concrete								
Aeration Tanks								
Vertical walls	744	CY					900	669,600
Slabs on Grad	600	CY					700	420,000
Suspended slabs	45	CY					1,000	45,000
Distribution Structures								
Vertical walls	38	CY					900	34,200
Slabs on Grad	16	CY					700	11,200
Suspended slabs	20	CY					1,000	20,000
Chlorine Contact Tank								
Vertical walls	115	CY					900	103,500
Slabs on Grad	67	CY					700	46,900
Suspended slabs	0	CY					1,000	0
Pump Station								
Vertical walls	30	CY					900	27,000
Slabs on Grad	10	CY					700	7,000
Suspended slabs	7	CY					1,000	7,000
2 Secondary Clarifiers								
Vertical walls	390	CY					900	351,000
Slabs on Grad	470	CY					700	329,000
Suspended slabs	0	CY					1,000	0
03600 Grout								
Grout	1	LS					35,000	35,000
Total Division 3								**2,106,400**
Division 4 - Masonry (Not Used)								
Division 5 - Metals								
05070 Miscellaneous Metals								
Miscellaneous Metals	1	LS					35,000	35,000
Metal Grating	1	LS					45,000	45,000
Weirs and Baffles	1	LS					25,000	25,000
05120 Aluminum Handrailing								
Handrailing	1	LS					47,000	47,000
Total Division 5								**152,000**

SECONDARY SYSTEM
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Protective Coatings	1	LS					25,000	25,000
Total Division 9								**25,000**
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11052 Automatic Samplers								
Sampler	1	LS					8,400	8,400
11212 Pumps								
RAS Pumps	4	EA					35,000	140,000
Scum Pumps	2	EA					12,000	24,000
WAS Pumps	2	EA					12,000	24,000
Effluent Pumps	4	EA					50,000	200,000
11263 Chlorine Contact Equipment								
Chlorine Contact Equipment	1	LS					600,000	600,000
11291 Gates								
Gates	1	LS					72,000	72,000
11375 Aeration Equipment								
Aeration Blower	2	EA					96,000	192,000
Aeration Diffusers	1	LS					175,000	175,000
11225 Clarifiers								
Clarifiers	2	EA					135,000	270,000
Total Division 11								**1,705,400**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15033 Automatic Backwash Strainer								
Auto Backwash Strainer	2	EA					42,000	84,000
15050 Piping, General								
Piping	1	LS					144,000	144,000
15070 Miscellaneous Piping Specialties								
Piping	1	LS					36,000	36,000
15100 Valves, General								
Piping	1	LS					48,000	48,000
Total Division 15								**312,000**

SECONDARY SYSTEM
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 16 - Electrical								
16050 Electrical, General								
RAS/WAS Pumps	1	LS					78,000	78,000
Effluent Pumps	1	LS					257,000	257,000
Chlorine System	1	LS					5,000	5,000
Blowers	1	LS					39,000	39,000
Scum Pumps	3	EA					5,000	15,000
Instrumentation/ Control	1	LS					160,000	160,000
Total Division 16								**554,000**
SUBTOTAL - SECONDARY SYSTEM								**5,327,000**
Contractor's Overhead & Profit (15%)								799,050
Construction Contingencies (25%)								1,331,750
ESTIMATED CONSTRUCTION COST (2009)								**$ 7,457,800**

SOLIDS HANDLING
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 2 - Site Work (Not Used)								
Division 3 - Concrete (Not Used)								
Division 4 - Masonry (Not Used)								
Division 5 - Metals (Not Used)								
Division 6 - Wood and Plastics (Not Used)								
Division 7 - Thermal and Moisture Protection (Not Used)								
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes (Not Used)								
Division 10 - Specialties (Not Used)								
Division 11 - Equipment								
11350 Sludge Handling and Treatment Equipment								
Rotary Drum Thickeners	1	EA					222,000	222,000
Sludge Centrifuges	1	LS					540,000	540,000
Remove one existing thickner and centrifuge	1	LS					30,000	30,000
Total Division 11								**792,000**
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								
Division 15 - Mechanical								
15070 Miscellaneous Piping Specialties								
Miscellaneous Piping	1	LS					15,000	15,000
Total Division 15								**15,000**
Division 16 - Electrical								
16050 Electrical, General								
Centrifuge and thickener electrical	1	LS					19,000	19,000
Total Division 16								**19,000**
SUBTOTAL - SOLIDS HANDLING								**826,000**
Contractor's Overhead & Profit (15%)								123,900
Construction Contingencies (25%)								206,500
ESTIMATED CONSTRUCTION COST (2009)								**$ 1,032,500**

OUTFALL
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 1 - General Requirements								
Traffic Maintenance and Control	1	LS					90,000	90,000
Total Division 1								**90,000**
Division 2 - Site Work								
02050 Demolition								
Sawcut and removal of AC pavement	150,500	SF			2	301,000	2	301,000
02100 Site Preparation								
Clearing and grubbing	1	LS					35,000	35,000
02140 Dewatering								
Dewatering	1	LS					65,000	65,000
02200 Earthwork								
Pipeline								
18" Pinole WWTP (new effluent PS) to Rodeo Outfall								
Open cut trenching and disposal	21,700	CY	0	0	20	434,000	20	434,000
Aggregate Base	19,100	CY	20	382,000	5	95,500	25	477,500
Backfill and compaction	19,100	CY	0	0	15	286,500	15	286,500
18" Pinole WWTP (from existing effluent PS tie-in to new outfall piping)								
Open cut trenching and disposal	700	CY	0	0	20	14,000	20	14,000
Aggregate Base	600	CY	20	12,000	5	3,000	25	15,000
Backfill and compaction	600	CY	0	0	15	9,000	15	9,000
Boring and Jacking								
Pit excavation	400	CY	0	0	20	8,000	20	8,000
Backfill and compaction	400	CY	20	8,000	5	2,000	25	10,000
Dredging	25	CY	0	0	6,000	150,000	6,000	150,000
02224 Pipe Boring and Jacking								
Boring and Jacking	200	LF			350	70,000	350	70,000
02390 Shoring								
Shoring	5,600	SF					12	67,200
02513 Pavement and Base								
AC Pavement	144,200	SF	3	432,600	2	288,400	5	721,000
Base (included in Section 02200)								
02580 Traffic Stripes and Pavement Markings								
Striping and Pavement Markings	1	LS					25,000	25,000
Total Division 2								**2,688,200**
Division 3 - Concrete								
03400 Precast Concrete Structures								
Transition Manhole	1	EA	15,000	15,000	5,000	5,000	20,000	20,000
03600 Grout								
Grout	1	LS					7,500	7,500
Total Division 3								**27,500**

OUTFALL
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
City of Pinole

Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 4 - Masonry (Not Used)								
Division 5 - Metals								
05030 Hot Dip Galvanizing								
Price included in Div 15								
05060 Pipe Welding								
Price included in Div 15								
05070 Miscellaneous Metals								
Manhole cover	1	EA	300	300	50	50	350	350
Supports for creek crossings	1	LS					15,000	15,000
Saddle clamp to attach duckbill valves to outfall ports	15	EA	2,500	37,500	3,000	45,000	5,500	82,500
Total Division 5								**97,850**
Division 6 - Wood and Plastics								
06607 Polywrap								
Protective Coatings for DIP fittings	1,200	LF	3	3,600	1	1,200	4	4,800
Total Division 6								**4,800**
Division 7 - Thermal and Moisture Protection								
07920 Sealants and Caulking								
Protective Coatings for transition MH	1	LS					1,000	1,000
Total Division 7								**1,000**
Division 8 - Doors and Windows (Not Used)								
Division 9 - Finishes								
09800 Protective Coatings								
Pipe coating (DI fittings) (included in Section 15061)								0
Total Division 9								
Division 10 - Specialties (Not Used)								
Division 11 - Equipment (Not Used)								
Division 12 - Furnishings (Not Used)								
Division 13 - Special Construction (Not Used)								
Division 14 - Conveying Systems (Not Used)								

OUTFALL
OPINION OF PROBABLE COST
FLOW EQUALIZATION OPTION 4
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Description	Quantity		Material Cost		Labor Cost		Total Cost	
	Number	Unit	Unit Cost	Total	Unit Cost	Total	Unit Cost	Total
Division 15 - Mechanical								
15050 Piping, General								
Megalug Pipe restraints								
18" Megalug	200	EA	550	110,000	50	10,000	600	120,000
18" Harness	225	EA	994	223,700	50	11,250	1,044	235,000
15061 Ductile Iron Pipe								
Fittings								
90º - 18"	14	EA	3,000	42,000	275	3,850	3275	45,850
45º - 18"	16	EA	2,860	45,760	275	4,400	3135	50,160
22.5º - 18"	20	EA	2,420	48,400	275	5,500	2695	53,900
11.25º - 18"	50	EA	2,420	121,000	275	13,750	2695	134,750
Tee - 18"	3	EA	4,510	13,530	275	825	4785	14,355
15062 Steel Pipe								
30" casing pipe for jack and bore	150	LF	150	22,500	incl in Section 02224		175	26,250
15064 Polyvinyl Chloride (PVC) Pipe								
18" C905 (DR18) from Pinole WWTP to RSD Outfall	20,600	LF	44	914,640	45	927,000	89	1,841,640
15100 Valves, General								
15105 Check Valves								
3" duckbill on outfall ports	30	EA	750	22,500	250	7,500	1,000	30,000
Total Division 15								**2,551,905**
Division 16 - Electrical (Not Used)								
SUBTOTAL - OUTFALL								**5,461,255**
Contractor's Overhead & Profit (15%)								819,188
Construction Contingencies (25%)								1,365,314
ESTIMATED CONSTRUCTION COST (2009)								**$ 6,826,569**