STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 10/2015) CALIFORNIA ENERGY COMMISSION

New Agreement ARV-15-054 (To be completed by CGL Office)

Division	Agreement Manager:	MS-	Phone
600 Fuels and Transportation Division	Chi-Chung Tsao	27	916-651-2934

Recipient's Legal Name	Federal ID Number
City of Petaluma	94-6000392

Title of Project
City of Petaluma – Biomass-to-Biofuel (B2B) Project

Term and Amount	Start Date	End Date	Amount
	03 / 09 / 2016	06 / 30 / 2019	$ 3,000,000

Business Meeting Information

☐ ARFVTP agreements $75K and under delegated to Executive Director.

Proposed Business Meeting Date	03 / 09 / 2016	☐ Consent	☒ Discussion
Business Meeting Presenter	Chi-Chung Tsao	Time Needed:	5 minutes

Please select one list serve. Altfuels (AB118- ARFVTP)

Agenda Item Subject and Description

Proposed resolution adopting California Environmental Quality Act findings for the City of Petaluma Biomass-to-Biofuel (B2B) Project, and the City of Petaluma Biomass-to-Biofuel (B2B) Project.

a. CALIFORNIA ENVIRONMENTAL QUALITY ACT FINDINGS. Findings that, based on the lead agency City of Petaluma's Environmental Impact Report (EIR), Addendum, and Revised Mitigation Monitoring Plan, the work under the proposed project presents no new significant or substantially more severe environmental impacts beyond those already considered and mitigated.

b. CITY OF PETALUMA BIOMASS-TO-BIOFUEL (B2B) PROJECT. Agreement with the City of Petaluma, for $3,000,000, to design, build, and operate an anaerobic digestion system at an existing wastewater recycling facility. The system will include an anaerobic digester, biogas processing unit and pipelines, compressed natural gas fueling station, screw press, and high-strength waste housing. The anaerobic digestion system will produce approximately 150,000 gasoline gallon equivalents of renewable natural gas per year from the waste of food and beverage production, which will be used to fuel waste-collection vehicles. The project, as a "closed loop" system, will be a scalable model for other communities with the goals of waste recovery and cutting dependence on fossil fuels.

California Environmental Quality Act (CEQA) Compliance

1. Is Agreement considered a "Project" under CEQA?
   ☒ Yes (skip to question 2) ☐ No (complete the following (PRC 21065 and 14 CCR 15378)):
   Explain why Agreement is not considered a "Project":
   Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .
2. If Agreement is considered a "Project" under CEQA:
   ☐ a) Agreement **IS** exempt. (Attach draft NOE)
   ☐ Statutory Exemption. List PRC and/or CCR section number:
   ☐ Categorical Exemption. List CCR section number:
   ☐ Common Sense Exemption. 14 CCR 15061 (b) (3)
   Explain reason why Agreement is exempt under the above section:
   ☒ b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.)
   Check all that apply
   ☐ Initial Study ☒ Environmental Impact Report
   ☐ Negative Declaration ☐ Statement of Overriding Considerations
   ☒ Mitigated Negative Declaration

List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)

Legal Company Name:	Budget
See attached sheet	$
	$
	$

List all key partners: (attach additional sheets as necessary)
Legal Company Name:
See attached sheet

Budget Information

Funding Source	Funding Year of Appropriation	Budget List No.	Amount
ARFVTP	14/15	601.118G	$3,000,000
Funding Source			$
Funding Source			$
Funding Source			$
Funding Source			$
R&D Program Area: Select Program Area		TOTAL:	$ 0
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

Recipient's Administrator/ Officer				**Recipient's Project Manager**			
Name:	Leah Walker			Name:	Dan St. John		
Address:	3890 Cypress Drive			Address:	202 N. McDowell Blvd		
City, State, Zip:	Petaluma, CA 94954			City, State, Zip:	Petaluma, CA 94954		
Phone:	707-778-4583	Fax:	707-776-3746	Phone:	707-778-4593	Fax:	707-778-4508
E-Mail:	lwalker@ci.petaluma.ca.us			E-Mail:	dstjohn@ci.petaluma.ca.us		

Selection Process Used

☒ Competitive Solicitation
☐ First Come First Served Solicitation

Solicitation #: PON-13-609

The following items should be attached to this GRF

1. Exhibit A, Scope of Work		☒ Attached
2. Exhibit B, Budget Detail		☒ Attached
3. CEC 105, Questionnaire for Identifying Conflicts		☒ Attached
4. Recipient Resolution	☐ N/A	☒ Attached
5. CEQA Documentation	☐ N/A	☒ Attached

Agreement Manager	Date	Office Manager	Date	Deputy Director	Date

List all subcontractors (major and minor) and equipment vendors:	
Legal Company Name:	Budget
Kennedy/Jenks	$ Match Funding
Unison	$ Match Funding
Clean Energy	$ Match Funding
TBD1	$ 790,000
TBD2	$ 2,210,000

List all key partners:
Legal Company Name:
Petaluma Refuse & recycling
Lagunitas Brewing Company
Petaluma Poultry
Clover-Stornetta
Petaluma Creamery

Exhibit A
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	Critical Project Review	Task Name
1		Administration
2		Outreach
3		Digester Construction
4	X	Biogas Processing Unit and CNG Fueling Design
5		Biogas Processing Unit and CNG Fueling Construction
6	X	High-Strength Waste Facilities Design
7		High-Strength Waste Facilities Construction
8		Data Collection and Analysis

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	Dan St John		City of Petaluma
2	Matt Pierce		City of Petaluma
3	Leah Walker		City of Petaluma
4	Ingrid Alverde		City of Petaluma
6		Kennedy/Jenks	
7		Unison	
8		Clean Energy	

GLOSSARY

Specific terms and acronyms used throughout this scope of work are defined as follows:

Term/ Acronym	Definition
ARFVTP	Alternative and Renewable Fuel and Vehicle Technology Program
CAM	Commission Agreement Manager
CNG	Compressed Natural Gas
CPR	Critical Project Review
FTD	Fuels and Transportation Division
B2B Project	City of Petaluma's Biomass-to-Biofuels Project
HSW	High Strength Waste

Term/ Acronym	Definition
GGE	Gasoline Gallon Equivalents
K/J	Kennedy/Jenks
Recipient	City of Petaluma
PR&R	Petaluma Resource and Recovery
ECWRF	Ellis Creek Water Recycling Facility
WRF	Water Recycling Facility

Background:
Assembly Bill (AB) 118 (Nùñez, Chapter 750, Statutes of 2007), created the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). The statute authorizes the California Energy Commission (Energy Commission) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change, clean air, and alternative energy policies. AB 8 (Perea, Chapter 401, Statutes of 2013) re-authorizes the ARFVTP through January 1, 2024. The ARFVTP has an annual budget of approximately $100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and non-road vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

The Energy Commission issued solicitation PON-13-609 entitled "Pilot-Scale and Commercial Scale Advanced Biofuels Production Facilities" under the ARFVTP on January 14, 2014. This competitive grant solicitation was an offer to cost share the development and production of new low carbon transportation fuels. In response to PON-13-609, the City of Petaluma (Recipient) submitted application number 5 which was proposed for funding in the Energy Commission's Notice of Proposed Awards on November 12, 2015. PON-13-609 and Recipient's aforementioned applications are hereby incorporated by reference into this Agreement in their entirety.

In the event of any conflict or inconsistency between the terms of the Solicitation and the terms of the Recipient's Application, the Solicitation shall control. In the event of any conflict or inconsistency between the Recipient's Application and the terms of the Energy Commission's Award, the Energy Commission's Award shall control. Similarly, in the event of any conflict or inconsistency between the terms of this Agreement and the Recipient's Application, the terms of this Agreement shall control.

Problem and Solution Statement:
The principal barriers addressed by this project and the benefits achieved by this project due to local and widespread adoption through implementation are summarized below:

- **Financial Impacts to Businesses:** This project eliminates the significant challenges associated with disposal of high-strength waste (wastewater exceeding local regulatory limits) outside of the community, including the costs of transportation to the nearest waste-processing facility which is over 45 miles away. Because the project will improve the City's ability to more economically handle food and beverage production by-products, it meets the City Council goal to attract and retain businesses in Petaluma, including those in the agriculture, creamery, and brewery industries.
- **Institutional/Regulatory Hurdles:** These same industries are facing local limits for discharge of waste to the Ellis Creek Water Recycling Facility (Ellis Creek WRF). This project will assist the City and its industries in meeting its water recycling and sustainability goals by reusing waste generated within the City.
- **Environmental Compliance:** This project will assist the state and Petaluma in meeting the goals of AB32 (the California Global Warming Solutions Act of 2006) by: addressing climate change, meeting the City's sustainability goals, reducing dependence on petroleum-based fuels by ultimately replacing 19 diesel waste hauling trucks with CNG, reducing energy costs and associated greenhouse gas emissions associated with truck trips that currently haul waste outside of Sonoma County, and displacing the consumption of approximately 21,200 gallons of diesel annually associated with hauling wastes.

This project provides a unique opportunity to create a comprehensive "closed-loop" local system. From the collection of waste to the production of CNG to the fueling of City waste hauler trucks, this project is repeatable and scalable for other communities. While this project focuses on the City of Petaluma, this project can demonstrate technologies that can be "multiplied" throughout the state and which will have the greatest impact on reducing overall carbon emissions and supporting local self-sufficiency.

Goals of the Agreement:
The goal of the Biomass-to-Biofuels (B2B) project is to use anaerobic digestion and state-of-the-art compressed natural gas (CNG) production technology to transform high-strength waste (HSW) from food and beverage production into CNG to fuel City waste collection vehicles. The construction works in this project include building an additional anaerobic digester, a biogas processing unit, a CNG fueling station, and high-strength waste facilities. This "closed loop" system will be a scalable model for other communities with the goal of enhancing resource recovery of waste products produced within their service areas by turning it into usable energy and cutting dependence on fossil fuels.

Objectives of the Agreement:
The objectives of the B2B project are measurable and quantifiable and will be able to demonstrate how the goals of the project will be achieved. These include:

- **Process biomass locally and reduce transport of:**
  - Approximately 710,000 gallons per month of liquid feedstock from food and beverage processors.

- **Improve and expand City's wastewater treatment process ability to transform biomass to biomethane:**
  - Construct a new anaerobic digester with a capacity of at least 550,000 gallons, and associated facilities.
- **Convert biomethane to biofuel:**
  - Produce at least 75,000 GGE per year of CNG with existing municipal wastewater solids.
  - Produce at least 150,000 GGE per year of CNG with the addition of HSW.
- **Reduce greenhouse gases by:**
  - Approximately 2,200 tons of CO_2e per year by replacing petroleum based fuels with CNG for City vehicles.
  - Approximately 210 tons of CO_2 per year reducing the distance required to haul wastes approximately 90 miles round trip to East Bay Municipal Utility District (EBMUD).
  - Approximately 620 tons of CO_2e per year by eliminating flaring at the Ellis Creek WRF.
- **Reduce dependence on petroleum-based fuels:**
  - Provide a reliable CNG fuel source to support and encourage conversion and use of low carbon intensity renewable fuels.
- **Provide an economic incentive to retain and attract food processing businesses to the region:**
  - Maintain a partnership with at least three providers of feedstock by 2018.
- **Demonstrate a process that is repeatable and scalable for other communities:**
  - Present B2B progress to at least 4 relevant conferences and at least 3 local events.

TASK 1 ADMINISTRATION

Task 1.1 Attend Kick-off Meeting

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement. The CAM shall designate the date and location of this meeting and provide an agenda to the Recipient prior to the meeting.

The Recipient shall:

- Attend a "Kick-Off" meeting with the Commission Agreement Manager, the Grants Officer, and a representative of the Accounting Office. The Recipient shall bring its Project Manager, Agreement Administrator, Accounting Officer, and others designated by the Commission Agreement Manager to this meeting.
- Discuss the following administrative and technical aspects of this Agreement:
  - Agreement Terms and Conditions
  - Critical Project Review (Task 1.2)
  - Match fund documentation (Task 1.6) No reimbursable work may be done until this documentation is in place.
  - Permit documentation (Task 1.7)
  - Subcontracts needed to carry out project (Task 1.8)
  - The CAM's expectations for accomplishing tasks described in the Scope of Work
  - An updated Schedule of Products and Due Dates

- Monthly Progress Reports (Task 1.4)
- Technical Products (Product Guidelines located in Section 5 of the Terms and Conditions)
- Final Report (Task 1.5)

Recipient Products:

- Updated Schedule of Products
- Updated List of Match Funds
- Updated List of Permits

Commission Agreement Manager Product:

- Kick-Off Meeting Agenda

Task 1.2 Critical Project Review (CPR) Meetings

CPRs provide the opportunity for frank discussions between the Energy Commission and the Recipient. The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and to identify any needed modifications to the tasks, products, schedule or budget.

The Commission Agreement Manager may schedule CPR meetings as necessary, and meeting costs will be borne by the Recipient.

Meeting participants include the CAM and the Recipient and may include the Commission Grants Officer, the Fuels and Transportation Division (FTD) biofuel lead, other Energy Commission staff and Management as well as other individuals selected by the CAM to provide support to the Energy Commission.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Recipient the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. Prepare a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not modifications are needed to the tasks, schedule, products, and/or budget for the remainder of the Agreement. Modifications to the Agreement may require a formal amendment (please see section 8 of the Terms and Conditions). If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Lead Commissioner for Transportation for his or her concurrence.
- Provide the Recipient with a written determination in accordance with the schedule. The written response may include a requirement for the Recipient to revise one or more product(s) that were included in the CPR.

The Recipient shall:

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects.

This report shall be submitted along with any other products identified in this scope of work. The Recipient shall submit these documents to the CAM and any other designated reviewers at least 15 working days in advance of each CPR meeting.

- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

CAM Products:

- Agenda and a list of expected participants
- Schedule for written determination
- Written determination

Recipient Product:

- CPR Report(s)

Task 1.3 Final Meeting

The goal of this task is to closeout this Agreement.

The Recipient shall:

- Meet with Energy Commission staff to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

  This meeting will be attended by, at a minimum, the Recipient, the Commission Grants Office Officer, and the Commission Agreement Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Agreement Manager.

  The technical portion of the meeting shall present an assessment of the degree to which project and task goals and objectives were achieved, findings, conclusions, recommended next steps (if any) for the Agreement, and recommendations for improvements. The Commission Agreement Manager will determine the appropriate meeting participants.

  The administrative portion of the meeting shall be a discussion with the Commission Agreement Manager and the Grants Officer about the following Agreement closeout items:
  - What to do with any equipment purchased with Energy Commission funds (Options)
  - Energy Commission's request for specific "generated" data (not already provided in Agreement products)
  - Need to document Recipient's disclosure of "subject inventions" developed under the Agreement
  - "Surviving" Agreement provisions
  - Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

Products:

- Written documentation of meeting agreements
- Schedule for completing closeout activities

Task 1.4 Monthly Progress Reports
The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the objectives of this Agreement on time and within budget.
The objectives of this task are to summarize activities performed during the reporting period, to identify activities planned for the next reporting period, to identify issues that may affect performance and expenditures, and to form the basis for determining whether invoices are consistent with work performed.

The Recipient shall:

- Prepare a Monthly Progress Report which summarizes all Agreement activities conducted by the Recipient for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Agreement Manager within 10 days of the end of the reporting period. The recommended specifications for each progress report are contained in Section 6 of the Terms and Conditions of this Agreement.
- In the first Monthly Progress Report and first invoice, document and verify match expenditures and provide a synopsis of project progress, if match funds have been expended or if work funded with match share has occurred after the notice of proposed award but before execution of the grant agreement. If no match funds have been expended or if no work funded with match share has occurred before execution, then state this in the report. All pre-execution match expenditures must conform to the requirements in the Terms and Conditions of this Agreement.

Product:

- Monthly Progress Reports

Task 1.5 Final Report
The goal of the Final Report is to assess the project's success in achieving the Agreement's goals and objectives, advancing science and technology, and providing energy-related and other benefits to California.

The objectives of the Final Report are to clearly and completely describe the project's purpose, approach, activities performed, results, and advancements in science and technology; to present a public assessment of the success of the project as measured by the degree to which goals and objectives were achieved; to make insightful observations based on results obtained; to draw conclusions; and to make recommendations for further projects and improvements to the FTD project management processes.

The Final Report shall be a public document. If the Recipient has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Recipient shall perform the following activities for both the public and confidential versions of the Final Report.

The Recipient shall:

- Prepare an Outline of the Final Report, if requested by the CAM.
- Prepare a Final Report following the latest version of the Final Report guidelines which will be provided by the CAM. The CAM shall provide written comments on the Draft Final Report within fifteen (15) working days of receipt. The Final Report must be completed at least 60 days before the end of the Agreement Term.
- Submit one bound copy of the Final Report with the final invoice.

Products:

- Outline of the Final Report, if requested
- Draft Final Report
- Final Report

Task 1.6 Identify and Obtain Matching Funds

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. Although the Energy Commission budget for this task will be zero dollars, the Recipient may utilize match funds for this task. Match funds shall be spent concurrently or in advance of Energy Commission funds for each task during the term of this Agreement. Match funds must be identified in writing and the associated commitments obtained before the Recipient can incur any costs for which the Recipient will request reimbursement.

The Recipient shall:

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Agreement Manager at least 2 working days prior to the kick-off meeting. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state such in the letter. If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter a list of the match funds that identifies the:
  - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied.
  - Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
- Provide a copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured. For match funds provided by a grant a copy of the executed grant shall be submitted in place of a letter of commitment.
- Discuss match funds and the implications to the Agreement if they are reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide the appropriate information to the Commission Agreement Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Agreement Manager within 10 days if during the course of the Agreement existing match funds are reduced. Reduction in match funds must

be approved through a formal amendment to the Agreement and may trigger an additional CPR meeting.

Products:

- A letter regarding match funds or stating that no match funds are provided
- Copy(ies) of each match fund commitment letter(s) (if applicable)
- Letter(s) for new match funds (if applicable)
- Letter that match funds were reduced (if applicable)

Task 1.7 Identify and Obtain Required Permits

The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.
Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. Although the Energy Commission budget for this task will be zero dollars, the Recipient shall budget match funds for any expected expenditures associated with obtaining permits. Permits must be identified in writing and obtained before the Recipient can make any expenditure for which a permit is required.

The Recipient shall:

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Agreement Manager at least 2 working days prior to the kick-off meeting. If there are no permits required at the start of this Agreement, then state such in the letter. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
  - A list of the permits that identifies the:
    - Type of permit
    - Name, address and telephone number of the permitting jurisdictions or lead agencies
  - The schedule the Recipient will follow in applying for and obtaining these permits.
- Discuss the list of permits and the schedule for obtaining them at the kick-off meeting and develop a timetable for submitting the updated list, schedule and the copies of the permits. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in the Progress Reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, provide the appropriate information on each permit and an updated schedule to the Commission Agreement Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Agreement Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Agreement Manager within 5 working days. Either of these events may trigger an additional CPR.

Products:

- Letter documenting the permits or stating that no permits are required
- A copy of each approved permit (if applicable)

- Updated list of permits as they change during the term of the Agreement (if applicable)
- Updated schedule for acquiring permits as changes occur during the term of the Agreement (if applicable)
- A copy of each final approved permit (if applicable)

Task 1.8 Obtain and Execute Subcontracts
The goal of this task is to ensure quality products and to procure subcontractors required to carry out the tasks under this Agreement consistent with the Agreement Terms and Conditions and the Recipient's own procurement policies and procedures. It will also provide the Energy Commission an opportunity to review the subcontracts to ensure that the tasks are consistent with this Agreement, and that the budgeted expenditures are reasonable and consistent with applicable cost principles.

The Recipient shall:
- Manage and coordinate subcontractor activities.
- Submit a draft of each subcontract required to conduct the work under this Agreement to the Commission Agreement Manager for review.
- Submit a final copy of the executed subcontract.
- If Recipient decides to add new subcontractors, then the Recipient shall notify the CAM.

Products:
- Draft subcontracts
- Final subcontracts

TECHNICAL TASKS

TASK 2 OUTREACH
The goal of this task is to maintain external communication with the public, food and beverage industry, and other entities to enlist support, recruit food waste generators and demonstrate that the biofuel production process is repeatable and scalable for other communities.

The Recipient shall:
- Attend at least 4 relevant conferences or trade association events, and at least 3 community events to present B2B Project progress.
- Develop webpage on City website to provide updates on the B2B Project.

Products:
- List of Outreach Events and Presentation Materials

TASK 3 DIGESTER CONSTRUCTION
The goal of this task is to complete all required work to prepare the construction site, complete construction, and complete startup operations of a new 550,000 gallon anaerobic digester and associated solids handling facilities, based on previously completed design works.

Task 3.1 Construct New Anaerobic Digestion Facilities
The goal of this subtask is to construct a new anaerobic digester with at least 550,000 gallon capacity, and associated facilities.

The Recipient shall:

- Coordinate final design and construction of the anaerobic digester to integrate with the biogas processing unit (Task 5.2) and high-strength waste facilities (Task 6).
- Conduct on-site preliminary activities necessary to allow construction to proceed with new anaerobic digestion facilities, including but not limited to:
  - Perform necessary earthwork and grading.
  - Perform utility coordination.
- Construct the following major components:
  - 550,000 gallon anaerobic digester
  - New heat exchanger, boiler and gravity belt thickener
  - New sludge-cake handling equipment
  - New pipelines, controls, and other ancillary equipment such as digester mixing pumps, Thickened Waste Activated Sludge pumps, and hot water pumps.
- Prepare Written Notification of Construction Completion for new anaerobic digestion facility.
- Prepare statements including but not limited to:
  - Written Notification of Site Readiness for Construction.
  - Written Notification of Substantial Completion.
- Prepare Written Notification of Construction Completion and Operation Start Date for a new anaerobic digester. The Written Notification shall contain the following elements:
  - The date the project achieved operation.
  - A narrative on the current status of the project and initial operations.
  - Any changes made from the project as originally proposed and reasons for those changes.

Products:

- Written Notification of Site Readiness for Construction
- Written Notification of Substantial Completion
- Written Notification of Construction Completion and Operation Start Date

Task 3.2 As-Needed Construction Modifications

The goal of this subtask is to perform as-needed construction modifications to the anaerobic digester to support the biogas processing unit (Task 5.2) and high-strength waste facilities (Task 6).

The Recipient shall:

- Conduct on-site preliminary activities such as engineering assessment of hot water piping system and pipe alignments. Coordinate between digester designer and biogas processing unit designer to allow construction of modifications, as needed.
- Construct modifications, as needed.
- Prepare Written Notification of Construction Completion for modifications, as needed.

Products:

- Written Notification of Construction Completion for modifications or for no modifications

TASK 4 BIOGAS PROCESSING UNIT AND CNG FUELING STATION DESIGN

The goal of this task is to complete all required design work to construct and install the biogas processing equipment, gas conveyance pipelines, and a CNG compressor and fueling station.

[CPR will be held upon completion of this task. See Task 1.2 for details]

Task 4.1 Design New Pipelines

The goal of this subtask is to complete all required design work to re-route the existing pipelines and boilers and to construct new pipelines.

The Recipient shall:

- Develop Design Drawings and Specifications for new pipelines to convey CNG.
- Develop proposed construction timeline from start of construction through operation date for new pipelines to convey CNG.
- Prepare a Written Notification of Readiness to Construct and provide to the CAM.

Products:

- Design Drawings and Specifications
- Written Notification of Readiness to Construct
- Construction Timeline

Task 4.2 Design Biogas Processing Unit

The goal of this subtask is to complete all required design work to construct the biogas processing unit.

The Recipient shall:

- Prepare performance criteria. For example, outflow temperature, pressure, and relative humidity, and the ratio of the contents in product, e.g. methane, carbon dioxide, nitrogen, oxygen, hydrogen sulfide, siloxanes and volatile organic carbons.
- Develop *Design Drawings and Specifications* for biogas processing unit.
- Develop proposed construction timeline from start of construction through operation date.
- Prepare a Written Notification of Readiness to Construct and provide to the CAM.

Products:

- Design Drawings and Specifications
- Written Notification of Readiness to Construct and associated documents
- Construction Timeline

Task 4.3 Design CNG Fueling Station
The goal of this subtask is to complete all required design work to construct a CNG fueling station.

The Recipient shall:

- Prepare performance criteria. For example, daily, weekly and monthly projected demands, fuel delivery requirements (volume of fuel over time), gas quality, fill speed requirements, operation and maintenance needs, service requirements, staffing needs, noise level, liquid and vapor fugitive emissions.
- Develop Design Drawings and Specifications for CNG fueling station.
- Develop proposed construction timeline from start of construction through operation date.
- Prepare a Written Notification of Readiness to Construct and provide to the CAM.

Products:

- Design Drawings and Specifications
- Written Notification of Readiness to Construct and associated documents
- Construction Timeline

TASK 5: BIOGAS PROCESSING UNIT AND CNG FUELING STATION CONSTRUCTION
The goal of this task is to complete all required work to prepare the construction site, complete construction and startup the facilities.

Task 5.1 Construct New Pipelines
The goal of this subtask is to construct new pipelines.

The Recipient shall:

- Conduct on-site preliminary activities necessary to allow construction to proceed with new pipelines.
  - Perform necessary earthwork and grading.
  - Perform utility coordination.
- Construct the new biogas conveyance pipeline.
- Prepare Written Notification of Construction Completion for modifications to existing facilities and new pipelines.
- Prepare statements including but not limited to:
  - Written Notification of Site Readiness for Construction.
  - Written Notification of Substantial Completion.
- Prepare Written Notification of Construction Completion for new pipeline. The Written Notification shall contain the following elements:
  - The date the project achieved operation.
  - A narrative on the current status of the project and initial operations.
  - Any changes made from the project as originally proposed and reasons for those changes.

Products:

- Written Notification of Site Readiness for Construction
- Written Notification of Substantial Completion
- Written Notification of Construction Completion

Task 5.2 Construct Biogas Processing Unit
The goal of this subtask is to construct the biogas processing unit.

The Recipient shall:

- Conduct on-site preliminary activities necessary to allow construction to proceed with the biogas processing unit.
  - Perform any necessary earthwork and grading and pour concrete pad.
  - Perform utility coordination.
- Specify and fabricate a biogas processing unit skid.
- Mount biogas processing unit skid on a concrete pad located adjacent to the digesters and connected to the biogas piping (Task 4.1).
- Perform start-up testing for biogas processing unit.
- Prepare statements including but not limited to:
  - Written Notification of Site Readiness for Construction.
  - Written Notification of Substantial Completion.
- Prepare Written Notification of Construction Completion and Operation Start Date for biogas processing unit. The Written Notification shall contain the following elements:
  - The date the project achieved operation.
  - A narrative on the current status of the project and initial operations.
  - Any changes made from the project as originally proposed and reasons for those changes.

Products:

- Written Notification of Site Readiness for Construction
- Written Notification of Substantial Completion
- Written Notification of Construction Completion and Operation Start Date

Task 5.3 Construct CNG Fueling Station
The goal of this subtask is to construct the CNG fueling station.

The Recipient shall:

- Conduct on-site preliminary activities necessary to construct the CNG fueling station.
  - Perform any necessary earthwork and grading.
  - Perform utility coordination.
- Construct the following major components:
  - Fuel Storage Vessel
  - Inlet Gas Dryer
  - Booster Compressor
  - Fuel Dispensing Station
- Perform start-up testing for CNG fueling station.
- Prepare statements including but not limited to:
  - Written Notification of Site Readiness for Construction.
  - Written Notification of Substantial Completion.
- Prepare Written Notification of Construction Completion and Operation Start Date for CNG fueling station. The Written Notification shall contain the following elements:

- The date the project achieved operation.
- A narrative on the current status of the project and initial operations.
- Any changes made from the project as originally proposed and reasons for those changes.

- Verify the ability to produce at least 75,000 GGE per year of CNG and prepare a statement.

Products:

- Written Notification of Site Readiness for Construction
- Written Notification of Substantial Completion
- Written Notification of Construction Completion and Operation Start Date
- Written verification of ability to produce at least 75,000 GGE per year of CNG.

TASK 6 HIGH-STRENGTH WASTE FACILITIES DESIGN

The goal of this task is to complete all required design work to initiate construction.

[CPR will be held upon completion of this task. See Task 1.2 for details]

Task 6.1 Design New High-Strength Waste Facilities

The goal of this subtask is to complete all required design work to repurpose the existing acid-phase digester to receive high-strength waste (HSW) and convey HSW to the anaerobic digesters.

The Recipient shall:

- Develop design drawings and specifications to repurpose the existing acid-phase digester and associated pipelines, controls, and other ancillary equipment.
- Prepare a Written Notification of Readiness to Construct.

Products:

- Written Notification of Readiness to Construct

Task 6.2 Design New Screw Press and Screw Press Building

The goal of this subtask is to complete all required design work to construct a new screw press and a new screw press building to handle additional biosolids generated through the processing of HSW.

The Recipient shall:

- Develop design drawings and specifications for a screw press, building, and other ancillary equipment.
- Develop proposed construction timeline from start of construction through operation date for screw press.
- Prepare a Written Notification of Readiness to Construct.

Products:

- Written Notification of Readiness to Construct
- Construction Timeline

Task 6.3 Perform Modifications
The goal of this subtask is to perform modifications based on the performance of the anaerobic digester or biogas processing unit of the project or required modifications to support the high strength waste facilities.

The Recipient shall:

- Review operational data to identify any design modifications recommended for the project.
- If design of major modifications are required:
  - Develop design drawings and specifications for recommended modifications.
- Complete modifications.
- Prepare Written Notification of Construction Completion for modifications or for no modifications.

Products:

- Written Notification of Construction Completion for modifications or for no modifications

TASK 7 HIGH STRENGTH WASTE FACILITIES CONSTRUCTION
The goal of this task is to complete all required work to prepare the construction site, complete construction, and startup operations of the high strength waste facilities.

Task 7.1 Construct New High Strength Waste Facilities
The goal of this subtask is to perform construction modifications to the existing acid-phase digester to receive HSW and convey HSW to the anaerobic digesters.

The Recipient shall:

- Conduct on-site preliminary activities necessary to allow construction to proceed with new HSW facilities.
  - Perform necessary earthwork and grading.
  - Perform utility coordination.
  - Perform coordination to integrate with the anaerobic digester and biogas processing unit.
- Construct modifications to the existing acid-phase digester to receive HSW and convey HSW to the anaerobic digesters, and construct associated new pipelines, controls and other ancillary equipment.
- Prepare statements including but not limited to:
  - Written Notification of Site Readiness for Construction.
  - Written Notification of Substantial Completion.
- Prepare Written Notification of Construction Completion and Operation Start Date for new anaerobic digestion facilities. The Written Notification shall contain the following elements:
  - The date the project achieved operation.
  - A narrative on the current status of the project and initial operations.
  - Any changes made from the project as originally proposed and reasons for those changes.

- Verify the ability to produce at least 150,000 GGE per year of CNG and prepare a statement.

Products:

- Written Notification of Site Readiness for Construction
- Written Notification of Substantial Completion
- Written Notification of Construction Completion and Operation Start Date
- Written verification of ability to produce at least 150,000 GGE per year of CNG.

Task 7.2 Construct New Screw Press and Screw Press Building

The goal of this subtask is to construct a new screw press and a new screw press building to handle additional biosolids generated through the processing of HSW.

The Recipient shall:

- Conduct on-site preliminary activities necessary to allow construction to proceed with new screw press and building.
  - Perform necessary earthwork and grading.
  - Perform utility coordination.
  - Perform coordination to integrate with the anaerobic digester and biogas processing unit.
- Prepare statements including but not limited to:
  - Written Notification of Site Readiness for Construction.
  - Written Notification of Substantial Completion.
- Prepare Written Notification of Construction Completion and Operation Start Date for new screw press and building. The Written Notification shall contain the following elements:
  - The date the project achieved operation.
  - A narrative on the current status of the project and initial operations.
  - Any changes made from the project as originally proposed and reasons for those changes.

Products:

- Written Notification of Site Readiness for Construction
- Written Notification of Substantial Completion
- Written Notification of Construction Completion and Operation Start Date

Task 7.3 As-Needed Construction Modifications

The goal of this subtask is to perform as-needed construction modifications to the anaerobic digester and biogas processing unit of the project or required modifications to support the high strength waste facilities.

The Recipient shall:

- Conduct on-site preliminary activities and coordination necessary to allow construction of modifications, as-needed.
- Perform construction modifications, as-needed.
- Prepare Written Notification of Construction Completion for modifications, if any

Products:

- Written Notification of Construction Completion for modifications, if any, or state that no modifications are required.

Task 8 DATA COLLECTION AND ANALYSIS

The goal of this task is to collect operational data from the project, to analyze that data for economic and environmental impacts, and to include the data and analysis in the Final Report.

The Recipient shall:

- Develop data collection test plan.
- Troubleshoot any issues identified.
- Collect 6 months of throughput, usage, and operations data from the project including, but not limited to:
  - Maximum capacity of the new fueling system
  - Gallons of gasoline and/or diesel fuel displaced (with associated mileage information)
  - Expected air emissions reduction, for example:
    - Non-methane hydrocarbons
    - Oxides of nitrogen
    - Non-methane hydrocarbons plus oxides of nitrogen
    - Particulate Matter
    - Formaldehyde
  - Duty cycle of the current fleet and the expected duty cycle of future vehicle acquisitions
  - Specific jobs and economic development resulting from this project
- Identify any current and planned use of renewable energy at the facility.
- Identify the source of the alternative fuel.
- Describe any energy efficiency measures used in the facility that may exceed Title 24 standards in Part 6 of the California Code Regulations.
- Provide data on potential job creation, economic development, and increased state revenue as a result of expected future expansion.
- Provide a quantified estimate of the project's carbon intensity values for life-cycle greenhouse gas emissions.
- Compare any project performance and expectations provided in the proposal to Energy Commission with actual project performance and accomplishments.
- Collect data, information, and analysis described above and include in the Final Report.

Products:

- Data collection information and analysis will be included in the Final Report

State of California **California Natural Resources Agency**

M e m o r a n d u m

To: ARV-15-054, City of Petaluma Biomass-to-Biofuel File **Date:** February 22, 2016

Telephone: CALNET (916) 651-2934

From: Chi-Chung Tsao

Subject: California Environmental Quality Act Analysis for ARV-15-054

I am an Air Pollution Specialist in Fuel and Transportation Division, California Energy Commission. Based on my review of the City of Petaluma's (the "City's") 2002 Final Environmental Impact Report for the Water Recycling Facility and River Access Improvements Project ("EIR"), the City's 2002 Mitigation Monitoring Program and 2016 Revised Mitigation Monitoring Program, and the City's 2016 Addendum to the 2002 EIR, and the proposed agreement including scope of work for proposed Agreement ARV-15-054, it is my opinion that the work to be performed under the proposed agreement will result in no significant environmental impacts. The reasons for my conclusion are as follows.

The proposed project includes three main construction components: (1) high-strength waste facilities including a waste-receiving building and the installation of screw press equipment; (2) a new anaerobic digester with a biogas processing unit for the conversion of biomethane to compressed natural gas ("CNG"); and (3) a CNG fueling station with pipeline. All of the construction and operation will be within the Water Recycling Facility analyzed in the 2016 EIR addendum, and the construction will take place on existing paved areas. The scope of work of the proposed agreement has no omissions from or conflicts of information with the City's 2016 EIR Addendum.

Surface Water Quality:

The project would create approximately 0.26 mgd (million gallons per day) of new recycled water (meeting Federal, State, and regional agencies' standards) which would likely be discharged during the winter and reused during the summer non-discharge season. The quantity of additional water would be small (~ 4% of permitted discharges) and would not significantly affect the water quality. The City of Petaluma's adopted mitigation measures include water quality monitoring and source reduction program which ensure the compilation of the mass emissions limit for the effluent.

Biological Resources:

A newly installed CNG pipeline to the CNG fueling station would be buried in the existing Water Recycling Facility access road or the road shoulder. The CNG fueling station would be located on uplands in the northeast portion of the City's property. The proposed facilities would not affect any jurisdictional wetlands and would not be located within the buffer zones of any sensitive resources. No new special-status species were identified by the California Natural Diversity Database. The City of Petaluma's adopted mitigation measures include aquatic species, rare, threatened and endangered plant, wildlife, active raptor and migratory bird nest, and a rookery/nest protection program which ensure the protection of sensitive species in the disturbed environment and result in no significant environmental impacts.

Traffic:

Construction Traffic:

All major grading on the site was completed during the original construction of the Water Recycling Facility, so no hauling of soil on or off the site will be required. The construction traffic in total is estimated to be, at maximum, 40 round trips per day. There is no significant change in environmental impacts due to construction traffic. The City of Petaluma's adopted mitigation measures include rerouting construction worker trips, which will reduce the local traffic impacts during construction to insignificant levels.

Operation Traffic:

Increased traffic would be approximately 42 new vehicle (hauling truck or bus) round-trips a day added to local roadways accessing the Water Recycling Facility site. There is no significant change in environmental impacts due to operation traffic. The City of Petaluma's adopted mitigation measure includes installing signage to reroute employee and visitor trips, which will reduce the local traffic impacts during operation to insignificant levels.

Air Quality:

The proposed addition of a pump station would not increase local air emissions because it would be electric-powered. The CNG fueling facility would also be subject to State and regional regulations. The project would substantially reduce greenhouse gas emissions through: (1) replacement of diesel fuel with CNG; (2) reduction of vehicle miles traveled by waste haulers; and (3) elimination of flaring of methane at the Water Recycling Facility. Therefore, no new significant air emissions, either for criteria pollutants or toxics, would occur. The adopted mitigation measures include construction air quality controls, permitting and control of toxic air contaminants, and odor control which will minimize criteria emissions and ensure the compilation of regional regulation and national ambient air quality standards, resulting in no significant environmental impacts.

02-0809-2

his notice was posted on AUG - 9 2002
nd will remain posted for a period of thirty days
ntil 09/08/02.

EEVE T. LEWIS, Co. Clerk
BY C. FARIAS
DEPUTY CLERK

NOTICE OF DETERMINATION

To X Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

$850.
C-54168
$35.
C-54169

X County Clerk
County of Sonoma
2300 County Center Drive, Ste# B177
Santa Rosa, CA 95403

From: City of Petaluma
Department of Water Resources
and Conservation
11 English Street
Petaluma, CA 94952

Subject: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code

Project Title: City of Petaluma, California Water Recycling Facility and River Access Improvements Final EIR

State Clearinghouse Number: SCH #: 2001052089
Contact Person: Michael Ban
Phone Number: (707) 778-4487

Project Location: Sonoma County. Decommissioning and demolition of the existing wastewater treatment facilities would occur at 950 Hopper Street, Petaluma. The new water recycling facility and river access improvements would be located in the 4000 block of Lakeville Highway, Petaluma.

Project Description: The City of Petaluma, California proposes to build a new Water Recycling Facility to treat the community's wastewater and replace the existing wastewater treatment facility. The preferred alternative evaluated in the Final EIR is an extended aeration design with wetlands. This design includes a combination of biological and physical processes to remove organic material and pollutants from the wastewater. The facility would provide secondary treatment for an annual average flow of 8 million gallons per day (mgd), up to 4 mgd of tertiary recycled water for urban reuse, biosolids treatment to meet EPA Class B requirements for beneficial reuse, and wetlands for algae removal and effluent polishing. The design also includes a number of public education and recreation features. The existing wastewater treatment facility at 950 Hopper Street, Petaluma, would be decommissioned and demolished.

The City of Petaluma also proposes to build improvements related to river access, recreation and education about recycled water and wetlands. These improvements have been evaluated in the Final EIR at a conceptual or program level.

This is to advise that the **City of Petaluma** has approved the above describe project on
☒ *Lead Agency* ☐ *Responsible Agency*

August 5, 2002 and has made the following determinations regarding the above described projects.
(Date)

1. The project [☒ will ☐ will not] have a significant effect on the environment.
2. ☒ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.

   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA

3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.

is notice was posted on AUG - 9 2002
d will remain posted for a period of thirty days
ntil 09/08/02.

02-0809-

EEVE T. LEWIS, Co. Clerk
BY C. FARIAS
DEPUTY CLERK

4. A Statement of Overriding Considerations [☒ was ☐ was not] adopted for this project.

This is to certify that the final EIR with comments and responses and record of project approval is available to the General Public at

PETALUMA CITY HALL
DEPARTMENT OF WATER RESOURCES AND CONSERVATION
11 ENGLISH STREET
PETALUMA, CALIFORNIA 94952
(707) 778-4487

	8/7/02	Engineering Manager
Signature (Public Agency)	*Date*	*Title*

County of Sonoma
OFFICE OF THE COUNTY CLERK

Receipt #C0054168 08/09/2002 1110

Fee Type: ENVIRON.IMPACT RPT.

Amount $850.00

Tender Type: Check
Check # 23647

Remarks: 02-0809-2
Payer:
CITY OF PETALUMA
11 ENGLISH ST
PETALUMA CA 94953

1079

County of Sonoma
OFFICE OF THE COUNTY CLERK

Receipt #C0054169 08/09/2002 1110

Fee Type: PROCESS FEE

Amount $35.00

Tender Type: Check
Check # 23643

Remarks: 02-0809-2
Payer:
CITY OF PETALUMA

1079

DETACH TOP PORTION BEFORE DEPOSITING

THIS CHECK IS TENDERED IN PAYMENT OF ITEMS LISTED

08-05-2002	$35.00	Notice of Determination-Water Recycle Proj

CITY OF PETALUMA
P.O. BOX 61
PETALUMA, CALIFORNIA 94953
(707) 778-4413

Portions of this form are printed on Recycled Pa

AMOUNT $35.00 VENDOR 00975 CHECK 23643

DETACH TOP PORTION BEFORE DEPOSITING

THIS CHECK IS TENDERED IN PAYMENT OF ITEMS LISTED

08-08-2002	$850.00	Notice of Determination-Fish & Game Fee

CITY OF PETALUMA
P.O. BOX 61
PETALUMA, CALIFORNIA 94953
(707) 778-4413

Portions of this form are printed on Recycled P

AMOUNT $850.00 VENDOR 00975 CHECK 23647

STATE OF CALIFORNIA - THE RESOURCES AGENCY
DEPARTMENT OF FISH AND GAME
ENVIRONMENTAL FILING FEE CASH RECEIPT
DFG 753.5a (6-01)

207751

Lead Agency: City of Petaluma Date: 08/09/02

County / State Agency of Filing: Sonoma County. Document No: 02-0809-2

Project Title: City of Petaluma CA. Water Recycl. Facility and River Access Improvements Proj. EIR.

Project Applicant Name: Petaluma City Hall Phone Number: 778-4487

Project Applicant Address: Dept of Water and Resources 11 English St. Petaluma CA 94952

Project Applicant *(check appropriate box)*: Local Public Agency [X] School District [ ] Other Special District [ ]
State Agency [ ] Private Entity [ ]

CHECK APPLICABLE FEES:

(X) Environmental Impact Report	$850.00	$	850.00
( ) Negative Declaration	$1,250.00	$	
( ) Application Fee Water Diversion *(State Water Resources Control Board Only)*	$850.00	$	
( ) Projects Subject to Certified Regulatory Programs	$850.00	$	
(X) County Administrative Fee	$25.00	$	35.00
( ) Project that is exempt from fees			
	TOTAL RECEIVED	$	885.00

Signature and title of person receiving payment: [signature]

WHITE-PROJECT APPLICANT YELLOW-DFG/FASB PINK-LEAD AGENCY GOLDENROD-STATE AGENCY OF FILING

CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND MARSH ACQUISITION, ENHANCEMENT, AND ACCESS IMPROVEMENTS PROJECT

REVISED MITIGATION MONITORING PROGRAM

SCH # 2001052089

April 16, 2004

Prepared by Parsons

REVISED MITIGATION MONITORING PROGRAM

BACKGROUND

The legal basis for the development and implementation of mitigation measures lies in the California Environmental Quality Act (CEQA). Pursuant to Section 21002 of CEQA, public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. Subsection 21002.1 further requires that each public agency shall mitigate or avoid the significant effects on the environment of projects it approves or carries out whenever it is feasible to do so.

Assembly Bill (AB) 3180 was enacted in 1989 to ensure that required mitigation measures and project alternatives were implemented. AB 3180 specifies the public agency's responsibility to adopt a mitigation monitoring and reporting program:

> SECTION I. Section 21081.6 is added to the Public Resources Code, to read: 21081.6. When making the findings required by subdivision (a) of Section 21081 or when adopting a negative declaration pursuant to paragraph (2) of subdivision (c) of Section 21081, the public agency shall adopt a reporting or monitoring program for the changes to the Project which it has adopted or made a condition of Project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during Project implementation. For those changes which have been required or incorporated into the Project at the request of an agency having jurisdiction by law over natural resources affected by the Project, that agency shall, if so requested by the lead or responsible agency, prepare and submit a proposed reporting or monitoring program.

The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of Project approval in order to mitigate significant effects on the environment.

PURPOSE

This Mitigation Monitoring Program is designed to serve as a tool for the evaluation of Project compliance with mitigation measures accepted from the EIR. The basic objectives of the Mitigation Monitoring Program are to achieve the following:

- To report to the City Council, and the public, information regarding compliance with the EIR mitigation measures; and
- To provide assurance and documentation that the studies and actions called for in the mitigation measures are being performed as planned.

DOCUMENT FORMAT

Compliance with Existing Programs

This document presents the applicable federal, state, regional, county, and local policies and regulations with which the project must comply. Compliance with these policies and regulations will result in avoidance and/or minimization of adverse environmental impacts.

Measures Included in the Project

This document presents a listing and description of measures and standards which have been incorporated into the project design. The City has adopted these measures and incorporated them as part of the project in order to avoid or minimize potential environmental impacts. These measures represent standard engineering, design, construction, and maintenance practices. The process for the development of these measures began during the scoping and early planning phase of the project. Measures were developed to change the project and avoid potential impacts identified by the public and federal, state, and local agencies. Other measures were developed as a result of geotechnical, biological, cultural, and hydrological analysis in order to avoid or minimize potential impacts.

Because these measures are part of the project, they do not qualify under the normal definition of mitigation. However, these measures have been included in this chapter to provide a mechanism to ensure that these measures are implemented and monitored, and to assist the reader in understanding the commitments made by the City of Petaluma.

This document includes measures to be implemented in all phases of the project, including planning and design, construction, operation, and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

Mitigation Measures

This document incorporates mitigation measures recommended in Chapter 4, Environmental Analysis, of the Water Recycling Facility and River Access Improvements EIR (2002) and revisions made in the EIR Addendum (2004). The mitigation measures listed in this document are recommended by the consultant team to avoid or reduce environmental impacts. As described above under Background, the City is required to mitigate impacts whenever it is feasible. Mitigation measures will be adopted by the City at the time of project approval. At that time, the City has the option of approving alternate mitigation measures, if they can be shown to be effective and feasible.

Some of the mitigation measures will only be implemented during the final planning and detailed design of the project. They often require the refinement of the final project design to accommodate particular environmental constraints Other mitigation measures are intended to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Finally, there are mitigation measures to be implemented during operation of the project.

These measures generally require monitoring of operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with all of these measures would result in the reduction of adverse environmental impacts.

ADMINISTRATION

The Director of the Water Resources and Conservation Department and/or his/her designee will be responsible for overall implementation and administration of the Mitigation Monitoring Program. In order to carry out the mitigation monitoring program, the Director will designate a staff person to serve as coordinator among the various agencies and departments. This person (Coordinator) will ensure that each mitigation measure is implemented to the standards specified in the EIR and is completed in a timely manner. If current staffing within the Department cannot absorb the work demand to implement the program, a private contractor will be hired to manage and coordinate the mitigation monitoring and reporting program. The contractor will serve under the direction of the Director.

Administration of the Mitigation Monitoring Program will include the following:

- Documentation of permit approvals by other agencies;
- Compliance with conditions of project approval;
- Routine inspections and reporting activities;
- Plan checks;
- Coordination of activities of consultants hired by the City when such expertise and qualifications are necessary;
- Coordination with applicable agencies that have mitigation monitoring and reporting responsibilities (if any);
- Follow-up and response to citizens' complaints;
- Development of a work plan and schedule for monitoring activities;
- Maintenance of a mitigation monitoring checklist or other suitable mitigation compliance summary;
- Implementation of corrective actions or enforcement measures, as needed;
- Preparation of reports of the status of implementation and monitoring of mitigation measures; and
- Monitoring of financial resources associated with the program.

MITIGATION MEASURE FORMAT

Table 3-1 presents the format for each mitigation measure and the information that each measure will contain.

IMPLEMENTATION

Each responsible individual or agency listed as a "Monitoring Agency" in the Mitigation Monitoring Program will be responsible for determining whether the mitigation measures contained within the monitoring program have been implemented. A Monitoring Agency may submit a Verification Report Form (see page 3-6) or other verification report to the Coordinator that documents compliance with each of the mitigation measures for which they are responsible. Based on the information provided by the reports, the Coordinator will maintain a mitigation monitoring checklist that documents the completion status of all required mitigation measures as shown in Table 3-2. Prior to issuance of grading or building permits, the Coordinator will review the mitigation monitoring program checklist to ensure that the Project design is in compliance with all mitigation measures that are required to be implemented as a condition of the permit.

ENFORCEMENT

If a responsible individual or agency determines that compliance has not been achieved, a written notice shall be delivered to the Director or Coordinator describing the non-compliance and requiring compliance within a specified period of time. If non-compliance still exists at the expiration of the specified period of time, construction may be halted, and/or remedies shall be required, as appropriate and at the discretion of the Director.

APPROVAL AND CHANGES

This Mitigation Monitoring Program is adopted in conjunction with the Final EIR and project approvals for the project. Subsequent changes to the Mitigation Monitoring Program may be approved by the Director if deemed to meet the intent of said mitigation.

VERIFICATION REPORT

Date:_____ Arrival Time:_____ Departure:_____

Location:_____
_____
_____

Construction Sheet No.:_____

Discipline:
- ☐ Archaeology
- ☐ Biology
- ☐ Soils/Geology
- ☐ Other_____
- ☐ Dust/Air Quality
- ☐ Noise

Condition:_____

Compliance: ☐ Acceptable ☐ Unacceptable

- ☐ Delay Activity
- ☐ Remedial Action Implemented
- ☐ Work Stopped
- ☐ Follow-up Conference Required

Activity:_____
_____

Observations:_____
_____

Recommendations:_____
_____

By:_____ Report Approval:_____

Receipt By Project Supervisor:

Signature:_____ Date:_____
Time:_____

Comments/Actions:_____
_____

Copies to:_____

Date Entered to Environmental Monitoring File:_____

By:_____

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
Measures Included in the Project				
PD-1 Uniform Relocation Assistance	City of Petaluma	City of Petaluma		
PD-2 Purchase Locally Grown or Inspected Plants	Design Engineer	City of Petaluma		
PD-3 Liquefaction Protection	Design Engineer	City of Petaluma		
PD-4 Seismic Design to Resist Ground Shaking	Design Engineer	City of Petaluma		
PD-5 Standard Engineering Methods for Expansive Soils	Design Engineer	City of Petaluma		
PD-6 Standard Engineering Methods for Corrosive Soils	Design Engineer	City of Petaluma		
PD-7 Groundwater Monitoring and Management	City of Petaluma	City of Petaluma		
PD-8 Erosion, Stormwater Runoff, and Spill Control Measures	Construction Manager and Design Manager	City of Petaluma & San Francisco Bay RWQCB		
PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons	City of Petaluma	City of Petaluma		
PD-10 Monitor Soil and Groundwater During Demolition/ Construction for Evidence of Hazardous Waste at Hopper Street	Construction Manager	City of Petaluma		
PD-11 Test Suspected and Properly Dispose of Soils and Groundwater at Hopper Street	City of Petaluma	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
PD-12 Inspect and Test for Lead-based Paint and Asbestos Containing Material (ACM) in any Buildings at 950 Hopper Street that will be Demolished	Construction Manager	City of Petaluma		
PD-13 Mosquito Prevention	City of Petaluma	City of Petaluma		
PD-14 Construction Air Quality Controls	Design Engineer	City of Petaluma		
PD-15 Permitting and Control of Toxic Air Contaminants	City of Petaluma	City of Petaluma		
PD-16 Odor Control	Design Engineer and Plant Operator	City of Petaluma		
PD-17 Construction Noise Mitigation Measures	Construction Manager and City of Petaluma	City of Petaluma		
PD-18 Operational Noise Mitigation Measures	Design Engineer	City of Petaluma		
PD-19 Protection of Historic and Archaeological Resources.	City of Petaluma	City of Petaluma		
PD-20 Protection of Previously Undiscovered Historic and Archeological Resources.	Design Engineer and Construction Manager	City of Petaluma		
PD-21 Landscaping Design	Design Engineer	City of Petaluma		
PD-22 Lighting Design	Design Engineer and City of Petaluma	City of Petaluma		
PD-23 Fire Protection	Design Engineer and City of Petaluma	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
Mitigation Measures				
LU-1 Annexation and Change of General Plan Land Use Designation and Zoning	City of Petaluma	City of Petaluma		
GW-1 Drinking Water Well Protection Program	City of Petaluma	City of Petaluma		
WQ-1a Chromium Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1b Nickel Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1c Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1d Constituents not Monitored in Effluent Monitoring and Source Reduction	City of Petaluma	City of Petaluma		
WQ-1e Dioxin/Furan Congener Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
BIO-1a Aquatic Species Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-1b Rare, Threatened and Endangered Plant Protection Program	City of Petaluma	City of Petaluma	Complete Summer 2003	No rare, threatened or endangered plants found during surveys.
BIO-1c Wildlife Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-2a Active Raptor and Migratory Bird Nest Protection Program	City of Petaluma	City of Petaluma and Construction Manager		

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
BIO-2b Rookery Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-7 Create or Restore Wetlands and Waters of the U.S.	City of Petaluma and Design Engineer	City of Petaluma		
TR-1a Reroute Construction Worker Trips	Construction Manager	City of Petaluma		
TR-1b Install Signage to Reroute Employee and Visitor Trips	City of Petaluma	City of Petaluma and Construction Manager		

Source: Parsons Harland Bartholomew & Associates Inc., 1999

COMPLIANCE WITH EXISTING PROGRAMS

This section presents the applicable federal, state, regional, county, and local policies and regulations that the project components are required to comply with. Compliance with these policies and regulations, and future modifications thereof, is required, and will result in avoidance and/or minimization of adverse environmental impacts.

Federal

Archaeological and Historic Data Preservation Act of 1974

California Toxics Rule

Clean Air Act of 1970, amended 1977 and 1990

Clean Water Act of 1977, amending the Water Pollution Control Act

Comprehensive Environmental Response, Compensation and Liability Act of 1980, amended by the Superfund amendment and Reauthorization Act of 1986

Emergency Preparedness and Community Right-to-Know Act

Endangered Species Act of 1973, as amended (FESA)

Migratory Bird Treaty Act of 1918

National Historic Preservation Act of 1966, amended 1976 and 1980, Sections 106 and 110

Resources Conservation and Recovery Act

Rivers and Harbors Act of 1899, Section 10

U.S. EPA's 304(a) Gold Book (Water Quality Criteria)

U.S. EPA Federal Toxics rule

Water Pollution Control Act, as amended by the Clean Water Act of 1977; Section 404

State

Accidental Release Prevention and Hazardous Waste Control Laws

Alquist-Priolo Earthquake Fault Zone Act

California Clean Air Act

California Department of Fish and Game Stream Bed Alteration Agreement (Fish and Game Code Section 1601-1603)

California Department of Fish and Game Wildlife/Hardwood Management Guidelines (Revised 1994)

California Endangered Species Act (CESA) (Fish and Game Code Sec. 2050-2098)

California Government Code, Sec. 65962.5, Hazardous Waste and Substances Sites List (Cortese List

California Health and Safety Code, Sections 2270-2294, Mosquito Abatement

California Health and Safety Code, Section 25500 et seq. - Hazardous Materials Release Response Plans and Inventory

California Native Plant Protection Act (Fish and Game Code Section 1900-1913)

California Occupational Safety and Health Administration (Cal-OSHA)

California Wetlands Conservation Policy 1993

Porter-Cologne Water Quality Control Act

Public Resources Code, Sections 5020-5024 (California Register of Historic Places)

State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy)

State Water Resources Control Board *Antidegradation Policy Implementation for NPDES Permitting (APU 90-004)*

Title 8, California Code of Regulations (CCR), Sec. 25500 *et seq*., Hazardous Material Storage

Title 8, California Code of Regulations (CCR), Sec. 1500-1938, California Construction Safety Regulations

Title 8, California Code of Regulations (CCR), Sec. 1539-1541.1, Excavations

Title 8, California Code of Regulations (CCR), Sec. 1509 & 3203, Injury and Illness Prevention Program

Title 8, California Code of Regulations (CCR), Sec. 1597-1599, Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs

Title 8, California Code of Regulations (CCR), Sec. 5194, Hazard Communication

Title 22, California Code of Regulations (CCR), Sec. 60301 *et seq*., Recycled/Reclaimed Water

Title 22, California Code of Regulations, Section 66260.1 *et seq*. - California Hazardous Waste Regulations

Uniform Building Code (UBC) as amended locally

Water Quality Control Plan for the San Francisco Bay Basin (1995)

Regional

Bay Area Clean Air Plan

Bay Area Air Quality Management District Risk Management Policy

Bay Area Air Quality Management District Rules and Regulations

Sonoma County

Sonoma County General Plan

Sonoma County Tree Ordinance (No. 4014)

Sonoma County Zoning Ordinance

Sonoma County Building Codes

Petaluma

Petaluma General Plan

Petaluma Building and Grading Regulations

Petaluma Zoning Ordinance

Petaluma City Ordinance No. 1856, Heritage & Landmark Trees

MEASURES INCLUDED IN THE PROJECT

This section presents the measures the City decided to incorporate into the project.

PD-1 Uniform Relocation Assistance

Description: To mitigate for the loss of a dwelling unit and disruption of farming operations, the City shall develop and approve a relocation assistance program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies of 1970, which will govern all of the acquisition and displacement actions of the project. The affected property owner and tenants, depending on eligibility, would be afforded various services and forms of compensation in accordance with the provisions of this act.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR and after land acquisition.

Complete: Prior to the start of construction.

Monitoring Agency: City of Petaluma

Validation: Compensation of affected property owners and tenants shall be agreed upon in writing.

PD-2 Purchase Locally Grown or Inspected Plants

Description: The City of Petaluma shall designate that the purchase of all plants for the wetlands and restoration efforts shall be from locally grown stock or from a nursery that has an approved monitoring program for the glassy-winged sharpshooter.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of landscaping or restoration

Monitoring Agency: City of Petaluma

Validation: Specifications for restoration and landscaping contracts

PD-3 Liquefaction Protection

Description: The City shall densify or solidify soil as necessary where site specific conditions are identified that are liquefaction-prone. Overexcavation and replacement of liquefiable soil will be viable for some of the construction. Vibro-replacement or compaction grouting would also be effective, especially in areas of deeper excavation or trenching. Special foundation designs (e.g., pile or structural slab) may be appropriate for structures such as the new structures near existing Pond No. 10. Piles are not required for new facilities in existing Ponds No. 1 and 4.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** Upon certification of the EIR

Complete: At completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract.

PD-4 Seismic Design to Resist Ground Shaking

Description: The City shall take into account the high probability of strong seismic ground shaking, by incorporating design features that accommodate lateral movements and flexibility. Construction of all facilities and earth embankments should meet UBC standards for Seismic Zone 4, Seismic Source Type A, and Seismic Coefficients of 0.44 Na (Ca) and 0.64 Na (Cv). UBC soil profile type for the site is Sd and near source factors for the Rodger's Creek fault are 1.19 (Na) and 1.58 (Nv). New facilities should be designed in accordance with the Sonoma County building codes which incorporate the seismic design for Zone 4 provisions of the 1997 Uniform Building Code.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: DesignEngineer

Timing: **Start:** Upon certification of the EIR

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-5 Standard Engineering Methods for Expansive Soils

Description: The City shall implements standard geotechnical practices for expansive soils, testing according to American Society for Testing and Materials (ASTM) standards, and proper choice of materials shall be required.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** Upon certification of the EIR

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-6 Standard Engineering Methods for Corrosive Soils

Description: The City shall sample soils for corrosivity and remove affected soils. Facilities shall be constructed of materials not susceptible to corrosion or designed to provide corrosion protection.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** Upon certification of the EIR

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-7 Groundwater Monitoring and Management

Description: The City shall monitor groundwater conditions around the site shall be monitored on a regular basis. Sampling of the three monitoring wells bordering the existing facility on the Lakeville site shall be supplemented by the addition of a fourth well, located downgradient from the proposed wetlands area (see Figure 4.4-1). This new well shall be installed and all four wells sampled prior to construction of new facilities. Following construction, the four wells shall be analyzed annually. Samples shall be analyzed for the constituents listed in Table 4.4-1, at a minimum. Additionally any constituents that are detected above the NPDES limits in the facility effluent should be added to the monitoring well analyte list. Monitoring shall include water level measurements. Should any groundwater contamination be determined to be resulting from the facilities, corrective action, such as source control (pretreatment) or additional treatment, shall be taken.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Prior to the start of construction

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report of monitoring results and Technical Memo describing corrective actions.

PD-8 Erosion, Stormwater Runoff, and Spill Control Measures

Description: The City shall develop and implement measures designed to prevent significant construction impacts to water quality. Examples of possible measures include the following:

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
Temporary Soil Stabilization	
SS-1	Scheduling
SS-2	Preservation of Existing Vegetation
SS-3	Hydraulic Mulch
SS-4	Hydroseeding
SS-5	Soil Binders
SS-6	Straw Mulch
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats
SS-8	Wood Mulching
SS-9	Earth Dikes/Drainage Swales & Ditches
SS-10	Outlet Protection/Velocity Dissipation Devices
SS-11	Slope Drains
Temporary Soil Stabilization	
SC-1	Silt Fence
SC-2	Desilting Basin
SC-3	Sediment Trap
SC-4	Check Dam
SC-5	Fiber Rolls
SC-6	Gravel Bag Berm
SC-7	Street Sweeping and Vacuuming
SC-8	Sandbag Barrier
SC-9	Straw Bale Barrier
SC-10	Storm Drain Inlet Protection
Wind Erosion Control	
WE-1	Wind Erosion Control
Tracking Control	
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash
Non-Storm Water Management	
NS-1	Water Conservation Practices
NS-2	Dewatering Operations

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
NS-3	Paving and Grinding Operations
NS-4	Temporary Stream Crossing
NS-5	Clear Water Diversion
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting
NS-7	Potable Water/Irrigation
NS-8	Vehicle and Equipment Cleaning
NS-9	Vehicle and Equipment Fueling
NS-10	Vehicle and Equipment Maintenance
Waste Management and Materials Pollution Control	
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Source: Caltrans 2000.

In addition, stormwater runoff collected on the Parcel A/B treatment facilities site during operation shall be diverted into the wastewater treatment system. Stormwater runoff from the visitors parking lot on Parcel A shall be treated either by diversion into the wastewater treatment system or installation of a retention basin/vegetated swale at the bottom of the lot.

Construction within the Petaluma River or the lower portions of Ellis Creek shall be performed from a barge and with divers when appropriate. Excavation underwater shall be done with pressurized water.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Prior to start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and San Francisco Bay Regional Water Quality Control Board

Validation: Storm Water Pollution Prevention Plan

PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons

Description: The 1994 Phase I Site Assessment at 950 Hopper Street noted that the soil materials beneath the sludge lagoons may contain metals and other substances found in sewage influent. Therefore, the City shall perform a Phase II Site investigation (e.g., collection of soil or groundwater samples) for the lagoons. A State of California certified hazardous waste lab using EPA-approved analytical methods shall perform the laboratory analysis.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of demolition of Hopper Street facilities

Monitoring Agency: City of Petaluma

Validation: Phase II Site Assessment

PD-10 Monitor Soil and Groundwater during Demolition/construction for Evidence of Hazardous Waste at Hopper Street

Description: The City shall include monitoring by the contractor for subsurface contamination in compliance with the California Department of Occupational Safety and Health (Cal/OSH) for all demolition/construction activities related to the demolition at Hopper Street that require excavation or exposure of soil in areas suspected of containing soil or groundwater contamination. This monitoring would, at a minimum, include visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training as required by Cal/OSH for workers engaged in hazardous waste operations.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** At the start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Review of personnel training records to ensure use of appropriately trained personnel.

PD-11 Test Suspected and Properly Dispose of Contaminated Soils and Groundwater at Hopper Street

Description: In areas where contamination of soil and groundwater is suspected or known, the City shall contain groundwater brought to the surface as a result of dewatering in Baker tanks or similar containment devices or immediately dispose of or remediate on site as recommended by the Phase II investigation. At a minimum, this would allow the suspended solids associated with dewatering to settle out before discharge, if discharge is allowable. Depending on the Phase II investigation, and the probability of groundwater being contaminated based on visual or other evidence, samples would be collected and analyzed. A State of California certified hazardous waste laboratory using EPA-approved analytical methods should perform the laboratory analyses. The types of analyses should be based on the likely contaminant(s) and on local permitting requirements.

All potentially contaminated materials encountered during project demolition/construction activities shall be evaluated in the context of applicable local, state and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. All evaluations, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel (having received a minimum of 40 hours HAZWOPER training).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Upon completion of Phase II investigation

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: The City of Petaluma shall ensure the use of qualified hazardous waste personnel, review the results of any hazardous waste analysis, and monitor any necessary containerization program.

PD-12 Inspect and Test for Lead-based Paint and Abestos Containing Material (ACM) Any Buildings at 950 Hopper Street that will be Demolished

Description: The City shall inspect (and test as necessary) all buildings subject to demolition for asbestos containing material (ACM) and lead-based paints. Certified inspectors and consultants shall perform the work (i.e., Cal/OSH certification for asbestos workers and California Department of Health Services certification for lead workers). The City of Petaluma or its demolition contractor shall notify the Bay Area Air Quality Management District before demolition commences if the asbestos survey identifies ACM exceeding the threshold amounts specified in state regulations. Certified contractors shall perform any required remediation.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of demolition

Monitoring Agency: City of Petaluma

Validation: Review personnel certification records and pre-demolition inspection records to ensure compliance and carry out necessary notification and remediation.

PD-13 Mosquito Prevention

Description: The City shall continue consulting with the Marin/Sonoma Mosquito and Vector Control District in designing and developing the wetlands and storage ponds. The City of Petaluma shall comply with the Marin/Sonoma Mosquito and Control District's criteria for mosquito prevention in wastewater reclamation or disposal projects. The District's design and mosquito prevention criteria shall be incorporated into the project's Wetlands Management Program. For example, wetlands that are operated as shallow water areas (less than one foot) should be properly graded to facilitate drainage and ditched to provide access for mosquito fish. Among the District's design recommendations are that ponds should not have small coves or irregularities (although the ponds may be of any shape), that side slopes should be as steep as possible, and that dead algae, vegetation and debris should be routinely removed to minimize mosquito habitat.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of construction

Monitoring Agency: City of Petaluma

Validation: Marin/Sonoma Mosquito and Control District shall review design of wetlands and storage ponds.

PD-14 Construction Air Quality Controls

Description: The BAAQMD considers air quality impacts associated with construction activities to be less than significant, if all applicable control measures recommended in their CEQA guidelines are implemented. The City shall incorporate the following into construction contract specifications:

- Water all active construction areas with the potential to generate significant amounts of dust at least twice daily and more often during windy periods. Watering is the single-most effective measure to control dust emissions from construction sites. Proper watering could reduce dust emissions by over 75%.
- Cover all trucks hauling dirt or maintain at least two feet of freeboard. Dust-proof chutes shall be used as appropriate to load debris onto trucks during any demolition.
- Pave, apply water two times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.
- Hydro seed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas that are inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.
- Limit traffic speeds on any unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Properly maintain construction equipment. This measure could reduce emissions of ROG, NOx and PM10 by about 5%.

- Prior to demolition activities, identify any hazardous building materials or soils that may be disturbed during construction/demolition. If hazardous materials are identified, consult with the BAAQMD's Enforcement Division to ensure that demolition activities will comply with BAAQMD Regulations.

- Optional - Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

- Optional - If necessary, install windbreaks, or plant trees/vegetative windbreaks at the windward side(s) of construction areas.

- Optional - Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph and visible dust emission cannot be prevented from leaving the construction site(s).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** At the start of construction

Complete: Upon the completion of Project construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-15 Permitting and Control of Toxic Air Contaminants

Description: The City shall obtain all necessary permits from the BAAQMD. If necessary, the project shall incorporate control equipment to reduce exposure of the public to insignificant levels. Control measures, such as carbon absorption systems, shall be implemented if necessary to reduce air toxic emissions.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of EIR.

Complete: Prior to start of Project operation.

Monitoring Agency: City of Petaluma

Validation: BAAQMD permits and Technical Memo describing control measures if needed.

PD-16 Odor Control

Description: The City shall ensure proper design and operation of the facilities to reduce the potential for odor complaints. The design and operation of facilities shall ensure conformance with BAAQMD Regulation 7. Ten or more complaints or five or more verified complaints over a 90-day period would indicate that an odor problem with the proposed facility exists. Additional mitigation/abatement measures, such as scrubbers or further oxidation processes, shall be taken to eliminate any substantial odor problems

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and Plant Operator

Timing: **Start:** Upon certification of EIR

Complete: On-going during operation of project

Monitoring Agency: City of Petaluma

Validation: A complaint monitoring program and Technical Memo describing additional abatement measures if required.

PD-17 Construction Noise Mitigation Measures

Description: The City shall incorporate the following conditions in related construction contract agreements:

- Construction Scheduling. Limit noise-generating construction activities, including truck traffic coming to and from the site for any purpose, to daytime, weekday, non-holiday hours (7:00 am to 6:00 pm).
- Construction Equipment Mufflers and Maintenance. Properly muffle and maintain all construction equipment powered by internal combustion engines.
- Idling Prohibitions. Prohibit unnecessary idling of internal combustion engines.
- Equipment Location and Shielding. Locate all stationary noise-generating construction equipment such as air compressors as far as practical from existing nearby residences and other noise-sensitive land uses. Acoustically shield such equipment.
- Quiet Equipment Selection. Select quiet construction equipment, particularly air compressors, whenever possible. Fit motorized equipment with proper mufflers in good working order.
- Noise Disturbance Coordinator. Designate a "noise disturbance coordinator" who will be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager/City of Petaluma

Timing: **Start:** During construction

Complete: At the completion of construction

Monitoring Agency: City of Petaluma

Validation: The City will perform daily checks to ensure compliance with this measure. The City will respond to complaints from private citizens regarding construction noise within 24 hours.

Construction noise shall be monitored at the nearest noise-sensitive receptor locations(s) outside the project boundaries, during high noise generating activity to determine compliance with local noise criteria.

In the event that the noise criteria are exceeded, the construction activities shall be reviewed to determine additional mitigation measures to further reduce the construction noise. The telephone number of the Noise Disturbance Coordinator shall be made available to the residents around the project site so that annoyed residents would be able to report their complaints.

PD-18 Operational Noise Mitigation Measures

Description: As part of the design process the City shall retain an acoustical engineer to ensure that the noise levels produced by mechanical equipment at the Lakeville facility do not exceed County standards. Potential measures may include;

- Acoustical enclosures at noise producing equipment
- Alternative equipment selections with lower noise emissions
- Mufflers for equipment exhaust systems

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** During final design of the proposed Project

Complete: At completion of final design

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-19 Protection of Historic and Archaeological Resources

Description: In order to preserve cultural resources, the City shall perform subsurface testing, evaluation for significance, and/or recordation for the four sites, when avoidance is not feasible. The Hopper Street facility, the communication facility, Site C-757 (to the extent it is located on City property), and the farm complex on Lakeville Highway shall be recorded, mapped, and photographed by a qualified professional architectural historian to Department of Parks and Recreation (DPR) standards on current DPR 523 series forms. The Hopper Street facility shall be evaluated for significance to the NRHP. All site records and evaluation documentation shall be submitted to the State Historic Preservation Office for Section 106 compliance prior to any construction activities on the site.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Completion: Prior to construction

Monitoring Agency: City of Petaluma

Validation: Recordation for the four sites

PD-20 Protection of Previously Undiscovered Historic and Archaeological Resources

Description: If subsurface archaeological or historical remains are discovered during construction, work in the area shall stop immediately and a qualified professional archaeologist shall be consulted to develop, if necessary, further mitigation measures to reduce any archaeological impact to a less than significant level before construction continues.

If human burials are encountered, all work in the area will stop immediately and the Sonoma County coroner's office shall be notified immediately. If the remains are determined to be Native American in origin, both the Native American Heritage Commission and any identified descendants must be notified and recommendations for treatment solicited (CEQA Section 15064.5); Health and Safety Code Section 7050.5; Public Resources Code Section 5097.94 and 5097.98).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and Construction Manager

Timing: **Start:** Upon certification of the EIR

Completion: Completion of construction

Monitoring Agency: City of Petaluma

Validation: A qualified professional archaeologist shall be consulted if subsurface archaeological or historical remains are discovered.

PD-21 Landscaping Design

Description: The City shall provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway. Landscape materials in the form of mature and fast-growing trees (such as the poplars already on site) and other appropriate vegetation at the site's southwestern perimeter would screen the view from northwest-bound travelers. Where technically feasible, locate new facilities on the southwest portion of the site to increase the viewing distance from the highway. Design the landscaping, buildings and facilities in character with the surrounding agricultural uses and subject to site plan and architectural review. If new fencing is necessary along Lakeville Highway, locate new fencing for the wetlands area away from the highway with a landscape buffer between the highway and the fence.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** During construction.

Complete: Within one year of completing construction of a Project component.

Monitoring Agency: City of Petaluma

Validation: Specifications for landscape and restoration contracts

PD-22 Lighting Design

Description: The City shall design lighting for the administration and maintenance buildings, treatment facilities and parking areas to utilize shielded, low-intensity light sources. Locate light sources low and directed away from off-site viewers. Direct personnel to turn lights on only when needed; do not operate exterior lighting continuously or automatically.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and City of Petaluma

Timing: **Start:** Certification of the EIR

Complete: Throughout the life of the project

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract. The design of the lighting will be verified during the review and certification of Final Engineering Drawings. The City will check compliance with installation of the specified lighting and controls during regular inspections of construction. The City will monitor conformance with the operational criteria as part of regular reviews of operation procedures.

PD-23 Fire Protection

Description: The City shall provide sprinklers in new buildings. In addition to the sprinklers, there will be a requirement to install a weather station at the site. This will provide the Fire Department with weather information in the event of any potential release of hazardous chemicals in the future. Fire alarms shall be installed at the site. This will quickly alert employees of fire danger and allow them to evacuate the area.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and City of Petaluma

Timing: **Start**: At start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

MITIGATION MEASURES

This section contains mitigation measures to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Compliance with these mitigation measures would result in minimizing, rectifying, or reducing adverse environmental impacts.

LU-1 Annexation and Change of General Plan Land Use Designation and Zoning

Description: The City shall apply for annexation of Parcels A and B prior to construction of project facilities and change the General Plan Land Use Designation and zoning to a designation that allows allow for public facilities on the site (i.e., Public and Institutional Land Use Designation and General Industrial zone). As part of annexation, the Urban Growth Boundary shall be revised to include Parcels A and B.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After approval of the project

Complete: Prior to the start of construction

Monitoring Agency: City of Petaluma

Validation: Copy of the LAFCO resolution approving annexation.

GW-1 Drinking Water Well Protection Program

Description: The City shall monitor water quality in the nearby drinking water well before and after construction. If changes are detected after construction that are deemed deleterious to public health, one of the following measures, or an equivalent measure, shall be implemented:

- Drill a new well further from the Water Recycling Facility
- Retrofit the existing well, e.g., provide a deeper casing
- Provide wellhead treatment system for the constituents that are causing the public health concern.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring and Technical Memo describing corrective measures if necessary.

WQ-1a Chromium Monitoring and Source Reduction Program

Description: The City shall implement a Chromium Monitoring Program to determine if the concentration of chromium in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of chromium to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of chromium during the discharge season exceed the lowest CTR or Basin Plan criterion for chromium (currently 11 µg/L), the City shall implement a Chromium Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for chromium and will provide for enforcement of these limits. Typical chromium sources are industries involving the following uses of chromium: fabrication of alloys; preparation of alloy steels to enhance corrosion and heat resistance; fabrication of plated products for decoration or increased wear resistance; production of non-ferrous alloys to impart special qualities to the alloys; textile industry use in dyeing, silk treating, printing, and moth proofing wool; leather industry use for tanning; photographic fixing baths; and fuel additives and propellant additives.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Ongoing

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1b Nickel Monitoring and Source Reduction Program Program

Description: The City shall implement a Nickel Monitoring Program to determine if the concentration of nickel in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of nickel to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of nickel exceeds the lowest CTR or Basin Plan criterion for nickel (currently 7.1 µg/L), the City shall implement a Nickel Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for nickel and will provide for enforcement of these limits. Typical nickel sources are manufacturing processes involving the following uses of nickel: plating; for various alloys such as new silver, Chinese silver, German silver; for coins, electrotypes, lightning rod tips, electrical contacts and electrodes, spark plugs, machinery parts; as a catalyst for hydrogenation of organic substances; in the manufacture stainless steels and nickel chrome resistance wire; and for coloring glass.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Ongoing

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1c Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program

Description: The City shall implement a Bis(2-ethylhexyl)phthalate Effluent Monitoring Program to determine if the concentrations of bis(2-ethylhexyl)phthalate in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of bis(2-ethylhexyl)phthalate results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for bis(2-ethylhexyl)phthalate. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1d Constituents not Monitored in Effluent Monitoring and Source Reduction

Description: The City shall implement an Unmeasured Priority Pollutant Monitoring Program to determine if the concentrations of aldrin, 2,3,7,8-TCDD, acrolein, and acrylonitrile in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of any of these compounds results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for that compound. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1e Dioxin/Furan Congener Monitoring and Source Reduction Program

Description: The City shall implement a Dioxin/Furan Congener Monitoring Program to determine if the concentration of dioxin/furan congeners in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of dioxin/furan congeners to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If the TEF normalized concentration of three consecutive samples of a dioxin/furan congener exceeds the lowest CTR or Basin Plan criterion for 2,3,7,8-TCDD (currently 0.014 µg/L) or any future CTR or Basin Plan criterion established for that congener, the City shall implement a Dioxin/Furan Congener Source Reduction Program for non-atmospheric sources of dioxin/furan congeners. Under this program, the City will establish local pretreatment limits for non-atmospheric sources of the dioxin/furan congener and will provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Ongoing

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

BIO-1a Aquatic Species Protection Program

Description: The City shall implement an Aquatic Species Protection Plan, as follows:

- A Worker Environmental Awareness Training Program for construction personnel shall be provided.
- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.
- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.
- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.
- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of 1:1 (1 acres of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers or Regional Water Quality Control Board. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.
- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. As an appropriate example, best management practices are decribed in the *CAltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual*

(November 2000). Refer to PD-8 for a potential list. These shall be implemented as necessary under the supervision of the construction manager. Detailed specifications shall be incorporated onto bid documents and construction drawings.

- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: Before start of construction of the affected area

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

BIO-1b Rare, Threatened and Endangered Plant Protection Program

Description: The City shall retain a qualified biologist to conduct floristically-based surveys for special-status plants in accordance with the CDFG's "Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities" prior to initiation of construction activities. The purpose of these surveys will be to locate and identify any special-status plants that may occur in the proposed construction zone.

If special-status plants are located during the surveys, exclusionary buffer zones (recommend a minimum 20-foot buffer, where feasible) shall be established around each population site. Mesh fencing shall be installed at the boundary of the exclusionary buffer zone prior to initiation of construction activities.

If complete avoidance cannot be achieved, the City shall submit a site-specific mitigation and compensation program for the affected plants in consultation with the CDFG. The mitigation program shall include the results of the surveys, delineation of suitable habitats for restoration or planting of rare species, procedures for obtaining seed before construction, and performance standards for success of the mitigation program. Sufficient areas exist along Ellis Creek and elsewhere on the site to create or restore plant communities if needed.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

BIO-1c Wildlife Protection Program

Description: The City shall implement rules at the public areas on Parcels A and B to require dogs to be leashed at all times. In addition, rules will be established requiring the public to remain on established trails.

Lead Agency: City of Petaluma Water Resources and Conservation Department and City of Petaluma Parks and Recreation Department

Implementing Agency: City of Petaluma

Timing: **Start**: Upon completion of construction

Complete: Throughout the life of the project

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Copy of rules

BIO-2a Active Raptor and Migratory Bird Nest Protection Program

Description: The City shall retain a qualified biologist to conduct pre-construction surveys to determine if any active raptor or migratory bird nests occur within 500 feet of the project area at least two weeks prior to initiation of construction activities.

If active nests are located in the study area, construction exclusion zones shall be established around each active nest. Appropriate construction exclusion zones shall be established through consultation with CDFG. Construction activities shall be prohibited within exclusion zone until the end of the nesting season.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors. The monitor shall also monitor the nest to determine when the young have fledged and submit weekly reports to the CDFG and the City of Petaluma throughout the nesting season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

BIO-2b Rookery Protection Program

Description: A qualified biologist will conduct pre-construction surveys to determine if rookeries or other nests occur within 500 feet of the project area. A construction exclusion zone shall be maintained around each rookery between January 15 and June 15 to ensure that no construction activities occur within 500 feet of an active rookery (personal communication, Wilcox 2001).

If an active rookery is found, a qualified biologist shall monitor the rookery to evaluate potential disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the rookery.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

BIO-7 Create or Restore Wetlands and Waters of the U.S.

Description: The City shall prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. The Plan shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. Mitigation will be on site and in kind, if possible.

Compensatory mitigation for permanent impacts shall be provided at a ratio of 1:1, that is, 1 acres of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers or Regional Water Quality Control Board.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma and Design Engineer

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

TR-1a Reroute Construction Worker Trips

Description: Before 9:00 AM and after 4:00 PM, and after the new access road is constructed, construction workers shall be required to enter and exit Lakeville Highway at McDowell Boulevard.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start**: At start of construction.

Complete: Upon completion of construction.

Monitoring Agency: City of Petaluma

Validation: Specifications in each construction contract

TR-1b Install Signage to Reroute Employee and Visitor Trips

Description:	The City shall install an informational sign on Lakeville Highway just west of the intersection with McDowell Blvd., indicating that the new wetlands park can be accessed by turning right on McDowell Blvd. In addition, the City shall install a sign as visitors leave the wetlands park to prohibit a right turn into Pine View between 4:00 and 6:00 PM on weekdays.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: Upon completion of construction
	Complete: Throughout the life of the project
Monitoring Agency:	City of Petaluma and Construction Manager
Validation:	Copy of signage

city of
Petaluma, California

water recycling

FACILITY AND RIVER ACCESS IMPROVEMENTS

Volume 1

DRAFT

Environmental Impact Report

State Clearing House #2001052089

April 2002

carollo engineers

PET402R2-6069.PSD

CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND RIVER ACCESS IMPROVEMENTS DRAFT ENVIRONMENTAL IMPACT REPORT

VOLUME 1

April 12, 2002

Prepared by Parsons

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1 INTRODUCTION AND SUMMARY

ENVIRONMENTAL REGULATION

Pursuant to the California Environmental Quality Act (CEQA), discretionary decisions by public agencies regarding public projects are subject to environmental review. The purpose of an environmental impact report (EIR) is to identify the significant effects of the project on the environment, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided (Section 21002.1(a)). Each public agency is required to mitigate or avoid the significant effects on the environment of projects it approves or carries out whenever it is feasible.

This Draft EIR has been prepared by the City of Petaluma, California (lead agency) for the Water Recycling Facility and River Access Improvements pursuant to CEQA and the CEQA Guidelines (California Administrative Code Section 15000 *et seq*.). Environmental effects of the project that must be addressed include the significant adverse effects of the project, growth-inducing effects of the project, and significant cumulative effects of past, present, and reasonably anticipated future projects.

This EIR is termed a Subsequent EIR, in that a 1995 EIR also evaluated a similar wastewater treatment facility. This Subsequent EIR may rely on the previous EIR where data are still relevant and up-to-date, but will be a full and complete evaluation of impacts, including all of the required elements of an EIR. This EIR is different from the 1995 EIR in a number of respects:

Table 1-1

Comparison of the 1995 EIR and the 2002 EIR

	1995 Project and EIR	2002 Project and Subsequent EIR
Ownership/operation	Private	Public – City of Petaluma
Level of project definition	Basic	More detailed
Project Elements	All phases of wastewater operations, including treatment, discharge, and disposal of recycled water through new agricultural irrigation and storage reservoirs.	Evaluates wastewater treatment and discharge; no change in existing disposal via agricultural irrigation is included. Also evaluates River Access Improvements at a conceptual level.

Source: Parsons 2002

DESCRIPTION OF EXISTING SYSTEM, THE PROJECT AND ALTERNATIVES

The City of Petaluma provides wastewater treatment for areas within the city limits and for the unincorporated Sonoma County community of Penngrove. Treatment of wastewater occurs at the wastewater treatment facility at 950 Hopper Street and the oxidation ponds at 4400 Lakeville Highway. The treatment facility at Hopper Street does not have adequate capacity for the current and future wastewater flows. Flows up to 6.0 mgd are treated at Hopper Street. The mix of primary and secondary treated effluent is then blended with any raw wastewater flows in excess of 6 mgd and pumped to the oxidation ponds for additional treatment. From May 1 through October 20, treated effluent from the ponds is disinfected and recycled for irrigation of approximately 800 acres of pasture and a portion of the Adobe Creek Golf Course. From approximately October 21 to April 30 treated effluent is disinfected and dechlorinated, and is discharged into the Petaluma River.

The City proposes to demolish the existing facilities at Hopper Street and construct new treatment facilities, capable of producing tertiary treated recycled water, at the existing oxidation pond site at Lakeville Highway. The proposed treatment process uses extended aeration and oxidation ponds. Because algae are generated in the oxidation pond, the system also includes algae removal, which is necessary to meet discharge and reuse requirements. Algae removal is provided by a wetlands treatment system within the existing oxidation pond site. In addition, up to 45 acres northwest of the existing oxidation ponds will be developed into polishing wetlands on the area designated Parcels A and B. These wetlands will treat disinfected secondary effluent and will be open for public access and education. The polishing wetlands will provide further reduction of metals, nutrients and organics. The effluent from the polishing wetlands will be returned to the plant site for reuse or discharge.

Also, the project includes a set of improvements titled River Access Improvements that will provide public recreational and educational amenities on Parcels A and B. These improvements have been formulated at a conceptual level and environmental review is also at a conceptual level.

In addition to the project, the City considered four other treatment alternatives, whose impacts are evaluated in this EIR, in comparison to the project. Some of these alternatives utilize property to the southeast designated Parcel C. The Alternatives are:

- Alternative 1 – Advanced Facultative Ponds: advanced facultative ponds ⇒ oxidations ponds ⇒ wetlands (or DAFs)
- Alternative 2 – Aerated Lagoons: aerated lagoons ⇒ oxidation ponds ⇒ wetlands (or DAFs)
- Alternative 3 – Primary Clarifiers/Ponds: primary clarifiers (with digesters and cogeneration) ⇒ oxidation ponds ⇒ wetlands (or DAFs)

- Alternative 4 – Hopper Street: primary clarifiers (with digesters and cogeneration) and activated sludge at Hopper street ⇒ oxidation ponds at Lakeville Highway ⇒ wetlands (or DAFs) at Lakeville Highway

In addition, the City evaluated three design issues associated with the project and each of the alternatives. These are: Algae Removal Methods, River Access Improvements, Wetlands and Treatment for Metals, Nutrients, and Organics. The alternatives, as well as the three design issues and their related options, are described in more detail in Chapter 5.

PUBLIC AND AGENCY INVOLVEMENT

The City held two Public Scoping Meetings to solicit comments about the issues that should be addressed in the EIR. In preparation for the Public Scoping Meetings, the City prepared an advertisement flyer that was mailed to over 130 interested persons and agencies. Notices were also posted at City Hall and the Petaluma City Library. The Public Scoping Meetings were discussed at a May 21, 2001, Petaluma City Council meeting. City Council meetings are tape recorded and re-played continuously on the Petaluma Community Access cable television station. Additionally, the Press Democrat included an article on the project and the Public Scoping meetings.

The City held the first Public Scoping Meeting for the EIR on June 5, 2001, at the Petaluma Community Center. Two members of the public attended and spoke. On June 19, 2001, the City held a second Scoping Meeting at the Petaluma Community Center. Six members of the public attended and spoke. Written comments were accepted until June 21, 2001. The letters and a summary of the oral comments are presented in the Scoping Report, which was published in August 2001. Overall, 98 scoping comments and five letters were received.

A Notice of Preparation (NOP) and Initial Study were prepared and sent to the State Clearinghouse and interested agencies on May 18, 2001. Four of the letters received during scoping were from agencies who received the NOP. Refer to the Scoping Report for copies of the agency letters.

This Draft EIR was prepared based on input received during scoping, and presents the findings of technical analyses and investigations conducted to determine the potential effects of implementing the proposed project. Technical reports and memoranda supporting these findings are available for review at City offices. The public and reviewing agencies have 45 days to review this Draft EIR and transmit comments or questions to the City of Petaluma. The comment period will close May 29, 2002.

Written questions and comments should be mailed or faxed to:

City of Petaluma
Department of Water Resources and Conservation
11 English Street
Petaluma, CA 94952
Fax: 707-776-3635
Attention: Michael Ban

In addition the public will have the opportunity to comment on the Draft EIR at two public hearings, which are scheduled for May 13 and May 20, 2002 at the Petaluma City Council Chambers, 11 English Street (tentative dates). The meetings will start on or around 7:00 p.m.

USES OF THE DRAFT EIR

This EIR will be considered by the City of Petaluma when they decide whether to proceed with the project and determine those conditions that should be made part of the project. Although the lead agency must consider the information in the EIR, the document's conclusions do not control the lead agency's authority to approve or disapprove a project. A lead agency may approve a project despite its significant adverse impacts if that agency issues two sets of findings. The first set must specifically state how the lead agency has responded to the significant effects identified in the EIR. Secondly, the agency must prepare a "statement of overriding considerations", which sets forth the specific reasons the agency has approved the project despite significant environmental effects. After the City, as lead agency, has certified the EIR and issued the proper findings, the City may approve the project.

Many other agencies have discretionary authority to approve part or all of the project and will rely on the City to produce an EIR adequate for their needs. In addition, the City and other permit-granting agencies must confer with other interested public agencies that do not have approval authority over the project, but which have specific expertise with regard to the project or have responsibility for resources affected by the project. These agencies must use the EIR as the basis for their permit approvals. A list of agencies and approvals is presented in Chapter 2 of this EIR.

BACKGROUND

Petaluma's history of wastewater treatment began in 1938. When City officials decided to construct a facility to treat the community's wastewater, less than 30% of urban wastewater in the United States was treated. There was no federal money available to help local governments solve water pollution control problems. It would be another ten years before Congress passed the Water Pollution Control Act of 1948, which, for the first time, authorized the federal government to provide state and local governments money to address water pollution problems.

The 1938 facility, constructed at 950 Hopper Street, included a digester, two primary trickling filters and two sedimentation tanks. All of the facilities, except the digester, are

still in operation. Adapting to regulatory and community changes, additional facilities were added from the 1950s through the early 1970s and included:

- 1950s: additions to the trickling filter plant included primary digester, final sedimentation tank and final trickling filter;
- 1960s: activated sludge plant, including two aeration basins, an activated sludge final clarifier, an aerobic digester and sludge lagoons;
- 1970s: oxidation ponds at 4400 Lakeville Highway.

Shortly after Petaluma completed construction of an upgrade to the wastewater treatment plant in 1968, two events occurred that prompted the City to begin planning for the next upgrade. First, the City was growing at a higher rate than projected. Second, the Regional Water Quality Control Board adopted the Interim Water Quality Management Plan in 1971, which recommended that all wastewater from Petaluma and southern Sonoma and northern Marin counties be exported to a regional wastewater treatment plant located near San Rafael. To meet the needs of the community, the City considered expanding the existing wastewater treatment facility at Hopper Street, or constructing a new secondary treatment facility south of the City until the sub-regional facilities became operational. The City determined that it would be more cost effective to construct a facility that supported the sub-regional plan. The City decided to construct a new 29 million gallons per day (mgd) pump station at Hopper Street to convey the wastewater to new oxidation ponds to be constructed south of the city, near Lakeville Highway. The oxidation ponds would receive and treat a mixture of treated effluent and untreated wastewater.

Construction of the oxidation ponds began in 1972 and was completed in approximately 1975. The new facility was designed and permitted for a capacity of 5.2 mgd, average dry weather flow (ADWF). The oxidation ponds were constructed recognizing that all wastewater flows in excess of the capacity of the Hopper Street facility would be directly sent to the oxidation ponds for treatment.

Petaluma's wastewater is collected in 200 miles of underground pipe and conveyed to the wastewater treatment facility at 950 Hopper Street. Because of its limited capacity, only flows of 6 mgd and under are treated at 950 Hopper Street. Flows greater than 6 mgd are pumped directly to the oxidation ponds. Effluent from 950 Hopper Street, which consists of approximately 2 mgd primary effluent, 2 mgd trickling filter effluent (secondary treatment) and 2 mgd activated sludge effluent (secondary treatment) is also pumped to the oxidation ponds. The oxidation ponds provide additional treatment and disinfection of the effluent. From November through April the treated effluent is discharged into the Petaluma River. Between the months May through October the treated effluent is recycled for irrigation of approximately 800 acres of agricultural land and for the Adobe Creek Golf Course. The City annually reuses over 2,200 acre-feet (717 million gallons) of recycled water produced by the wastewater treatment facility.

Petaluma's wastewater treatment facility treats wastewater from Petaluma and Penngrove, an unincorporated Sonoma County community north of Petaluma. In 1973 the Regional Water Quality Control Board prohibited the construction of any new septic systems in the Penngrove area due to concerns about the suitability of soils in the area. The Board further prohibited the discharge of wastewater to any and all septic systems in Penngrove effective October 15, 1976. In 1977, the City of Petaluma and Sonoma County executed a Joint Powers Agreement for wastewater facilities in Penngrove. The agreement stipulates that Petaluma will "…accept in its system the wastewater generated within County Service Area 19 (Penngrove) up to a volume amount equivalent to usage by 3,000 persons using standard measuring formulas."

The impetus for procuring a new wastewater treatment facility began in 1988 with an evaluation of the capital improvements needed for operation of the existing wastewater treatment facility on Hopper Street. The evaluation yielded an extensive list of major repairs, including repair and cleaning of the anaerobic digesters, repair of the grit collection and removal system, repair of all clarifiers and biofilters, and repair to the ponds and pond distribution system. In addition to being in need of repair, the facility was also in need of expansion since average dry weather flows had exceeded 75 percent of the 5.2-mgd average dry weather design (and permitted) capacity. The City determined that additional investment in the treatment plant would not be cost-effective and, therefore, decided to implement the minimum repairs necessary to the existing treatment facility (cleaning and rehabilitation of the digesters) and began pursuing a long-term strategy to meet the community's wastewater treatment needs.

In October 1988, the City's contract operator, Envirotech Operating Services (EOS), submitted a proposal to design, build, own, and operate a new wastewater treatment facility to replace the existing facility. The proposal included conducting preliminary treatment at the existing Hopper Street plant site, with construction of a new 10.0-mgd secondary wastewater treatment facility (oxidation ditch followed by secondary clarification) at the oxidation pond site. The secondary treated effluent would be discharged into the aerated lagoon, flow through the oxidation pond system, and then would finally be disinfected in the chlorine contact tank prior to being used for reclamation or being dechlorinated and discharged into the Petaluma River. The proposal did not include tertiary treatment and thus would not have produced tertiary recycled water.

In response to the proposal, the Council questioned whether the City's wastewater treatment needs could be met by modifying the existing treatment facility. This led to preparation of *Facilities Review (EOS, November 1989).* The *Facilities Review* concluded that modifying the existing treatment facility was not cost effective.

The Review recommended that the existing treatment facility be abandoned, with the exception of the Pond Influent Pump Station, and that a new wastewater treatment facility be constructed at the oxidation pond site using the oxidation ditch system.

The *Facilities Review* was followed up by a City report in April 1990, which concluded that by proceeding with a design, build, operate, and private ownership approach, "the

City can be reassured that the facility will be constructed in a timely fashion and at a cost affordable to the City's rate payers." The report recommended that the City enter into a Memorandum of Understanding (MOU) with EOS for the design, construction, operation, and ownership (20 years) of a new wastewater treatment facility to be located at the oxidation pond site. On April 29, 1991, the City Council adopted Resolution No. 91-107, which authorized execution of an MOU with EOS for provision of a new wastewater treatment facility.

The California Public Utilities Commission regulates privately owned wastewater treatment facilities. On July 31, 1991, EOS submitted an application to the Commission seeking an exemption from regulations under the California Local Government Privatization Act of 1985. On October 21, 1991, Administrative Law Judge Ramsey ordered that "the application is denied without prejudice to refiling after amendment."

In February 1992, EOS and the City mutually agreed to rescind the MOU.

In an effort to educate and encourage the community's participation in the decision-making process, the City sponsored a series of eight public workshops. The workshops were conducted at the Community Center and were lead by Dr. George Tchobanoglous of the University of California, Davis. Dr. Tchobanoglous has served as a consultant to the City on several wastewater related issues and is a leading expert in the field of wastewater treatment. Each workshop focused on a specific set of topics, including:

- Workshops 1 and 2 -- Introduction and Background
- Workshops 3 and 4 -- Technology/Capacity
- Workshop 5 -- Financing and Rates
- Workshops 6 and 7 -- Review and Conclusions
- Workshop 8 -- Privatization

The first step towards procurement of proposals for the project was the issuance of a Request for Statements of Qualifications. In September 1992, the City Council adopted Resolution No. 92-247, approving the Request for Statements of Qualifications for the provision of a "turnkey" design, construction, and contract operations of a new wastewater treatment facility. Proposals that included financing and/or private ownership options were also welcomed.

The Request for Statements of Qualifications (SOQ) was issued to over 80 engineering design firms, construction companies, operations and maintenance companies, and interested persons. In response, the City received SOQs from nine vendor teams. The City and Citizens' Wastewater Advisory Committee evaluated the SOQs, and the following five vendor teams were short-listed:

- James M. Montgomery Operations Services, Inc. (later Montgomery United Water)

- Petaluma Clean Consortium
- Petaluma Community Wastewater Service Company
- Professional Services Group, Inc.
- Wheelabrator Clean Water Systems, Inc. (later US Filter/EOS)

The City initiated preparation of an Environmental Impact Report (EIR) for the new wastewater treatment facility in December 1992. At this time, only the siting of the project was certain. The type of treatment to be used was unknown (and would remain unknown until the proposals were received in January 1998). In July and August 1993, the City sponsored two public environmental scoping workshops. The objective of the workshops was to present information and receive comments on the results of a constraints and opportunities analysis conducted on the proposed wastewater treatment facility, and the definition of the proposed project and project alternatives. The Draft EIR was completed in December 1994 and submitted to the Planning Commission. Subsequent to conducting public hearings, the Planning Commission directed that additional information and new alternatives be evaluated prior to forwarding the EIR to the City Council.

In 1994, the City commissioned Ernst and Young to assess and compare the relative implications of three options being considered by the City for procurement of a new wastewater treatment facility:

- Traditional Approach. The City would finance and own the facility, contracting with separate firms for the design, construction management, and operation of the proposed new wastewater treatment facility. The construction contract would be publicly bid.
- Facility Agreement Approach. The City would contract out design, construction management, and operations to a single consortium from among the five short-listed vendors. The construction contract would be publicly bid.
- Service Agreement Approach. Design, construction, operations, ownership, and possibly financing would be by a private consortium from among the five short-listed vendors.

On June 20, 1994, the City Council adopted Resolution No. 94-156, which directed that the “service agreement approach” be utilized for procurement of a new wastewater treatment facility. The City Council also adopted Resolution No. 94-157, which established the methodology for evaluating proposals for the wastewater treatment facility project.

In response to Planning Commission direction on the Draft EIR, and in an effort to address issues raised during review of the Draft EIR and additional alternatives for the project as described in the Project Report, the Revised Draft EIR was prepared and

completed in August 1995 (Brown and Caldwell, Jones & Stokes Associates, Inc. August 1995). On November 27, 1995, the City Council held a study session during which the findings of the Revised Draft EIR were discussed and the findings of the Project Report were presented. The Final EIR and Response to Comments were completed in December 1995. Additional public hearings were held on February 12, and March 25, 1996. The public hearing was officially closed on March 25, 1996. However, because of citizen interest, the City Council authorized follow-up public meetings on April 17, and May 8, 1996.

On June 17, 1996, the City Council certified the Final EIR documents under Resolution No. 96-163. The Council also adopted Resolution No. 96-164, which approved the Project, and Resolution No. 96-165, which approved and authorized issuance of the Request For Proposals (RFP). The RFP was issued to five preselected teams on July 17, 1996.

In response to the RFP, the City received proposals from Montgomery United Water (MUW) and Wheelabrator EOS (later U.S. Filter/EOS) in January 1997. The City Council initiated consideration of the proposals with a series of public meetings in September 1997. The proposals were again considered by the Council at a study session on December 8, and at a regular council meeting on December 15, 1997. On January 5, 1998, the City Council adopted Resolution No. 98-11, which gave authorization to select Montgomery United Water (MUW) for contract negotiations for the wastewater treatment facilities project. Negotiations commenced on January 27, 1998.

Negotiations with MUW proceeded from January through September 1998. Agreement negotiations involved many revisions and discussions on contract language and requirements. Numerous discussions centered on issues such as the definition of Force Majeure, inflation adjustments to components of service fee, City review and approval of design, prohibition of service to third parties at the Project Site, service fee payments during periods of non-performance, proper and continued maintenance of the new wastewater treatment facility and equipment, indemnification, tax ownership, fair market value of the facility after 30 years, and dispute resolution. Negotiations on technical issues proceeded simultaneously.

The privatization effort had not included development of a publicly owned wastewater treatment facility to serve as a benchmark for comparison with MUW's proposed privately owned facility. The Local Government Privatization Act of 1985 requires this comparison. In recognition of the need for the development of a publicly owned alternative, the City Council, with the recommendation of the City Manager, approved preparation of a master plan for the new wastewater treatment facility on September 21, 1998. Negotiations with MUW were temporarily suspended pending completion of the master plan. In spring 1999, with the master plan nearly complete, MUW and the City resumed negotiations on the privatization agreement and technical issues.

The City Council considered the master plan's recommended project on June 7, 1999, and the privatization project on June 14, 1999. On July 19, 1999, the City Council considered the following alternatives:

- Alternative 1 – Continue and complete negotiations with Montgomery United Water for a privately owned wastewater treatment facility;

- Alternative 2 – Develop publicly owned wastewater treatment facility; or

- Alternative 3 – Other alternatives as further developed pursuant to policy deliberations by the City Council

On July 19, 1999, the City Council determined that the City would no longer pursue development of a privately owned wastewater treatment facility and that the new facility would be publicly owned. The City Council formalized this action with adoption, on September 21, 1999, of Resolution No. 99-188, which terminated the privatization process and established City ownership of new wastewater treatment facility.

In October 1999, after the City terminated the privatization process, the City solicited proposals from engineering firms to review the Master Plan's proposed project and identify alternatives. In April 2000, the City selected Carollo Engineers to perform this review. In December 2000, the Petaluma City Council selected the extended aeration treatment with wetlands alternative as the preferred alternative for the project based on the results of the review (*Project Report*, November 2000). Carollo Engineers developed the extended aeration alternative in greater detail for predesign and made further refinements to the alternative, particularly in regard to the wetlands. In January 2002, the Petaluma City Council considered the recommendations of the predesign report and approved preparation of the EIR on the preferred alternative of extended aeration with wetlands developed in predesign (*Predesign Report*, February 2002). Carollo Engineers will next complete the design development phase of the project and, with the assistance of Parsons, prepare the environmental documentation for the project.

AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

The CEQA Guidelines (Section 15123(b)(2)) require the summary section of an EIR to identify areas of controversy or expressed concern known to the Lead Agency, including issues raised by agencies and the public. Issues of concern raised by regional and local agencies and the public were identified through written responses received on the Notices of Preparation and through comments made at the scoping meetings. These comment letters and oral comments made at the meetings are presented in the Scoping Report for the project. Areas of concern that were raised about the project include:

- Effect on historic and archaeological sites
- Aesthetic impacts of new facilities
- Loss of farmland
- Potential hazardous materials releases associated with demolition of Hopper Street facilities
- Odor from treatment facilities and wetlands
- Loss of wildlife habitat
- Seismic safety of ponds
- Off-site seepage from ponds and wetlands

- Risks of hazardous materials transport
- Construction-period water quality impacts
- Construction traffic noise impacts
- Growth-inducing impacts
- Potential for loss of housing
- Traffic impacts from truck traffic
- Solid waste impacts
- Air quality conformity
- Air quality impacts of chlorination
- Effects on wetlands along the Petaluma River and associated permitting requirements
- Land use impacts of the wetlands

IMPACT AND MITIGATION SUMMARY

Table 1-2 at the end of this chapter provides a summary of the impacts, cumulative impacts, and mitigation measures that are discussed in detail in Chapter 4. Cumulative impacts are identified by a "C" before the numeric impact designation (i.e., BIO-C1). The impacts and mitigation measures are identified in one of three categories:

- Significant - Impact is significant before mitigation; some of these significant impacts can be mitigated to a less than significant level, but others remain significant after mitigation.

- Less than Significant - Impact is not considered significant and no mitigation is required.

- No Impact - The project has no effect on the resource described in the criterion.

SUMMARY OF CEQA - REQUIRED SECTIONS

Growth-Inducing Impacts

The project is considered growth-inducing because it would provide necessary public utility infrastructure for the growth projected in the General Plans of the City of Petaluma and County of Sonoma (regarding the community of Penngrove). Both general plans contain policies that address management of growth and mitigate significant impacts of growth.

Significant and Unavoidable Adverse Impacts

Although the project has the potential to result in a number of significant environmental impacts, most can be avoided through the adoption of appropriate mitigation measures that will reduce those effects to a less-than-significant level. However, one significant unavoidable impact of the project remains:

- Impact **AG-1**: Loss of approximately 149 acres of farmland on Parcels A and B

This impact is also considered cumulatively significant. Mitigation Measure AG-1 has been proposed that keeps approximately 79 acres of farmland in production on Parcels A and B; in doing so, however, some butterfly habitat and trails would need to be removed from the project. Even with this mitigation, the project would still cause significant and unavoidable impacts to farmland.

If the City decides to implement the project, either with or without Mitigation Measure AG-1, a statement of overriding considerations should be adopted, explaining why the polishing wetlands and public educational and recreational facilities were adopted as part of the project despite their significant impact on farmland.

Environmentally Superior Alternative

The No Project Alternative would have greater impacts than the project, because it would have significant water quality impacts. If no project were approved, then no upgrades would occur to the existing wastewater treatment plant, and significant water quality impacts could be expected as the growth identified in the approved general plans happens. The No Project Alternative, therefore, does not qualify as the environmentally superior alternative.

The remainder of the alternatives are differentiated by their impacts to farmland and wetlands. The alternatives that utilize Parcel C, Alternatives 1 (Advanced Facultative Ponds), 2 (Aerated Lagoons), and 3 (Primary Clarifiers/Ponds), have greater impacts to farmland and potentially greater impacts on wetlands. Alternative 4 (Hopper Street) and the project do not require development on Parcel C and would have basically the same impacts relative to farmland and wetlands. Alternative 4, Hopper Street, and the proposed project, Extended Aeration, would have similar levels of environmental impacts and therefore both qualify as the Environmentally Superior Alternative.

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
1. Land Use			
LU-1. Will the project be inconsistent with the land use plan map of an adopted General Plan?	Less than Significant	No mitigation is necessary.	Less than Significant
LU-2. Will the project be inconsistent with zoning?	Less than Significant	No mitigation is necessary.	Less than Significant
LU-3. Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	No Impact	No mitigation is necessary.	No Impact
LU-4. Will the project introduce inappropriate uses in a Community Separator?	No Impact	No mitigation is necessary.	No Impact
LU-5. Will the project increase potential for conflict as a result of incompatible land uses?	Less than Significant	No mitigation is necessary.	Less than Significant
LU-6. Will the project convert non-urban land to urban uses for Project facilities?	Less than Significant	No mitigation is necessary.	Less than Significant
LU-7. Will the project convert public open space for Project facilities?	No Impact	No mitigation is necessary.	No Impact
LU-8. Will the project result in loss of homes due to construction of facilities?	Less than Significant	No mitigation is necessary.	Less than Significant
LU-C1: Will the project have a cumulative potential to disturb land uses?	Less than Significant	No mitigation is necessary.	Less than Significant
2. Agriculture			
AG-1. Will the project cause loss of farmland?	Significant	AG-1. Maintain Maximum Acreage of Agricultural Production	Significant
AG-2. Will the project cause Williamson Act contracts to be canceled?	No Impact	No mitigation is necessary.	No Impact
AG-3. Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Less than Significant	No mitigation is necessary.	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
AG-C1. Will the project have cumulative impacts to agriculture?	Significant	AG-1. Maintain Maximum Acreage of Agricultural Production	Significant
3. Geology, Soils and Seismicity			
GS-1. Will project facilities be located within an area of unstable slope conditions?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-2. Will project facilities be subject to ground rupture due to location near a surface trace of an active fault?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-3. Will project facilities be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-4. Will earthquake-induced strong ground shaking damage project facilities?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-5. Will construction of the project cause off-site water-related erosion?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-6. Will project facilities be exposed to damage due to expansive soils?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-7. Will project facilities be exposed to damage due to construction on corrosive soils?	Less than Significant	No mitigation is necessary.	Less than Significant
GS-C1: Will the project have a cumulative potential for geologic or seismic impacts?	Less than Significant	No mitigation is necessary.	Less than Significant
4. Groundwater			
GW-1. Will the project degrade groundwater quality at existing drinking water wells, resulting in a public health hazard?	Significant	GW-1. Drinking Water Well Protection Program	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
GW-2. Will the project cause groundwater mounding or increase groundwater levels that cause surface discharge in a non-stream environment?	Less than Significant	No mitigation is necessary.	Less than Significant
GW-3. Will the project lower groundwater levels at existing wells?	No Impact	No mitigation is necessary.	No Impact
GW-C1: Will the project have a potential for cumulative groundwater impacts?	Less than Significant	No mitigation is necessary.	Less than Significant
5. Surface Water Quality			
WQ-1. Will the project discharge cause numeric-based criteria to be exceeded?	Significant	WQ-1a. Chromium Monitoring and Source Reduction Program WQ-1b. Nickel Monitoring and Source Reduction Program WQ-1c. Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program WQ-1d. Constituents not Monitored in Effluent Monitoring WQ-1e. Dioxin/Furan Congener Monitoring and Source Reduction Program	Less than Significant
WQ-2. Will the project cause narrative-based criteria to be exceeded.	Significant	WQ-1e. Dioxin/Furan Congener Monitoring and Source Reduction Program	Less than Significant
WQ-3: Will project construction result in a substantial degradation of surface runoff quality?	Less than Significant	No mitigation is necessary.	Less than Significant
WQ-C1: Will the project have a cumulative potential to cause numeric or narrative-based criteria to be exceeded?	Less than Significant	No mitigation is necessary.	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
6. Hydrology			
H-1. Will the project discharge cause flooding anywhere along the Petaluma River?	Less than Significant	No mitigation is necessary.	Less than Significant
H-2. Will the project discharge cause streambank erosion in the Petaluma River?	Less than Significant	No mitigation is necessary.	Less than Significant
H-3. Will non-discharge project components cause flooding?	Less than Significant	No mitigation is necessary.	Less than Significant
H-4. Will non-discharge project components cause streambank erosion?	Less than Significant	No mitigation is necessary.	Less than Significant
H-C1: Will the project have a cumulative potential to cause flooding or erosion?	Less than Significant	No mitigation is necessary.	Less than Significant
7. Public Health and Safety			
PHS-1. Will the project expose the public to chemicals, radionuclides, pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?	Less than Significant	No mitigation is necessary.	Less than Significant
PHS-2. Will the project expose workers or the public to hazards from a known hazardous waste site?	Less than Significant	No mitigation is necessary.	Less than Significant
PHS-3. Will the project increase potential exposure of the public to hazardous materials due to a chemical release?	Less than Significant	No mitigation is necessary.	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
PHS-4. Will the project expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Less than Significant	No mitigation is necessary.	Less than Significant
PHS-5. Will the project increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	Less than Significant	No mitigation is necessary.	Less than Significant
PHS-C1: Will the project have a cumulative impact on public health and safety?	Less than Significant	No mitigation is necessary.	Less than Significant
8. Biological Resources			
BIO-1. Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?	Significant	BIO-1a. Aquatic Species Protection program. BIO-1b. Threatened and Endangered Plant Protection Program. BIO-1c. Wildlife Protection Program	Less than Significant
BIO-2. Will the project cause loss of active raptor nest, migratory bird nests, or wildlife nursery sites?	Significant	BIO-2a. Active Raptor and Migratory Bird Nest Protection Program. BIO-2b. Rookery Protection Program.	Less than Significant
BIO-3. Will the project cause permanent loss of sensitive wildlife habitat?	Less than Significant	No mitigation is necessary	Less than Significant
BIO-4. Will the project cause permanent loss of sensitive native plant communities?	Significant	BIO-4. Prepare a Riparian Census and Conceptual Riparian Mitigation Plan.	Less than Significant
BIO-5. Will the project substantially block or disrupt major fish or wildlife migration or travel corridors?	Significant	BIO-1a. Aquatic Species Protection Program BIO-4. Prepare a Riparian Census and Conceptual Riparian Mitigation Plan	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
BIO-6. Will the project cause permanent loss of aquatic habitat (i.e., streams)?	Significant	BIO-1a: Aquatic Species Protection Program	Less than Significant
BIO-7. Will the project destroy wetlands or other waters of the U.S.?	Significant	BIO-7: Create or Restore Wetlands and Waters of the U.S.	Less than Significant
BIO-8. Will the project expose organisms to hazardous levels of toxic or bioaccumulatory substances?	Significant	WQ-1e: Dioxin/Furan Congener Monitoring and Source Reduction	Less than Significant
BIO-C1. Will the project have cumulative impacts to biological resources?	Less than Significant	No mitigation is necessary.	Less than Significant
9. Traffic and Circulation			
TR-1. Will project traffic cause congestion along study area roadways?	Significant	TR-1a Reroute construction worker trips TR-1b Install Signage to Reroute Employee and Visitor Trips	Less than Significant
TR-2. Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?	Less than Significant	No mitigation is necessary.	Less than Significant
TR-3. Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Less than Significant	No mitigation is necessary.	Less than Significant
TR-4. Will project construction traffic damage public or private roadbeds?	Less than Significant	No mitigation is necessary.	Less than Significant
TR-5. Will there be inadequate parking for project activities?	Less than Significant	No mitigation is necessary.	Less than Significant
TR-6. Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Less than Significant	No mitigation is necessary.	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
TR-C1: Will there be traffic congestion along srudy area roadways during the cumulative conditions?	Less than Significant	No mitigation is necessary.	Less than Significant
10. Air Quality			
AQ-1. Will construction of the Project generate emissions that expose people to high levels of dust and equipment exhaust?	Less than Significant	No mitigation is necessary.	Less than Significant
AQ-2. Will project emissions cumulatively exceed allowable limits?	Less than Significant	No mitigation is necessary.	Less than Significant
AQ-3. Will the project expose sensitive receptors to substantial levels of toxic air contaminants?	Less than Significant	No mitigation is necessary.	Less than Significant
AQ-4. Will project violate or contribute to violation of ambient air quality standard?	Less than Significant	No mitigation is necessary.	Less than Significant
AQ-5. Will the project cause potential odors?	Less than Significant	No mitigation is necessary.	Less than Significant
AQ-C1: Will the project have the potential to have a cumulative impact to air quality?	Less than Significant	No mitigation is necessary.	Less than Significant
11. Noise			
N-1: Will construction of the Project expose the public to high noise levels?	Less than Significant	No mitigation is necessary.	Less than Significant
N-2. Will construction of the Project cause high noise levels from construction traffic?	Less than Significant	No mitigation is necessary.	Less than Significant
N-3: Will operation and maintenance of the project expose the public to high noise levels?	Less than Significant	No mitigation is necessary.	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-mitigation Significance	Mitigation Measure	Post-mitigation Significance
N-C1: Will the project have a cumulative potential to disturb noise-sensitive receptors during or after construction?	Less than Significant	No mitigation is necessary.	Less than Significant
12. Cultural Resources			
CR-1. Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/ traditional heritage resources?	Less than Significant	No mitigation is necessary.	Less than Significant
CR-2. Will the project disturb unknown archaeological resources?	Less than Significant	No mitigation is necessary.	Less than Significant
CR-C1: Will the project have a cumulative potential to disturb historical or cultural resources?	Less than Significant	No mitigation is necessary.	Less than Significant
13. Visual Resources			
VR-1. Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?	No impact	No mitigation is necessary.	No impact

Table 1-2

Impact and Mitigation Summary

Impact	Pre-Mitigation Significance	Mitigation Measure	Post-Mitigation Significance
VR-2. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?	No impact	No mitigation is necessary.	No impact
VR-3. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Corridors?	Less than Significant	No mitigation is necessary.	Less than Significant
VR-4. Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?	No impact	No mitigation is necessary.	No impact
VR-5. Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?	Less than Significant	No mitigation is necessary.	Less than Significant
VR-6. Will the project cause an adverse effect on foreground views from one or more private residences	Less than Significant	No mitigation is necessary.	Less than Significant
VR-7. Will the project create a new light source?	Less than Significant	No mitigation is necessary.	Less than Significant
VR-C1: Will the project have a cumulative potential to disturb open space or visual resources?	Less than Significant	No mitigation is necessary.	Less than Significant

Table 1-2

Impact and Mitigation Summary

Impact	Pre-Mitigation Significance	Mitigation Measure	Post-Mitigation Significance
14. Public Services and Utilities			
PS-1. Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?	Less than Significant	No mitigation is necessary.	Less than Significant
PS-2. Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	No Impact	No mitigation is necessary.	No Impact
PS-C1: Will the project have a cumulative potential to impact public services and utilities?	Less than Significant	No mitigation is necessary.	Less than Significant

Source: Parsons 2002

2 PROJECT DESCRIPTION

PROJECT LOCATION

The City of Petaluma's existing wastewater treatment facilities are currently located at two sites:

- The wastewater treatment facility at 950 Hopper Street; and
- The oxidation ponds at 4400 Lakeville Highway.

Figure 2-1 shows the vicinity of the project and Figure 2-2 shows the locations of these two facilities. Under the project, facilities at Hopper Street would be demolished and facilities would be constructed and modified at the Lakeville Highway site. Lands adjacent to the pond site at Lakeville Highway are also proposed to be included in the project for polishing wetlands and river access improvements and are shown in Figure 2-2. The City's existing facilities are within the City of Petaluma, but adjacent lands proposed for polishing wetlands are outside the city limits in Sonoma County on parcels (designated Parcels A and B) located northwest of the existing oxidation ponds. The City currently discharges treated wastewater through an outfall on the Petaluma River, and the location of this outfall would not change. Figure 2-3 shows the existing Lakeville Highway oxidation pond site.

PROJECT OBJECTIVES

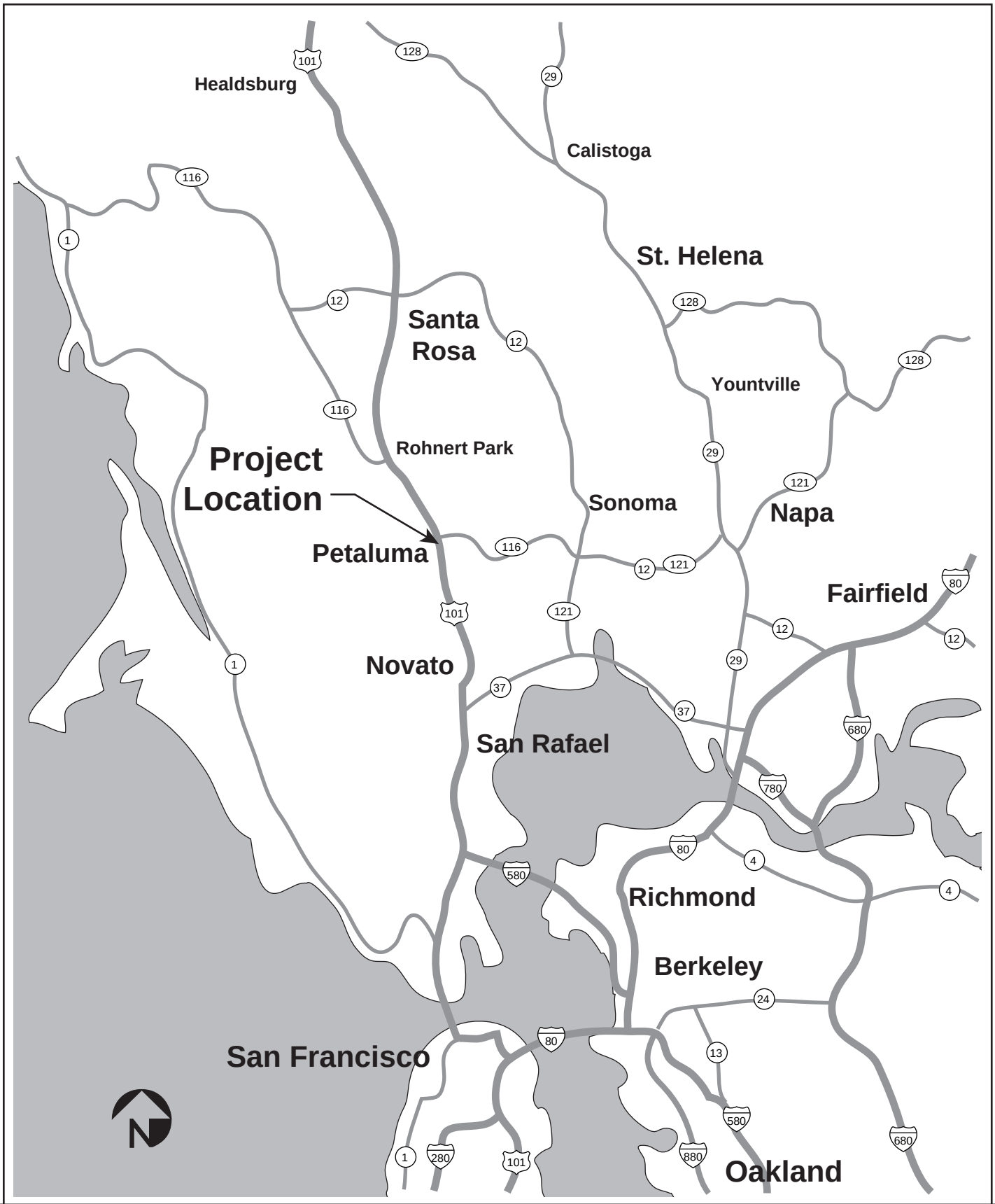
The City of Petaluma proposes to construct a Water Recycling Facility to meet the following objectives:

- To develop an economically and ecologically sustainable Water Recycling Facility to accommodate growth and development anticipated by the City's General Plan. The buildout population for Petaluma and Penngrove is estimated to be 70,650, requiring treatment of 6.7 mgd during average dry weather flow (ADWF).

- To comply with Federal, State and regional air and water quality regulations through appropriate design and operation of the Water Recycling Facility. Reliability and redundancy features will be included to be able to meet applicable regulations consistently.

- To replace or upgrade the existing wastewater treatment facility that is operating near its capacity and the end of its useful life.

- To protect the water quality of the Petaluma River and the San Francisco Bay by continuing to conduct wastewater treatment in an environmentally sensitive manner. The Water Recycling Facility will include the additional steps of ammonia removal to reduce the risk of ammonia toxicity in the river and polishing wetlands to reduce effluent concentrations of metals, organics, and nutrients.

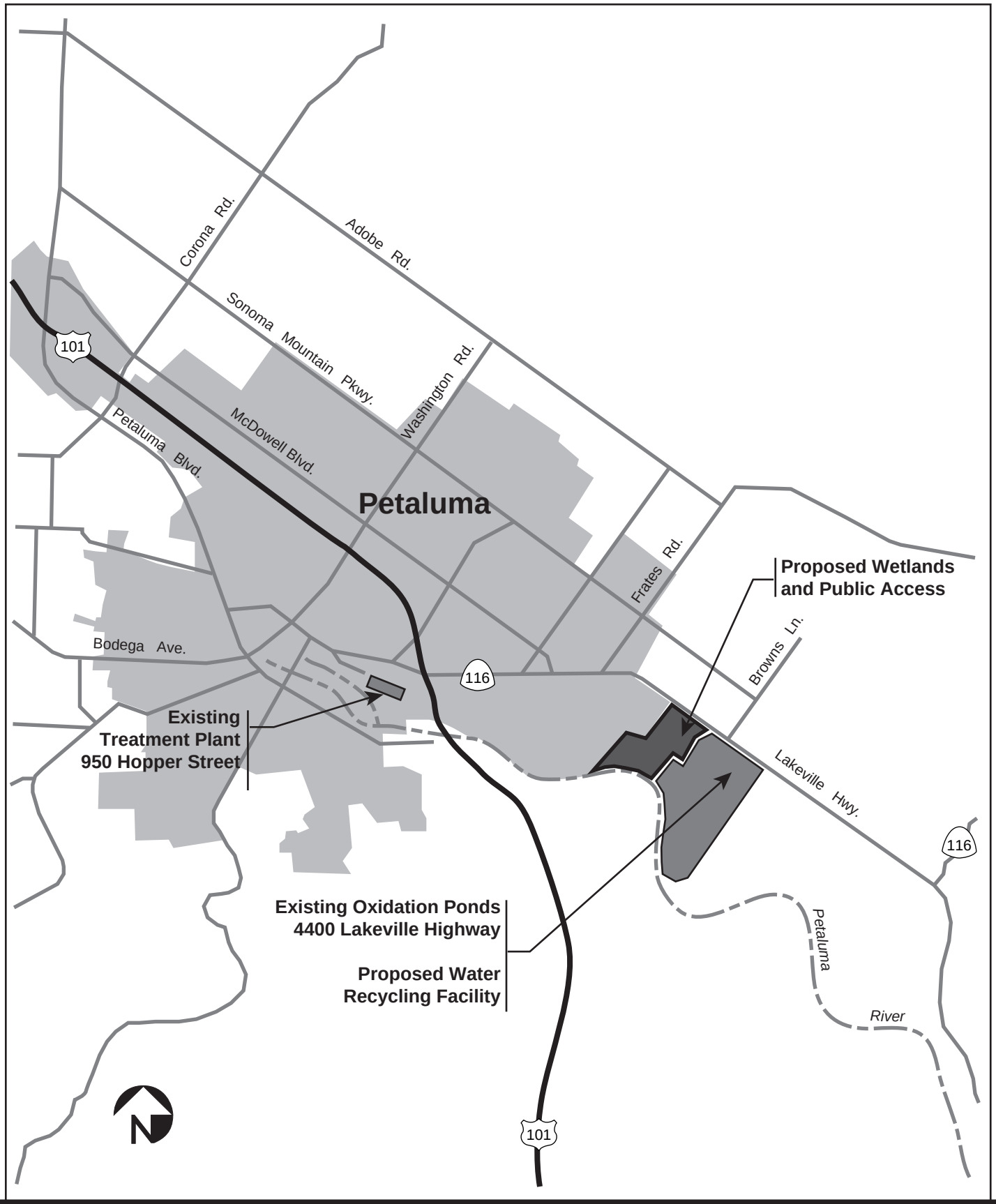


City of Petaluma
Water Recycling Facility EIR

VICINITY MAP

PARSONS

Figure 2-1



City of Petaluma
Water Recycling Facility EIR

LOCATION

PARSONS

Figure 2-2

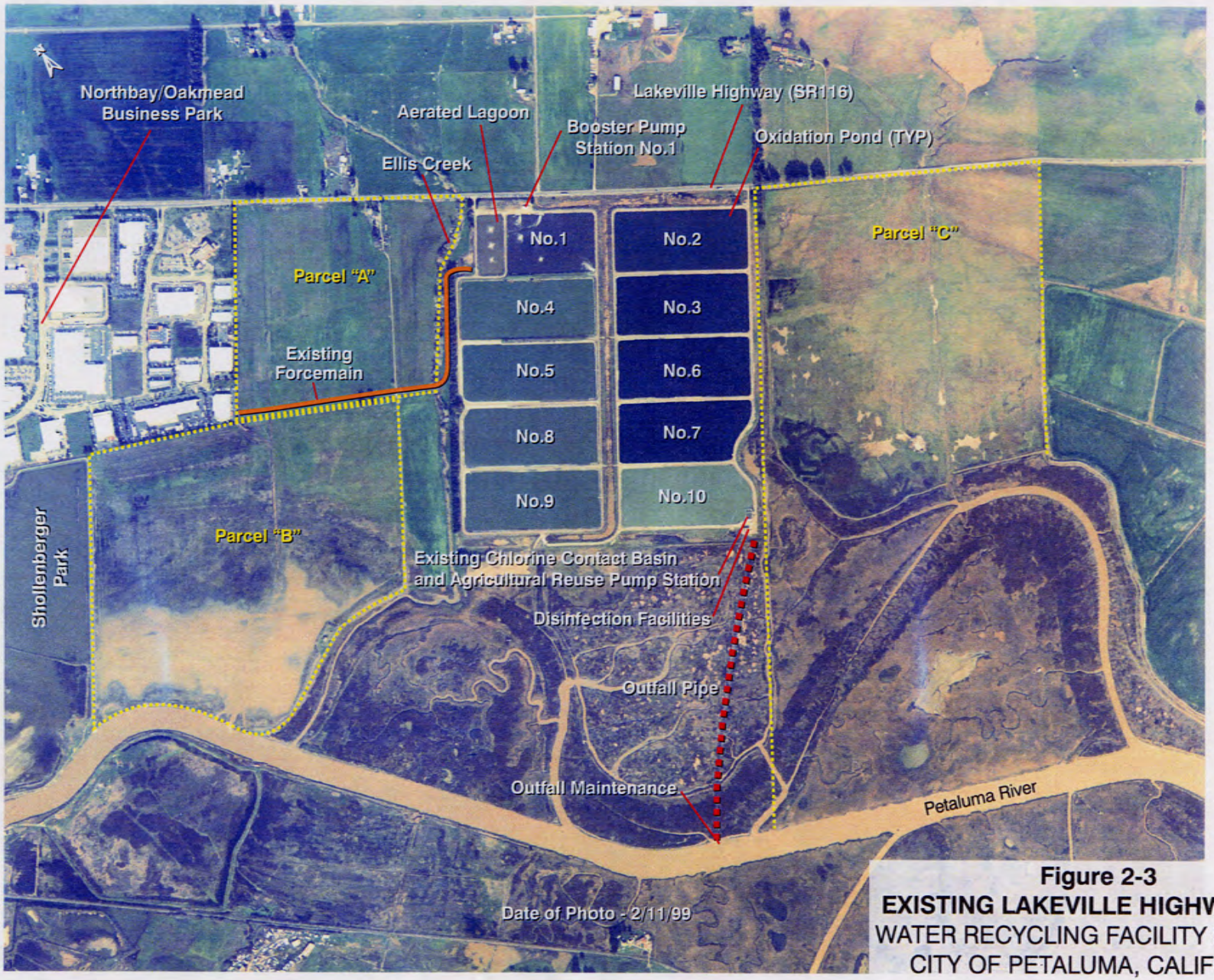


Figure 2-3
EXISTING LAKEVILLE HIGHWAY WRF
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Carollo Engineers, 2002

Pet402f3-6069.cdr

- To stabilize and treat the biosolids generated in the wastewater treatment process to EPA's Class B standards for beneficial reuse of the biosolids.

- To produce tertiary recycled water in accordance with California Title 22 so water can be recycled to irrigation users throughout the City.

- To provide storage in the oxidation ponds during river discharge prohibitions from May 1st to October 20th and to balance the recycled water program during this non-discharge period.

- To develop a facility that serves as an amenity to the community by providing educational and recreational opportunities.

In November 2000, the City completed the Project Report, which evaluated five alternatives for meeting these objectives. On December 11, 2000, the Petaluma City Council selected Extended Aeration with wetlands as the preferred alternative for evaluation in the EIR. The other five alternatives will be evaluated as alternatives in the EIR and are discussed in Chapter 5, Alternatives. The extended aeration alternative was further developed in the Predesign Report and again selected by the City Council as the preferred alternative on January 7, 2002.

DETERMINATION OF WASTEWATER FLOWS AND RECYCLED WATER SYSTEM REQUIREMENTS

The City has conducted evaluations to determine the project requirements including the level of treatment required, the amount of storage needed, and the required treatment capacity.

Level of Treatment

The Petaluma Water Recycling Facility will have two treatment levels. For water recycling in the summer months, the City will provide two treatment levels for recycled water: 1) "restricted use", disinfected secondary water for agricultural reuse, like the existing recycled water program, and 2) "unrestricted use", tertiary-treated water for urban reuse. The urban reuse water will be of the highest quality, allowing the greatest number of different uses, including irrigation of food crops that are spray irrigated and irrigation of landscapes with unlimited public access (such as parks and schools).

The California Code of Regulations, Title 22, Division 4, Chapter 3, Sections 60301 through 60355 (commonly referred to as "Title 22") specifies treatment requirements for reuse. Recycled water for unrestricted reuse must be secondary-treated, coagulated, filtered and disinfected to an effluent total coliform concentration that does not exceed 2.2 MPN (Most Probable Number)/100 mL and a filtered turbidity of a maximum of 2

NTU[1]. Recycled water for restricted reuse must be secondary-treated and disinfected to an effluent total coliform concentration that does not exceed 23 MPN/100 mL.

Winter discharge to the Petaluma River will meet requirements for secondary treatment and the City's National Pollutant Discharge Elimination System (NPDES) permit requirements.

Storage

Because the City's existing NPDES permit does not allow discharge to the Petaluma River from May 1 to October 20, all effluent must be stored or reused during this period. Meeting the discharge prohibition requires careful balancing of reuse deliveries, storage and river discharge immediately before and after the non-discharge period. The existing oxidation ponds and wetlands provide adequate storage, greater than 800 ac-ft.

Future Flow

Future wastewater flows were developed using historical data and future population projections. These projections provide the basis for sizing and determining costs of the project and alternatives. Projected flows are based on the City's buildout population from the adopted 1987 General Plan, plus the City's service agreement with Sonoma County for wastewater generated in Penngrove. The total population at buildout of the service area is projected to increase from 52,846 in 1999 to 70,644 at buildout, with a per capita flow of 86 gallons per capita per day. These figures were used to project residential average dry weather flow of 6.1 mgd. Average dry weather flows are based on the three consecutive low flow months and indicate the amount of wastewater actually produced by residential and commercial users.

Projected industrial flows were based on past flows for the four largest industrial contributors to the wastewater treatment plant: Petaluma Poultry Processors, Dairy Farmers of America, Clover-Stornetta Dairy, and Lace House Linen. Because limited data are available, only average annual flows were determined. Because there is very little seasonal variation in industrial flows, average annual flows are assumed to be roughly the same as average dry weather flows. Flows were assumed to increase 25 percent between now and the time when buildout conditions are reached. This would result in an increase in industrial flows from 0.49 mgd in 1999 to 0.6 mgd at buildout.

Because of infiltration and inflow, average and peak flows during wet weather are higher than the average dry weather flows. Historical average annual and average day flows in the maximum month were calculated and compared to average dry weather flows to develop peaking factors. These factors were used to project future flows. Average annual flow was determined to be 1.2 times average dry weather flow. Average day flow in the maximum month was estimated to be 1.8 times average dry weather flow.

[1] NTU = Nepholometric Turbidity Units, a measure of the clarity of the recycled water, which is determined by the amount of solid particles suspended in the water.

Peak hour flows can be much higher, so the treatment facilities must be designed with a sufficient hydraulic capacity to handle peak wet weather flows. The existing Pond Influent Pump Station will remain at Hopper Street and will be used to pump raw sewage to the Lakeville Water Recycling Facility. It is designed for a maximum capacity of 36 mgd. Therefore, the Lakeville facility needs to be able to handle a peak hydraulic capacity of 36 mgd. Table 2-1 summarizes information on projected residential and industrial flows.

Table 2-1

Projected Residential/Commercial and Industrial Flows

Source	Flow (mgd)
Residential Average Dry Weather Flow	6.1
Industrial Annual Average Flow	0.6
Total Average Dry Weather Flow	6.7
Total Annual Average Flow	8.0
Total Average Day Maximum Month Flow	12
Peak Hour Flow	36

Source: Carollo Engineers 2000

PROJECT CHARACTERISTICS

The preferred alternative[2] for the City's Water Recycling Facility is the Extended Aeration Alternative with wetlands. This project includes a combination of biological and physical processes to remove organic material and pollutants from the wastewater. Specifically, it includes improvements at the Lakeville Highway site designed to produce secondary treatment for up to 8 mgd annual average flow, tertiary treatment for up to 4 mgd for urban reuse, biosolids treatment to meet EPA Class B requirements for beneficial reuse, algae removal with wetlands, and polishing with wetlands. The project includes an increase in permitted discharge capacity based on average dry weather flow, an increase in biosolids production, and demolition of the Hopper Street plant (refer to Figure 2-2, Location). A detailed project description follows; for a more specific description, refer to Appendix A, Executive Summary of the Predesign Report dated February 2002.

Measures Included in the Project Design

In order to avoid or reduce environmental impacts, the following measures have been adopted by the City as part of the project. Please refer to Chapter 3, Section 3.2 for details of each of the project description measures.

[2] The preferred alternative option is the same as Alternative 5 in the Project Report by Carollo Engineers dated November 2000. This alternative is further developed and refined in the Predesign Report by Carollo Engineers dated February 2002.

PD-1	Uniform Relocation Assistance
PD-2	Purchase Locally Grown or Inspected Plants
PD-3	Liquefaction Protection
PD-4	Seismic Design to Resist Ground Shaking
PD-5	Standard Engineering Methods for Expansive Soils
PD-6	Standard Engineering Methods for Corrosive Soils
PD-7	Groundwater Monitoring and Management
PD-8	Construction Erosion and Spill Control Measures
PD-9	Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons
PD-10	Monitor Soil and Groundwater During Construction for Evidence of Hazardous Waste at Hopper Street
PD-11	Containerize and Test Suspect Soil and Groundwater Prior to Disposal at Hopper Street
PD-12	Inspect and Test for Lead-based Paint and Asbestos Containing Materials (ACM) in any Buildings at 950 Hopper Street that will be demolished
PD-13	Mosquito Prevention
PD-14	Construction Air Quality Controls
PD-15	Permitting and Control of Toxic Air Contaminants
PD-16	Odor Control
PD-17	Construction Noise Mitigation Measures
PD-18	Operational Noise Mitigation Measures
PD-19	Protection of Historic and Archaeological Resources
PD-20	Protection of Previously Undiscovered Historic and Archaeological Resources
PD-21	Landscaping Design
PD-22	Lighting Design
PD-23	Fire Protection

Acquisition of Land and Annexation

The City proposes to purchase 262 acres of land known as Parcels A and B, as shown on Figure 2-4. This land is currently unincorporated, and the City intends to annex the land at an undetermined time in the future.

Discharge

The plant's permitted discharge capacity will be increased from an average dry weather flow of 5.2 mgd to 6.7 mgd.

Demolition of Hopper Street Facility

After the new facility is operational, the Hopper Street plant will be demolished. Future uses of this site are not included in this project and, therefore, requirements for site decommissioning have not been prepared. These can be identified once the City has decided on a future use. The existing pond influent pump station will remain on site.

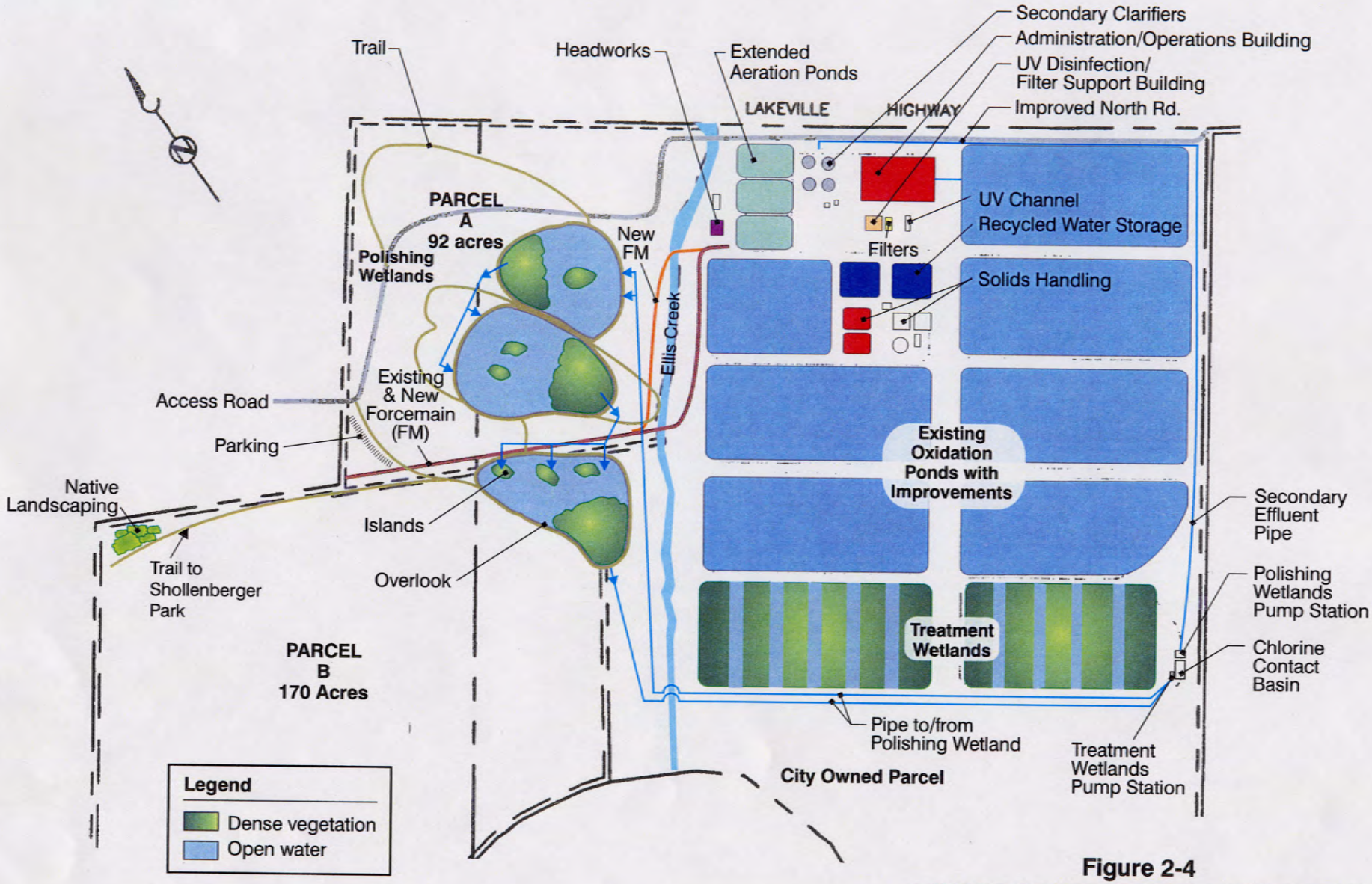


Figure 2-4
LAYOUT OF PREFERRED ALTERNATIVE
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Carollo Engineers, 2002

Pet402f2-6069.cdr

Water Recycling Facility

The extended aeration project alternative includes new treatment facilities at the Lakeville Highway site with treatment wetlands for algae removal and additional wetlands for polishing. Figures 2-4 and 2-5 show the schematic and layout for this alternative. The treatment components and site modifications are described on the following pages.

Preliminary Treatment

Preliminary treatment includes physical treatment to remove large particles and solids, such as rags and plastics that can clog pumps, and subsequent treatment processes. Preliminary treatment facilities include screening, grit removal and influent flow metering. The facilities will be housed in a headworks building or covered channels equipped with odor control. The headworks and associated odor control will be sited between the existing aerated lagoon and Ellis Creek (see Figure 2-43). The area for the headworks facilities will be filled to a 23.5 foot elevation with a 3:1 slope at the edges. The slope will be covered with rip-rap and other erosion control features.

Screenings and grit will be disposed of at the Redwood landfill, similar to existing disposal of preliminary solids.

Secondary Treatment

Secondary treatment includes biological treatment to reduce the organic content of the wastewater, typically to less than 30 milligram per liter (mg/l) biochemical oxygen demand (BOD) and suspended solids. Secondary treatment facilities include extended aeration basins, secondary clarifiers, a blower building, and a secondary sludge pump station. The aeration basins will be designed as a complete mix system with secondary clarifiers and a sludge return system. In the extended aeration system, oxygen is supplied to the lagoon-based aeration basins through diffused aeration equipment. The extended aeration system will provide BOD reduction of the wastewater, nitrification (ammonia removal) and partial denitrification (nitrogen reduction) of the wastewater. The secondary clarifiers will remove the biological solids from the effluent. Waste solids will then be pumped to the aerobic digester for stabilization prior to reuse or disposal. The existing aerated lagoons will be enlarged and converted into the new extended aeration basins. Other secondary facilities including secondary clarifiers, the blower building and the secondary sludge pump station will be located in Pond No. 1 area, as shown in Figure 2-4.

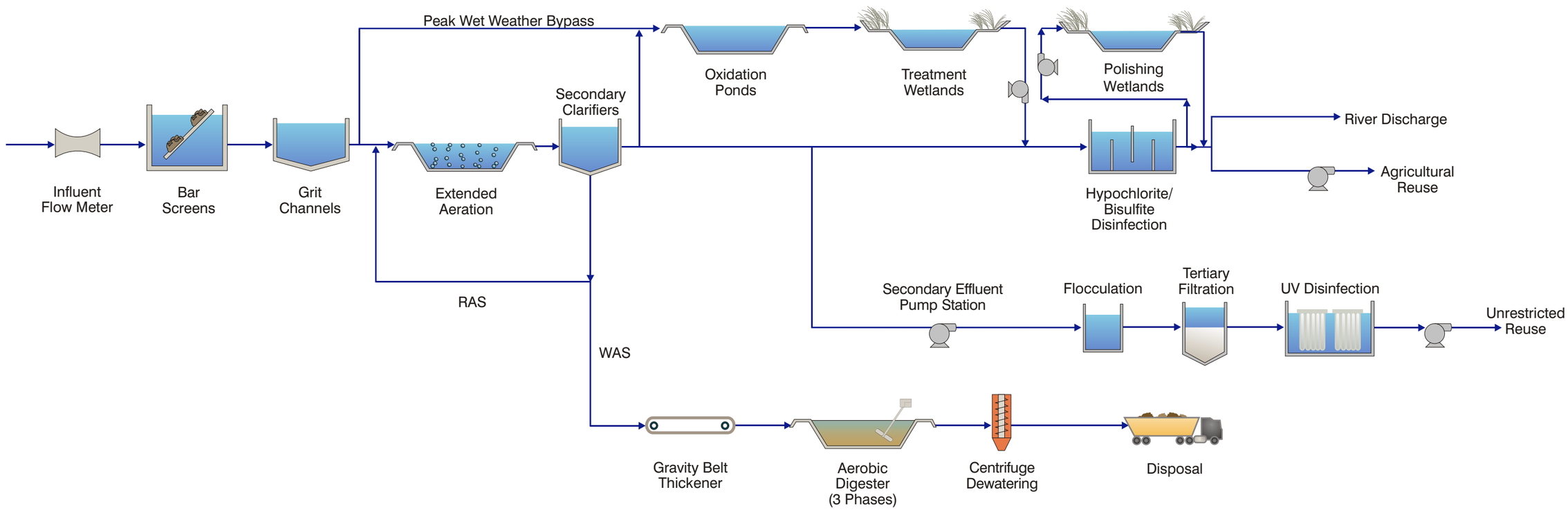


Figure 2-5
OVERALL FLOW SCHEMATIC
FOR PREFERRED ALTERNATIVE
WATER RECYCLING FACILITY PREDESIGN
CITY OF PETALUMA, CALIFORNIA

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Oxidation Ponds

Oxidation ponds provide both storage and biological treatment using oxygen supplied primarily from algae. The oxidation ponds also provide significant metals reduction. In the future, the oxidation ponds will primarily store secondary-treated effluent to meet the discharge prohibition and balance the recycled water program. In addition, the oxidation ponds will provide treatment for wet weather peak flow and polishing of the effluent flow for metals during the river discharge season. The storage volume provided by the oxidation ponds is sufficient for effluent management based on the monthly water balance. The berm will be raised from elevation 20 feet to 23.5 feet around the Extended Aeration Basins No. 1, 2 and 3.

Algae Removal

Algae, which is generated in the oxidation ponds as part of the treatment process, will need to be removed in order to meet discharge and reuse requirements. Algae removal can be provided by either a wetlands treatment system or dissolved air flotation (DAF) thickeners. These two options for algae removal were evaluated as subalternatives in the project report and the predesign report. The wetlands alternative was selected as the preferred alternative. The DAF alternative is discussed in the Alternatives section – Chapter 5.

Wetlands can be designed to remove algae if dense vegetation is provided. The densely vegetated treatment wetlands system would consist of approximately 25 to 30 acres in the existing oxidation Ponds No. 9 and 10 (see Figure 2-4). These ponds will contain secondary-treated water that has not been disinfected, and they will not be open for general public access. This wetlands system is not to be confused with the polishing wetlands proposed on Parcels A and B.

Solids Handling

Solids handling provides for treatment and handling of the solids generated in secondary treatment (waste-activated sludge). The solids treatment will include thickening, aerobic digestion, and dewatering. Thickening of the solids will reduce the size of digestion facilities and improve the process stability. Digestion provides a reduction in volatile solids content of the sludge and therefore a reduction in the odors from solids storage. Aerobic digestion will be in a three-stage process with the first stage in a concrete tank and the following two stages in lined, earthen lagoons. Dewatering provides for removal of water from the sludge prior to hauling off-site for reuse or disposal. All solids handling facilities will be located in Pond No. 4, as shown in Figure 2-4. Odor control facilities will be provided for the thickening and dewatering facilities.

An alternative to the aerobic digestion process, anaerobic digestion is currently under review. The anaerobic digestion process has several advantages including reduced solids for disposal, lower energy usage and energy recovery using the digester gas, and an enclosed process with less potential for odors.

Tertiary Filtration

Tertiary treatment includes chemical and physical treatment, i.e. filtration, to remove solids or organics remaining after secondary treatment. The goal of the project is to produce up to 4 mgd of tertiary-treated water that meets Title 22 requirements for unrestricted water reuse. Filtration facilities will consist of filter feed pumps, a flocculation chamber and filters.

The filters will be used during the water recycling season to remove the fine solid particles. Filtration facilities will be located adjacent to the disinfection facilities in the Pond No. 1 area, as shown in Figure 2-4. Filter backwash water is recycled back to the oxidation ponds or to the headworks. The tertiary filters will be used to produce recycled water for urban reuse during the non-discharge season. During the discharge season, the filters will be taken off-line.

Electrical Improvements

There will be a new electrical building including transformers, switchgear and standby generators located in Pond 1. The main utility service for the proposed facilities will be at 12 kilovolt level. The proposed power distribution system will be a simple radial system using indoor metal clad type switchgear and underground concrete encased ductbanks. There will be underground electrical lines going to the facility and a small substation. A standby power system will consist of multiple 480-volt diesel engine generators connected and synchronized via separate 480-voilt substations in the event of a power failure. For more details regarding the electrical power and distribution, please refer to Appendix A, Executive Summary of the Predesign Report.

Disinfection

Disinfection is currently provided using sodium hypochlorite and sodium bisulfite. Ultraviolet Light (UV) disinfection will be used downstream of filtration to meet reuse disinfection requirements for up to 4 mgd of unrestricted reuse water. The existing sodium hypochlorite/sodium bisulfite system will continue to be used for agricultural reuse (restricted use recycled water) and during the winter discharge period. The disinfection requirements for reuse are dictated by California Title 22. Disinfection requirements for discharge are established by the NPDES permit.

New sodium hypochlorite facilities located in Pond No. 1 will provide disinfection for in-plant uses and control growth in the urban reuse lines.

Storage Reservoir and Pump Station

Two recycled water storage reservoirs will be located in Pond No. 4 and will provide for 1 to 2 days of storage for filtered, disinfected recycled water. See

Figure 2-4 for the location of the reservoirs. A recycled water pump station will be located adjacent to the reservoir.

Administration Buildings

Three new buildings for administration, operation, maintenance and the laboratory will be included in the project. The area around them will include landscaping and demonstration gardens. See Figure 2-6 for the conceptual landscape plans. Landscaping includes revegetation of the existing poplar trees with columnar maple or a similar species; the poplars currently serve as a visual buffer between Lakeville Highway and the oxidation ponds. A drinking water pipeline will be brought out to the Project site for the new administration and operations buildings and for public access features (i.e., restrooms) at the polishing wetlands. The pipeline will be laid along the shoulder of the new access road from the business park, across Parcel A and will hang under the bridge across Ellis Creek into the plant site.

Phasing of the administration building is currently under consideration by the City. The design will include provisions to include the building in this phase or a future phase. The impacts evaluated in this document remain the same.

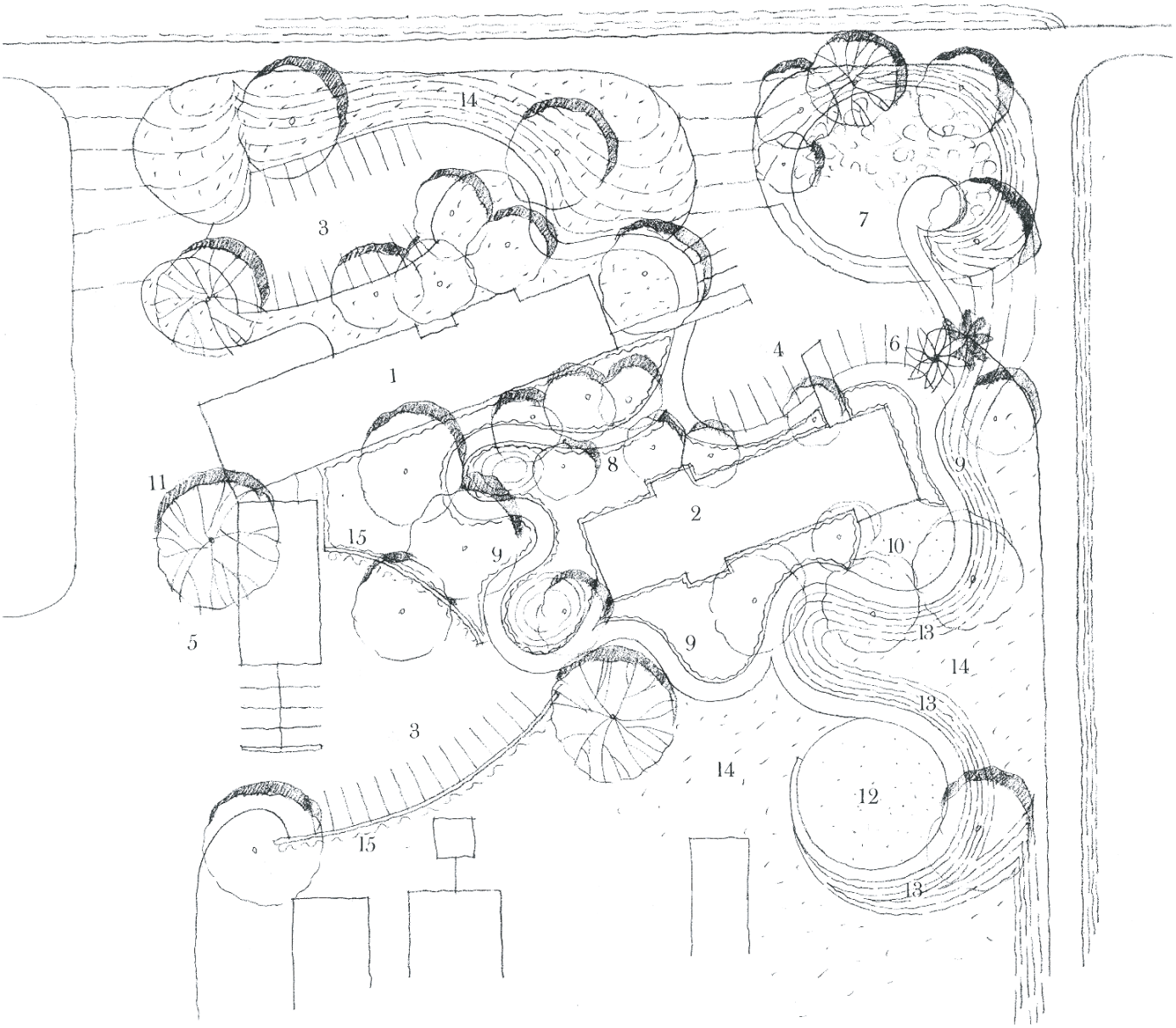
Polishing Wetlands

Up to 45 acres of land adjacent to the existing oxidation ponds (Parcels A and B), as shown on Figure 2-4, will be developed into polishing wetlands. These wetlands will treat disinfected secondary effluent and will be open for public access and education. The polishing wetlands will provide further reduction of metals, nutrients and organics. The effluent from the polishing wetlands will be returned to the plant site for reuse or discharge. The polishing wetlands will be constructed above the 7-foot elevation to avoid any impacts to existing jurisdictional wetlands in addition to being above the 100-year floodplain zone. Signage will be included around the polishing wetlands to meet Title 22 requirements. Facilities on Parcel A and B will provide a buffer between the existing business park and the Water Recycling Facility.

The polishing wetlands will have public education, recreation and landscape features, as shown in Figure 2-4, including:

- Trees planted along new access road and outer wetland cell berms to provide buffer.
- Agricultural fields between wetland cell berms and the business park as habitat with host plants for butterflies.
- Trails around the polishing wetlands, trails along the existing berms down to the old communications building and trails to the Petaluma River on existing road ways and trails.

- A trail link to Shollenberger Park with native plantings along the trail.



1 Operations & Maintenance
2 Administration
3 Staff Parking
4 Visitor Parking
5 Work Yard
6 Entry Palm Tree Accent
7 Water Demonstration Garden
8 Shady Demonstration Gardens
9 Sunny Demonstration Gardens
10 Meeting Amphitheatre
11 Large Shade Trees
12 Meeting/Staff Volleyball Area
13 Short Grass (Non-Mowed)
14 Grassland
15 Chain Link Fence with Vines

Scale in Feet
0 40

Source: ZAC Landscape Architects

City of Petaluma
Water Recycling Facility EIR

LANDSCAPE PLAN

PARSONS

Figure 2-6

- Point access and fenced trails to Ellis Creek.
- Riparian and upland habitat improvement along Ellis Creek and between creek and polishing wetland cells, including:

  - Removal of non-native plant species.
  - Planting of riparian vegetation species.
  - Planting of native grasses and other upland species.
  - Removal of very large, dead tree in creek that may be damming high flows.

  (Note: Some of the riparian and upland projects will be used as mitigation for impacts due to construction of project).

- Parking for up to 80 cars, including 10 spaces for oversized vehicles and a road connection to the new access road across Parcel A. Landscaping will be provided around the parking area for screening and shade.
- An information kiosk with maps.
- Restroom facilities similar to those at Shollenberger Park.
- Self-guided tour routes and markers for public education.
- Fencing may be provided along the trails as necessary for safety improvements. A gate may be placed between the parking lot and the wetlands.

Force Main

The existing force main (carrying wastewater to the oxidation pond site) runs through Parcel A adjacent to the old railroad right-of–way. A new 36 inch force main will be constructed parallel to the existing force main as shown in Figure 2-4. Minimum depths will be 3-4 feet below existing grade.

Outfall Replacement

The existing outfall diffuser directly west of the oxidation ponds is silted over and is likely corroded. The outfall diffuser section will be removed, and a new outfall diffuser section will be connected to the existing outfall pipe.

Site Access

Currently, there are two entrances into the Lakeville site from Lakeville Highway (State Route 116): east gate and west gate. Due to the speed and volume of traffic on Lakeville Highway, the site will require improved site access and includes the following:

- A new access road through the Oakmead/Northbay Business Park. A new road will be built from the cul-de-sac off Cypress Drive and proceed across Parcels A and B to the polishing wetlands and then the treatment plant. This access will be primarily for staff and public. The road will require a bridge across Ellis Creek near Pond No. 1, as shown in Figure 2-4. The bank on the east side of Ellis Creek is lower than the west side. The construction of the bridge will involve fill on the east side of the bank up to elevation 23.5 feet. The fill will extend from the existing road at the west corner of Pond No. 1 to the perimeter of the stream bank. There will be a 3:1 slope at the edges of the fill covered with rip-rap and other erosion protection features.

- Improvements to the existing east gate entrance. A right-turn lane will be added to Lakeville Highway, for east-bound right turns into the site, and an acceleration lane will be added for right turns out of the site, for east-bound traffic. Left turns out of the site at the east gate would be improved with the addition of a left turn bay.

- In-plant road improvements. Two in-plant roadways will be improved for the project. The east road section will be increased to handle truck traffic. The north road will be widened and the road section improved to provide a safer roadway for daily use. The north road improvements will also include a box culvert across the drainage swale to connect the west and east side of the plant.

- East gate improvements defined in the Traffic Master Plan, Appendix D, are currently under review. The preferred alternative (alternative 2) does not include a left turn bay for westbound left turn movement out of the WRF.

  The eastbound right turn out of the site is also under review, and will require drainage improvements in order to complete the acceleration lane. A culvert ma need to be extended to edge of the right-of way, and a retaining wall relocated to the edge of the right-of-way.

Staging Area and Construction Zones

There will be a fenced staging area located on Parcel A adjacent to the farmhouse. The staging area will be approximately 15 acres and will have a 100-foot setback from Ellis Creek. There will be temporary construction zones established around the following construction areas:

- North access road improvements. There will be a 10 foot wide temporary construction zone on the northern side of the existing road.

- A temporary construction zone will be established around the polishing wetlands and access road.

Construction and Operation Schedule

Construction is expected to start in late 2003 with operation in early 2007.

Cost

The Water Recycling Facility cost is estimated at $85.1 million. Annual operating costs are estimated at $4.9 million.[3]

River Access Improvements

The river access improvements are designed in concept, as shown in Figure 2-7, however project level design has not yet occurred. These improvements are therefore evaluated at a conceptual or program level.

- Restoration on Ellis Creek and creation of habitat including (the numbers in parentheses correspond to the legend on Figure 2-7):

  - Creation of seasonal ponds (for red-legged frogs) (7).

  - Planting of riparian vegetation species.

  - Development of more diverse creek structure: riffles, runs, pools, or sinuosity (meanders).

  - Creation / placement of in-stream habitat features, e.g. woody debris, overhanging cover, or drop structures/plunge pools.

  - Biotechnical bank stabilization projects.

- Two pedestrian bridges; each approximately a 100-foot span to bridge the levee breaches along the Petaluma River (20).

- A dock on the Petaluma River, near the bridges, to accommodate boat access (approximately 5 ft wide by 50 ft. west into the River and 75 ft long south along the River) (21).

[3] Construction costs are based on December 2004 dollars (mid-pt. of construction) using a San Francisco ENR Construction cost index of 7925. Costs include engineering, legal, administration, and construction contingency. Costs do not include Hopper Street Plant demolition, land acquisition, levee stabilization, easements, or right of way. Operation and maintenance estimate includes equipment replacement, chemical use, power, labor, solids handling, and wetlands maintenance based on December 2004 dollars.

- Levee stabilization is proposed along the Petaluma River on Parcel B to prevent further erosion and widening of the levee breaches (18).

- Retrofit four existing concrete structures (old radar antenna structures) located in tidal mudfats to provide wildlife habitat/use (24).

- A retrofit of the existing abandoned naval radio building to provide public viewing access to the existing tidal wetlands (22).

- A small dock on Ellis Creek, at existing bulkhead near the abandoned naval building, to provide canoe and kayak access (approximately 3 ft wide by 10 ft long, parallel to the creek) (26).

- A boardwalk trail connecting the dock on Ellis creek to the retrofitted naval building (approximately 3 ft wide 50 ft long, hand constructed to minimize impacts) (25).

- A retrofit of the existing farmhouse for potential public (visitor center) or city use, for example a petting zoo, country store, or deli for locally grown and produced food (9).

- Use of remaining agricultural fields on Parcel A as habitat/host plants for butterflies. Trails would be constructed through the fields to allow public viewing of butterfly habitat (10).

- A visitor center (approximately 40 ft by 40 ft) with an indoor classroom and an outdoor deck for viewing, located near the parking lot (13).

- A river trail along the existing levee (19).

Figure 2-7 Conceptual Plan, Polishing Wetlands & River Access Improvements

CUMULATIVE PROJECTS SCENARIO

Impacts of the project have been considered in the context of past, present and probable projects producing related or cumulative impacts. The following agencies were contacted to develop a list of cumulative projects:

- City of Petaluma
- Sonoma County Permit and Resource Management Department
- Sonoma County Water Agency
- San Francisco Bay Regional Water Quality Control Board

The following specific projects have been considered in the analysis:

Projects in the City of Petaluma

The City of Petaluma is considering or has approved a number of projects, several of which are in the vicinity of the project site. The closest of these are several projects east of Frates Road and Cader Lane, on both sides of Lakeville Highway. The largest is Southgate, a proposed project on 38.3 acres north of Lakeville Highway along Frates Road. The proposed project includes 340 townhouses or condominiums, 423,000 square feet of office space, 170,000 square feet of office and/or mixed use and 35,000 square feet of commercial space. Other similar but smaller projects are also approved but not yet occupied south of Lakeville Highway in this area.

Further west on Lakeville Highway is the Park Central project, which consists of a mixed-use development on 20.6 acres of land at the corner of Lakeville Highway and Casa Grande. The project includes 240 apartments, 233,500 square feet of office space and 22,200 square feet of commercial space and is currently under construction. The Sheraton Hotel at the Marina is a 154-room hotel that is expected to open in June or July 2002.

City of Petaluma Recycled Water Pipeline

To augment potable water supply, the City plans to expand the use of recycled water to include large urban irrigation customers such as golf courses, parks, and schools that currently use potable water for irrigation purposes. Potential irrigation customers for the program have been identified. The first phase of the project will provide secondary recycled water to Rooster Run Golf Course, and is expected to be completed in April 2004. After tertiary recycled water becomes available, additional urban irrigation customers in the northeast area of Petaluma would be added to the recycled water program.

Sonoma County Water Agency Projects

The Sonoma County Water Agency is proposing the following capital projects:

- Adobe Creek revegetation/channel clearing

- Lichau Creek revegetation/channel clearing
- Petaluma River Watershed Master Drainage Plan Update
- Channel clearing/revegetation at Corona
- Willow Brook Channel Improvements
- Upper Petaluma River project Flood Control

These projects are generally outside the area that would be affected by the proposed project, and the Water Agency has stated that they do not believe any of the projects would have cumulative impacts when combined with the project.

San Francisco Regional Water Quality Control Board TMDL for Petaluma River and San Pablo Bay

The Clean Water Act section 303(d) addresses waters that are not expected to meet water quality standards after application of technology-based requirements by point sources, by requiring states to identify these waters and to develop total maximum daily loads (TMDLs) for them, with oversight from the U.S. Environmental Protection Agency. A TMDL is the amount of loading of a constituent from all sources that a water body can receive and still meet water quality standards. The San Francisco Regional Water Quality Control Board is currently in the process of establishing TMDLs for nutrients, sediments and pathogens in the Petaluma River and for chlordane, copper, DDT, Diazinon, dieldrin, dioxin compounds, furan compounds, mercury, nickel, PCBs and selenium in San Pablo Bay. These efforts are expected to be completed between 2002 and 2010. Establishment of TMDLs would not have any direct cumulative effects on the project area, but could have implications for the City's discharge to the Petaluma River. Impacts of discharge are evaluated in the Surface Water Quality section.

AGENCIES AND APPROVALS

The following agencies may be Responsible Agencies under CEQA, that is, they may need to issue approvals for the project and thus need to rely upon the EIR.

U.S. Army Corps of Engineers

A Section 404 Permit may need to be obtained to fill wetlands or waters of the U.S. under the Clean Water Act.

U.S. Fish and Wildlife Service/National Marine Fisheries Service

Before granting a permit, the Corps will ask these agencies to concur with their decision to issue the permit. If there are potential impacts to species or migratory fish listed under the federal Endangered Species Act, then a consultation under Section 7 of the Endangered Species Act may be required.

State Office of Historic Preservation

Before granting a permit, the Corps will ask for this agency to concur with their decision to issue the permit. The City will need to manage the historical and archaeological resources on the property in accordance with Section 106 of the National Historic Preservation Act, as implemented by the State Historic Preservation Officer.

Caltrans

A new or improved entrance from the Lakeville site onto Lakeville Highway, State Route 116, will require an Encroachment Permit. Transport of heavy or oversized loads during construction may require a Transportation Permit.

State Water Resources Control Board

A Petition for Change may need to be filed with State Water Resources Control Board for the change in discharge amount into the Petaluma River. The City may also apply for a State Revolving Fund loan from the Board.

State Department of Water Resources, Division of Safety of Dams

The preferred alternative would not require approval from the Division of Safety of Dams because no new large ponds are included. However, this agency would need to issue approval of plans and specifications if an alternative were selected that included construction of ponds on Parcel C.

California Department of Fish and Game

A Streambed Alteration Agreement (Code Section 1601) will be required for any work in Ellis Creek or other streams. In addition, if there are affected endangered species as listed under the California Endangered Species Act, a Section 2081 Management Authorization may be required. In addition, the U.S. Army Corps of Engineers will coordinate with the Department of Fish and Game when they consider the issuance of a 404 Permit.

California Department of Health Services

An engineer's report on the design criteria for the recycling facilities must be submitted for approval by the Department of Health Services.

California Occupational Safety and Health Administration

The California Occupational Safety and Health Administration (Cal OSHA) may need to issue permits for construction, trench excavation, and demolition.

San Francisco Bay Regional Water Quality Control Board

The City currently has an NPDES Permit (No. CA 0037810) and Waste Discharge Requirements (Regional Board Order No. 98-076) that describe permit conditions for its existing conveyance, treatment and disposal facilities. The requirements have been

established for permitted flows up to 5.2 mgd, average dry weather flow. The new Water Recycling Facility will be designed for an average dry weather flow of 6.7 mgd. Increased flows will require adjustments in the permit conditions, which are normally made upon renewal of the permit every five years. Current requirements expire on July 15, 2003. It is anticipated that an increase in the average dry weather flow will be documented in the new permit. In order to support the City's efforts for State Revolving Loan funding, the City will likely seek issuance of the new permit prior to July 15, 2003. In addition, the Board may need to issue a Section 401 certification for fill of any wetlands or waters of the U.S. and a General Construction Stormwater NPDES Permit.

Bay Area Air Quality Management District

The City will be required to obtain an Authority to Construct and Permit to Operate from the Bay Area Air Quality Management District before construction and operation, respectively, of the new Water Recycling Facility. The solids and liquid handling unit processes, abatement equipment (scrubbers, filters), emergency generators, or congeneration facilities must also be permitted by the District.

Marin/Sonoma Mosquito and Vector Control District

The City will request this agency to review the Management Plan for the wetlands and ponds.

County of Sonoma

The Permit and Resource Management Department will need to issue a grading permit for construction on Parcels A and B, the merger of parcels, a Use Permit, a General Plan Consistency Review, and a 3836R stream crossing permit. The Local Agency Formation Commission would need to approve annexation of Parcels A and B into the City of Petaluma. The Public Works Department may need to issue a Transportation Permit for heavy or oversized loads during construction. The Sonoma County Water Agency will need to issue an encroachment permit for work in Ellis Creek.

City of Petaluma

Hopper Street Site: The Petaluma Community Development Department may need to issue permits for the demolition of the site.

Lakeville Highway Site: The Petaluma Community Development Department may need to consider a grading permit and building permit for construction on the existing Lakeville site, as well as annexation, rezoning, a Conditional Use Permit, and a General Plan amendment. Approval by the City's Site Plan and Architectural Committee may be required following issuance of the Conditional Use Permit. In addition, a Hazardous Material Management Plan, Storage Permit, and Inventory will need to be filed with the Petaluma Fire Department for chemicals used at the Water Recycling Facility.

3 MITIGATION MONITORING PROGRAM

BACKGROUND

The legal basis for the development and implementation of mitigation measures lies in the California Environmental Quality Act (CEQA). Pursuant to Section 21002 of CEQA, public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. Subsection 21002.1 further requires that each public agency shall mitigate or avoid the significant effects on the environment of projects it approves or carries out whenever it is feasible to do so.

Assembly Bill (AB) 3180 was enacted in 1989 to ensure that required mitigation measures and project alternatives were implemented. AB 3180 specifies the public agency's responsibility to adopt a mitigation monitoring and reporting program:

> SECTION I. Section 21081.6 is added to the Public Resources Code, to read: 21081.6. When making the findings required by subdivision (a) of Section 21081 or when adopting a negative declaration pursuant to paragraph (2) of subdivision (c) of Section 21081, the public agency shall adopt a reporting or monitoring program for the changes to the Project which it has adopted or made a condition of Project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during Project implementation. For those changes which have been required or incorporated into the Project at the request of an agency having jurisdiction by law over natural resources affected by the Project, that agency shall, if so requested by the lead or responsible agency, prepare and submit a proposed reporting or monitoring program.

The reporting or monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of Project approval in order to mitigate significant effects on the environment.

PURPOSE

This Mitigation Monitoring Program is designed to serve as a tool for the evaluation of Project compliance with mitigation measures accepted from the EIR. The basic objectives of the Mitigation Monitoring Program are to achieve the following:

- To report to the City Council, and the public, information regarding compliance with the EIR mitigation measures; and

- To provide assurance and documentation that the studies and actions called for in the mitigation measures are being performed as planned.

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CHAPTER FORMAT

Compliance with Existing Programs

This section presents the applicable federal, state, regional, county, and local policies and regulations with which the project must comply. Compliance with these policies and regulations will result in avoidance and/or minimization of adverse environmental impacts.

Measures Included in the Project

This section presents a listing and description of measures and standards which have been incorporated into the project design. The City has adopted these measures and incorporated them as part of the project in order to avoid or minimize potential environmental impacts. These measures represent standard engineering, design, construction, and maintenance practices. The process for the development of these measures began during the scoping and early planning phase of the project. Measures were developed to change the project and avoid potential impacts identified by the public and federal, state, and local agencies. Other measures were developed as a result of geotechnical, biological, cultural, and hydrological analysis in order to avoid or minimize potential impacts.

Because these measures are part of the project, they do not qualify under the normal definition of mitigation. However, these measures have been included in this chapter to provide a mechanism to ensure that these measures are implemented and monitored, and to assist the reader in understanding the commitments made by the City of Petaluma.

This section includes measures to be implemented in all phases of the project, including planning and design, construction, operation, and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

Mitigation Measures

This section contains a listing and description of mitigation measures recommended in Chapter 4, Environmental Analysis. The mitigation measures listed in this section are recommended by the consultant team to avoid or reduce environmental impacts. As described above under Background, the City is required to mitigate impacts whenever it is feasible. Mitigation measures will be adopted by the City at the time of project approval. At that time, the City has the option of approving alternate mitigation measures, if they can be shown to be effective and feasible.

Some of the mitigation measures will only be implemented during the final planning and detailed design of the project. They often require the refinement of the final project design to accommodate particular environmental constraints Other mitigation measures are intended to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Finally, there are mitigation measures to be implemented during operation of the project. These measures generally require monitoring of operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with all of these measures would result in the reduction of adverse environmental impacts.

ADMINISTRATION

The Director of the Water Resources and Conservation Department and/or his/her designee will be responsible for overall implementation and administration of the Mitigation Monitoring Program. In order to carry out the mitigation monitoring program, the Director will designate a staff person to serve as coordinator among the various agencies and departments. This person (Coordinator) will ensure that each mitigation measure is implemented to the standards specified in the EIR and is completed in a timely manner. If current staffing within the Department cannot absorb the work demand to implement the program, a private contractor will be hired to manage and coordinate the mitigation monitoring and reporting program. The contractor will serve under the direction of the Director.

Administration of the Mitigation Monitoring Program will include the following:

- Documentation of permit approvals by other agencies;
- Compliance with conditions of project approval;
- Routine inspections and reporting activities;
- Plan checks;
- Coordination of activities of consultants hired by the City when such expertise and qualifications are necessary;
- Coordination with applicable agencies that have mitigation monitoring and reporting responsibilities (if any);
- Follow-up and response to citizens' complaints;
- Development of a work plan and schedule for monitoring activities;
- Maintenance of a mitigation monitoring checklist or other suitable mitigation compliance summary;
- Implementation of corrective actions or enforcement measures, as needed;
- Preparation of reports of the status of implementation and monitoring of mitigation measures; and
- Monitoring of financial resources associated with the program.

MITIGATION MEASURE FORMAT

Table 3-1 presents the format for each mitigation measure and the information that each measure will contain.

IMPLEMENTATION

Each responsible individual or agency listed as a "Monitoring Agency" in the Mitigation Monitoring Program will be responsible for determining whether the mitigation measures contained within the monitoring program have been implemented. A Monitoring Agency may submit a Verification Report Form (see page 3-6) or other verification report to the Coordinator that documents compliance with each of the mitigation measures for which they are responsible. Based on the information provided by the reports, the Coordinator will maintain a mitigation monitoring checklist that documents the completion status of all required mitigation measures as shown in Table 3-2. Prior to issuance of grading or building permits, the Coordinator will

review the mitigation monitoring program checklist to ensure that the Project design is in compliance with all mitigation measures that are required to be implemented as a condition of the permit.

ENFORCEMENT

If a responsible individual or agency determines that compliance has not been achieved, a written notice shall be delivered to the Director or Coordinator describing the non-compliance and requiring compliance within a specified period of time. If non-compliance still exists at the expiration of the specified period of time, construction may be halted, and/or remedies shall be required, as appropriate and at the discretion of the Director.

APPROVAL AND CHANGES

This Mitigation Monitoring Program is adopted in conjunction with the Final EIR and project approvals for the project. Subsequent changes to the Mitigation Monitoring Program may be approved by the Director if deemed to meet the intent of said mitigation.

VERIFICATION REPORT

Date:_____ Arrival Time:_____ Departure:_____

Location:_____
_____
_____

Construction Sheet No.:_____

Discipline:
- ☐ Archaeology
- ☐ Biology
- ☐ Soils/Geology
- ☐ Other_____
- ☐ Dust/Air Quality
- ☐ Noise

Condition:_____

Compliance: ☐ Acceptable ☐ Unacceptable

- ☐ Delay Activity
- ☐ Remedial Action Implemented
- ☐ Work Stopped
- ☐ Follow-up Conference Required

Activity:_____
_____

Observations:_____
_____

Recommendations:_____
_____

By:_____ Report Approval:_____

Receipt By Project Supervisor:

Signature:_____ Date:_____ Time:_____

Comments/Actions:_____
_____

Copies to:_____

Date Entered to Environmental Monitoring File:_____
By:_____

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
Measures Included in the Project				
PD-1 Uniform Relocation Assistance	City of Petaluma	City of Petaluma		
PD-2 Purchase Locally Grown or Inspected Plants	Design Engineer	City of Petaluma		
PD-3 Liquefaction Protection	Design Engineer	City of Petaluma		
PD-4 Seismic Design to Resist Ground Shaking	Design Engineer	City of Petaluma		
PD-5 Standard Engineering Methods for Expansive Soils	Design Engineer	City of Petaluma		
PD-6 Standard Engineering Methods for Corrosive Soils	Design Engineer	City of Petaluma		
PD-7 Groundwater Monitoring and Management	City of Petaluma	City of Petaluma		
PD-8 Construction Erosion and Spill Control Measures	Construction Manager	City of Petaluma & San Francisco Bay RWQCB		
PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons	City of Petaluma	City of Petaluma		
PD-10 Monitor Soil and Groundwater During Demolition/ Construction for Evidence of Hazardous Waste at Hopper Street	Construction Manager	City of Petaluma		
PD-11 Test Suspected and Properly Dispose of Soils and Groundwater at Hopper Street	City of Petaluma	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
PD-12 Inspect and Test for Lead-based Paint and Asbestos Containing Material (ACM) in any Buildings at 950 Hopper Street that will be Demolished	Construction Manager	City of Petaluma		
PD-13 Mosquito Prevention	City of Petaluma	City of Petaluma		
PD-14 Construction Air Quality Controls	Design Engineer	City of Petaluma		
PD-15 Permitting and Control of Toxic Air Contaminants	City of Petaluma	City of Petaluma		
PD-16 Odor Control	Design Engineer and Plant Operator	City of Petaluma		
PD-17 Construction Noise Mitigation Measures	Construction Manager/City of Petaluma	City of Petaluma		
PD-18 Operational Noise Mitigation Measures	Design Engineer	City of Petaluma		
PD-19 Protection of Historic and Archaeological Resources.	City of Petaluma	City of Petaluma		
PD-20 Protection of Previously Undiscovered Historic and Archeological Resources.	Design Engineer and City of Petaluma	City of Petaluma		
PD-21 Landscaping Design	Design Engineer	City of Petaluma		
PD-22 Lighting Design	Design Engineer and City of Petaluma	City of Petaluma		
PD-23 Fire Protection	Design Engineer and City of Petaluma	City of Petaluma		
Mitigation Measures				
AG-1 Maintain Maximum Acreage of Agricultural Production	City of Petaluma	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
GW-1 Drinking Water Well Protection Program	City of Petaluma	City of Petaluma		
WQ-1a Chromium Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1b Nickel Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1c Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1d Constituents not Monitored in Effluent Monitoring and Source Reduction	City of Petaluma	City of Petaluma		
WQ-1e Dioxin/Furan Congener Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
BIO-1a Aquatic Species Protection Program	City of Petaluma	City of Petaluma		
BIO-1b Rare, Threatened and Endangered Plant Protection Program	City of Petaluma	City of Petaluma		
BIO-1c Wildlife Protection Program	City of Petaluma	City of Petaluma		
BIO-2a Active Raptor and Migratory Bird Nest Protection Program	City of Petaluma	City of Petaluma		
BIO-2b Rookery Protection Program	City of Petaluma	City of Petaluma		
BIO-4 Prepare a Riparian Census and Conceptual Riparian Mitigation Plan	City of Petaluma	City of Petaluma		
BIO-7 Create or Restore Wetlands and Waters of the U.S.	City of Petaluma	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
TR-1a Reroute Construction Worker Trips	Construction Manager	City of Petaluma		
TR-1b Install Signage to Reroute Employee and Visitor Trips	City of Petaluma	City of Petaluma		

Source: Parsons Harland Bartholomew & Associates Inc., 1999

COMPLIANCE WITH EXISTING PROGRAMS

This section presents the applicable federal, state, regional, county, and local policies and regulations that the project components are required to comply with. Compliance with these policies and regulations, and future modifications thereof, is required, and will result in avoidance and/or minimization of adverse environmental impacts.

Federal

Archaeological and Historic Data Preservation Act of 1974

California Toxics Rule

Clean Air Act of 1970, amended 1977 and 1990

Clean Water Act of 1977, amending the Water Pollution Control Act

Comprehensive Environmental Response, Compensation and Liability Act of 1980, amended by the Superfund amendment and Reauthorization Act of 1986

Emergency Preparedness and Community Right-to-Know Act

Endangered Species Act of 1973, as amended (FESA)

Migratory Bird Treaty Act of 1918

National Historic Preservation Act of 1966, amended 1976 and 1980, Sections 106 and 110

Resources Conservation and Recovery Act

Rivers and Harbors Act of 1899, Section 10

U.S. EPA's 304(a) Gold Book (Water Quality Criteria)

U.S. EPA Federal Toxics rule

Water Pollution Control Act, as amended by the Clean Water Act of 1977; Section 404

State

Accidental Release Prevention and Hazardous Waste Control Laws

Alquist-Priolo Earthquake Fault Zone Act

California Clean Air Act

California Department of Fish and Game Stream Bed Alteration Agreement (Fish and Game Code Section 1601-1603)

California Department of Fish and Game Wildlife/Hardwood Management Guidelines (Revised 1994)

California Endangered Species Act (CESA) (Fish and Game Code Sec. 2050-2098)

California Government Code, Sec. 65962.5, Hazardous Waste and Substances Sites List (Cortese List

California Health and Safety Code, Sections 2270-2294, Mosquito Abatement

California Health and Safety Code, Section 25500 et seq. - Hazardous Materials Release Response Plans and Inventory

California Native Plant Protection Act (Fish and Game Code Section 1900-1913)

California Occupational Safety and Health Administration (Cal-OSHA)

California Wetlands Conservation Policy 1993

Porter-Cologne Water Quality Control Act

Public Resources Code, Sections 5020-5024 (California Register of Historic Places)

State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy)

State Water Resources Control Board *Antidegradation Policy Implementation for NPDES Permitting (APU 90-004)*

Title 8, California Code of Regulations (CCR), Sec. 25500 *et seq*., Hazardous Material Storage

Title 8, California Code of Regulations (CCR), Sec. 1500-1938, California Construction Safety Regulations

Title 8, California Code of Regulations (CCR), Sec. 1539-1541.1, Excavations

Title 8, California Code of Regulations (CCR), Sec. 1509 & 3203, Injury and Illness Prevention Program

Title 8, California Code of Regulations (CCR), Sec. 1597-1599, Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs

Title 8, California Code of Regulations (CCR), Sec. 5194, Hazard Communication

Title 22, California Code of Regulations (CCR), Sec. 60301 *et seq*., Recycled/Reclaimed Water

Title 22, California Code of Regulations, Section 66260.1 *et seq*. - California Hazardous Waste Regulations

Uniform Building Code (UBC) as amended locally

Water Quality Control Plan for the San Francisco Bay Basin (1995)

Regional

Bay Area Clean Air Plan

Bay Area Air Quality Management District Risk Management Policy

Bay Area Air Quality Management District Rules and Regulations

Sonoma County

Sonoma County General Plan

Sonoma County Tree Ordinance (No. 4014)

Sonoma County Zoning Ordinance

Sonoma County Building Codes

Petaluma

Petaluma General Plan

Petaluma Building and Grading Regulations

Petaluma Zoning Ordinance

Petaluma City Ordinance No. 1856, Heritage & Landmark Trees

MEASURES INCLUDED IN THE PROJECT

This section presents the measures the City decided to incorporate into the project.

PD-1 Uniform Relocation Assistance

Description: To mitigate for the loss of a dwelling unit and disruption of farming operations, the City shall develop and approve a relocation assistance program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies of 1970, which will govern all of the acquisition and displacement actions of the project. The affected property owner and tenants, depending on eligibility, would be afforded various services and forms of compensation in accordance with the provisions of this act.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR and after land acquisition.

Complete: Prior to the start of construction.

Monitoring Agency: City of Petaluma

Validation: Compensation of affected property owners and tenants shall be agreed upon in writing.

PD-2 Purchase Locally Grown or Inspected Plants

Description:	The City of Petaluma shall designate that the purchase of all plants for the wetlands and restoration efforts shall be from locally grown stock or from a nursery that has an approved monitoring program for the glassy-winged sharpshooter.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Prior to the start of landscaping or restoration
Monitoring Agency:	City of Petaluma
Validation:	Specifications for restoration and landscaping contracts

PD-3 Liquefaction Protection

Description*:* The City shall densify or solidify soil as necessary where site specific conditions are identified that are liquefaction-prone. Overexcavation and replacement of liquefiable soil will be viable for some of the construction. Vibro-replacement or compaction grouting would also be effective, especially in areas of deeper excavation or trenching. Special foundation designs (e.g., pile or structural slab) may be appropriate for structures such as the new structures near existing Pond No. 10. Piles are not required for new facilities in existing Ponds No. 1 and 4.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** Upon certification of the EIR

Complete: At completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract.

PD-4 Seismic Design to Resist Ground Shaking

Description: The City shall take into account the high probability of strong seismic ground shaking, by incorporating design features that accommodate lateral movements and flexibility. Construction of all facilities and earth embankments should meet UBC standards for Seismic Zone 4, Seismic Source Type A, and Seismic Coefficients of 0.44 Na (Ca) and 0.64 Na (Cv). UBC soil profile type for the site is Sd and near source factors for the Rodger's Creek fault are 1.19 (Na) and 1.58 (Nv). New facilities should be designed in accordance with the Sonoma County building codes which incorporate the seismic design for Zone 4 provisions of the 1997 Uniform Building Code.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: DesignEngineer

Timing: **Start:** Upon certification of the EIR

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-5 Standard Engineering Methods for Expansive Soils

Description:	The City shall implements standard geotechnical practices for expansive soils, testing according to American Society for Testing and Materials (ASTM) standards, and proper choice of materials shall be required.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Specifications for each construction contract

PD-6 Standard Engineering Methods for Corrosive Soils

Description:	The City shall sample soils for corrosivity and remove affected soils. Facilities shall be constructed of materials not susceptible to corrosion or designed to provide corrosion protection.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Specifications for each construction contract

PD-7 Groundwater Monitoring and Management

Description: The City shall monitor groundwater conditions around the site shall be monitored on a regular basis. Sampling of the three monitoring wells bordering the existing facility on the Lakeville site shall be supplemented by the addition of a fourth well, located downgradient from the proposed wetlands area (see Figure 4.4-1). This new well shall be installed and all four wells sampled prior to construction of new facilities. Following construction, the four wells shall be analyzed annually. Samples shall be analyzed for the constituents listed in Table 4.4-1, at a minimum. Additionally any constituents that are detected above the NPDES limits in the facility effluent should be added to the monitoring well analyte list. Monitoring shall include water level measurements. Should any groundwater contamination be determined to be resulting from the facilities, corrective action, such as source control (pretreatment) or additional treatment, shall be taken.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Prior to the start of construction

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report of monitoring results and Technical Memo describing corrective actions.

PD-8 Construction Erosion and Spill Control Measures

Description: The City shall develop and implement measures designed to prevent significant construction impacts to water quality. Examples of possible measures include revegetation of temporarily disturbed sites, development and implementation of a Storm Water Pollution Prevention Plan, protection of waterways from toxic discharge, and concrete waste management.

Construction within the Petaluma River or the lower portions of Ellis Creek shall be performed from a barge and with divers when appropriate. Excavation underwater shall be done with pressurized water.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Prior to start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and San Francisco Bay Regional Water Quality Control Board

Validation: Storm Water Pollution Prevention Plan

PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons

Description: The 1994 Phase I Site Assessment at 950 Hopper Street noted that the soil materials beneath the sludge lagoons may contain metals and other substances found in sewage influent. Therefore, the City shall perform a Phase II Site investigation (e.g., collection of soil or groundwater samples) for the lagoons. A State of California certified hazardous waste lab using EPA-approved analytical methods shall perform the laboratory analysis.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of demolition of Hopper Street facilities

Monitoring Agency: City of Petaluma

Validation: Phase II Site Assessment

PD-10 Monitor Soil and Groundwater during Demolition/construction for Evidence of Hazardous Waste at Hopper Street

Description: The City shall include monitoring by the contractor for subsurface contamination in compliance with the California Department of Occupational Safety and Health (Cal/OSH) for all demolition/construction activities related to the demolition at Hopper Street that require excavation or exposure of soil in areas suspected of containing soil or groundwater contamination. This monitoring would, at a minimum, include visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training as required by Cal/OSH for workers engaged in hazardous waste operations.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** At the start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Review of personnel training records to ensure use of appropriately trained personnel.

PD-11 Test Suspected and Properly Dispose of Contaminated Soils and Groundwater at Hopper Street

Description: In areas where contamination of soil and groundwater is suspected or known, the City shall contain groundwater brought to the surface as a result of dewatering in Baker tanks or similar containment devices or immediately dispose of or remediate on site as recommended by the Phase II investigation. At a minimum, this would allow the suspended solids associated with dewatering to settle out before discharge, if discharge is allowable. Depending on the Phase II investigation, and the probability of groundwater being contaminated based on visual or other evidence, samples would be collected and analyzed. A State of California certified hazardous waste laboratory using EPA-approved analytical methods should perform the laboratory analyses. The types of analyses should be based on the likely contaminant(s) and on local permitting requirements.

All potentially contaminated materials encountered during project demolition/construction activities shall be evaluated in the context of applicable local, state and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. All evaluations, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel (having received a minimum of 40 hours HAZWOPER training).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Upon completion of Phase II investigation

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: The City of Petaluma shall ensure the use of qualified hazardous waste personnel, review the results of any hazardous waste analysis, and monitor any necessary containerization program.

PD-12 Inspect and Test for Lead-based Paint and Abestos Containing Material (ACM) Any Buildings at 950 Hopper Street that will be Demolished

Description: The City shall inspect (and test as necessary) all buildings subject to demolition for asbestos containing material (ACM) and lead-based paints. Certified inspectors and consultants shall perform the work (i.e., Cal/OSH certification for asbestos workers and California Department of Health Services certification for lead workers). The City of Petaluma or its demolition contractor shall notify the Bay Area Air Quality Management District before demolition commences if the asbestos survey identifies ACM exceeding the threshold amounts specified in state regulations. Certified contractors shall perform any required remediation.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of demolition

Monitoring Agency: City of Petaluma

Validation: Review personnel certification records and pre-demolition inspection records to ensure compliance and carry out necessary notification and remediation.

PD-13 Mosquito Prevention

Description: The City shall continue consulting with the Marin/Sonoma Mosquito and Vector Control District in designing and developing the wetlands and storage ponds. The City of Petaluma shall comply with the Marin/Sonoma Mosquito and Control District's criteria for mosquito prevention in wastewater reclamation or disposal projects. The District's design and mosquito prevention criteria shall be incorporated into the project's Wetlands Management Program. For example, wetlands that are operated as shallow water areas (less than one foot) should be properly graded to facilitate drainage and ditched to provide access for mosquito fish. Among the District's design recommendations are that ponds should not have small coves or irregularities (although the ponds may be of any shape), that side slopes should be as steep as possible, and that dead algae, vegetation and debris should be routinely removed to minimize mosquito habitat.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of construction

Monitoring Agency: City of Petaluma

Validation: Marin/Sonoma Mosquito and Control District shall review design of wetlands and storage ponds.

PD-14 Construction Air Quality Controls

Description: The BAAQMD considers air quality impacts associated with construction activities to be less than significant, if all applicable control measures recommended in their CEQA guidelines are implemented. The City shall incorporate the following into construction contract specifications:

- Water all active construction areas with the potential to generate significant amounts of dust at least twice daily and more often during windy periods. Watering is the single-most effective measure to control dust emissions from construction sites. Proper watering could reduce dust emissions by over 75%.
- Cover all trucks hauling dirt or maintain at least two feet of freeboard. Dust-proof chutes shall be used as appropriate to load debris onto trucks during any demolition.
- Pave, apply water two times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.
- Hydro seed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas that are inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.
- Limit traffic speeds on any unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.
- Properly maintain construction equipment. This measure could reduce emissions of ROG, NOx and PM10 by about 5%.

- Prior to demolition activities, identify any hazardous building materials or soils that may be disturbed during construction/demolition. If hazardous materials are identified, consult with the BAAQMD's Enforcement Division to ensure that demolition activities will comply with BAAQMD Regulations.

- Optional - Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

- Optional - If necessary, install windbreaks, or plant trees/vegetative windbreaks at the windward side(s) of construction areas.

- Optional - Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph and visible dust emission cannot be prevented from leaving the construction site(s).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** At the start of construction

Complete: Upon the completion of Project construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-15 Permitting and Control of Toxic Air Contaminants

Description: The City shall obtain all necessary permits from the BAAQMD. If necessary, the project shall incorporate control equipment to reduce exposure of the public to insignificant levels. Control measures, such as carbon absorption systems, shall be implemented if necessary to reduce air toxic emissions.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of EIR.

Complete: Prior to start of Project operation.

Monitoring Agency: City of Petaluma

Validation: BAAQMD permits and Technical Memo describing control measures if needed.

PD-16 Odor Control

Description: The City shall ensure proper design and operation of the facilities to reduce the potential for odor complaints. The design and operation of facilities shall ensure conformance with BAAQMD Regulation 7. Ten or more complaints or five or more verified complaints over a 90-day period would indicate that an odor problem with the proposed facility exists. Additional mitigation/abatement measures, such as scrubbers or further oxidation processes, shall be taken to eliminate any substantial odor problems

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and Plant Operator

Timing: **Start:** Upon certification of EIR

Complete: On-going during operation of project

Monitoring Agency: City of Petaluma

Validation: A complaint monitoring program and Technical Memo describing additional abatement measures if required.

PD-17 Construction Noise Mitigation Measures

Description: The City shall incorporate the following conditions in related construction contract agreements:

- Construction Scheduling. Limit noise-generating construction activities, including truck traffic coming to and from the site for any purpose, to daytime, weekday, non-holiday hours (7:00 am to 6:00 pm).
- Construction Equipment Mufflers and Maintenance. Properly muffle and maintain all construction equipment powered by internal combustion engines.
- Idling Prohibitions. Prohibit unnecessary idling of internal combustion engines.
- Equipment Location and Shielding. Locate all stationary noise-generating construction equipment such as air compressors as far as practical from existing nearby residences and other noise-sensitive land uses. Acoustically shield such equipment.
- Quiet Equipment Selection. Select quiet construction equipment, particularly air compressors, whenever possible. Fit motorized equipment with proper mufflers in good working order.
- Noise Disturbance Coordinator. Designate a "noise disturbance coordinator" who will be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager/City of Petaluma

Timing: **Start:** During construction

Complete: At the completion of construction

Monitoring Agency: City of Petaluma

Validation: The City will perform daily checks to ensure compliance with this measure. The City will respond to complaints from private citizens regarding construction noise within 24 hours.

Construction noise shall be monitored at the nearest noise-sensitive receptor locations(s) outside the project boundaries, during high noise generating activity to determine compliance with local noise criteria.

In the event that the noise criteria are exceeded, the construction activities shall be reviewed to determine additional mitigation measures to further reduce the construction noise. The telephone number of the Noise Disturbance Coordinator shall be made available to the residents around the project site so that annoyed residents would be able to report their complaints.

PD-18 Operational Noise Mitigation Measures

Description: As part of the design process the City shall retain an acoustical engineer to ensure that the noise levels produced by mechanical equipment at the Lakeville facility do not exceed County standards. Potential measures may include;

- Acoustical enclosures at noise producing equipment
- Alternative equipment selections with lower noise emissions
- Mufflers for equipment exhaust systems

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** During final design of the proposed Project

Complete: At completion of final design

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-19 Protection of Historic and Archaeological Resources

Description: In order to preserve cultural resources, the City shall perform subsurface testing, evaluation for significance, and/or recordation for the three sites, when avoidance is not feasible. The Hopper Street facility, the communication facility, and the farm complex on Lakeville Highway shall be recorded, mapped, and photographed by a qualified professional architectural historian to Department of Parks and Recreation (DPR) standards on current DPR 523 series forms. The Hopper Street facility shall be evaluated for significance to the NRHP. All site records and evaluation documentation shall be submitted to the State Historic Preservation Office for Section 106 compliance prior to any construction activities on the site.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Completion: Prior to construction

Monitoring Agency: City of Petaluma

Validation: Recordation for the three sites

PD-20 Protection of Previously Undiscovered Historic and Archaeological Resources

Description: If subsurface archaeological or historical remains are discovered during construction, work in the area shall stop immediately and a qualified professional archaeologist shall be consulted to develop, if necessary, further mitigation measures to reduce any archaeological impact to a less than significant level before construction continues.

If human burials are encountered, all work in the area will stop immediately and the Sonoma County coroner's office shall be notified immediately. If the remains are determined to be Native American in origin, both the Native American Heritage Commission and any identified descendants must be notified and recommendations for treatment solicited (CEQA Section 15064.5); Health and Safety Code Section 7050.5; Public Resources Code Section 5097.94 and 5097.98).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and City of Petaluma

Timing: **Start:** Upon certification of the EIR

Completion: Completion of construction

Monitoring Agency: City of Petaluma

Validation: A qualified professional archaeologist shall be consulted if subsurface archaeological or historical remains are discovered.

PD-21 Landscaping Design

Description: The City shall provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway. Landscape materials in the form of mature and fast-growing trees (such as the poplars already on site) and other appropriate vegetation at the site's southwestern perimeter would screen the view from northwest-bound travelers. Where technically feasible, locate new facilities on the southwest portion of the site to increase the viewing distance from the highway. Design the landscaping, buildings and facilities in character with the surrounding agricultural uses and subject to site plan and architectural review. If new fencing is necessary along Lakeville Highway, locate new fencing for the wetlands area away from the highway with a landscape buffer between the highway and the fence.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** During construction.

Complete: Within one year of completing construction of a Project component.

Monitoring Agency: City of Petaluma

Validation: Specifications for landscape and restoration contracts

PD-22 Lighting Design

Description: The City shall design lighting for the administration and maintenance buildings, treatment facilities and parking areas to utilize shielded, low-intensity light sources. Locate light sources low and directed away from off-site viewers. Direct personnel to turn lights on only when needed; do not operate exterior lighting continuously or automatically.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and City of Petaluma

Timing: **Start:** Certification of the EIR

Complete: Throughout the life of the project

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract. The design of the lighting will be verified during the review and certification of Final Engineering Drawings. The City will check compliance with installation of the specified lighting and controls during regular inspections of construction. The City will monitor conformance with the operational criteria as part of regular reviews of operation procedures.

PD-23 Fire Protection

Description: The City shall provide sprinklers in new buildings. In addition to the sprinklers, there will be a requirement to install a weather station at the site. This will provide the Fire Department with weather information in the event of any potential release of hazardous chemicals in the future. Fire alarms shall be installed at the site. This will quickly alert employees of fire danger and allow them to evacuate the area.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and City of Petaluma

Timing: **Start**: At start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

MITIGATION MEASURES

This section contains mitigation measures to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Compliance with these mitigation measures would result in minimizing, rectifying, or reducing adverse environmental impacts.

AG-1 Maintain Maximum Acreage of Agricultural Production

Description: The City shall maintain the maximum acreage feasible in agricultural production on Parcels A and B.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Upon completion of construction.

Monitoring Agency: City of Petaluma

Validation:

GW-1 Drinking Water Well Protection Program

Description: The City shall monitor water quality in the nearby drinking water well before and after construction. If changes are detected after construction that are deemed deleterious to public health, one of the following measures, or an equivalent measure, shall be implemented:

- Drill a new well further from the Water Recycling Facility
- Retrofit the existing well, e.g., provide a deeper casing
- Provide wellhead treatment system for the constituents that are causing the public health concern.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring and Technical Memo describing corrective measures if necessary..

WQ-1a Chromium Monitoring and Source Reduction Program

Description: The City shall implement a Chromium Monitoring Program to determine if the concentration of chromium in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of chromium to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of chromium during the discharge season exceed the lowest CTR or Basin Plan criterion for chromium (currently 11 µg/L), the City shall implement a Chromium Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for chromium and will provide for enforcement of these limits. Typical chromium sources are industries involving the following uses of chromium: fabrication of alloys; preparation of alloy steels to enhance corrosion and heat resistance; fabrication of plated products for decoration or increased wear resistance; production of non-ferrous alloys to impart special qualities to the alloys; textile industry use in dyeing, silk treating, printing, and moth proofing wool; leather industry use for tanning; photographic fixing baths; and fuel additives and propellant additives.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1b Nickel Monitoring and Source Reduction Program Program

Description: The City shall implement a Nickel Monitoring Program to determine if the concentration of nickel in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of nickel to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of nickel exceeds the lowest CTR or Basin Plan criterion for nickel (currently 7.1 µg/L), the City shall implement a Nickel Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for nickel and will provide for enforcement of these limits. Typical nickel sources are manufacturing processes involving the following uses of nickel: plating; for various alloys such as new silver, Chinese silver, German silver; for coins, electrotypes, lightning rod tips, electrical contacts and electrodes, spark plugs, machinery parts; as a catalyst for hydrogenation of organic substances; in the manufacture stainless steels and nickel chrome resistance wire; and for coloring glass.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1c Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program

Description: The City shall implement a Bis(2-ethylhexyl)phthalate Effluent Monitoring Program to determine if the concentrations of bis(2-ethylhexyl)phthalate in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of bis(2-ethylhexyl)phthalate results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for bis(2-ethylhexyl)phthalate. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1d Constituents not Monitored in Effluent Monitoring and Source Reduction

Description: The City shall implement an Unmeasured Priority Pollutant Monitoring Program to determine if the concentrations of aldrin, 2,3,7,8-TCDD, acrolein, and acrylonitrile in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of any of these compounds results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for that compound. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1e Dioxin/Furan Congener Monitoring and Source Reduction Program

Description: The City shall implement a Dioxin/Furan Congener Monitoring Program to determine if the concentration of dioxin/furan congeners in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of dioxin/furan congeners to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If the TEF normalized concentration of three consecutive samples of a dioxin/furan congener exceeds the lowest CTR or Basin Plan criterion for 2,3,7,8-TCDD (currently 0.014 µg/L) or any future CTR or Basin Plan criterion established for that congener, the City shall implement a Dioxin/Furan Congener Source Reduction Program for non-atmospheric sources of dioxin/furan congeners. Under this program, the City will establish local pretreatment limits for non-atmospheric sources of the dioxin/furan congener and will provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

BIO-1a Aquatic Species Protection Program

Description: The City shall implement an Aquatic Species Protection Plan, as follows:

- A Worker Environmental Awareness Training Program for construction personnel shall be provided.
- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.
- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.
- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.
- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of 2:1 (2 acres of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.
- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. Detailed specifications shall be incorporated onto bid documents and construction drawings.
- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing:	**Start**: After certification of the EIR start of construction
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Annual report

BIO-1b Rare, Threatened and Endangered Plant Protection Program

Description: The City shall retain a qualified biologist to conduct floristically-based surveys for special-status plants in accordance with the CDFG's "Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities" prior to initiation of construction activities. The purpose of these surveys will be to locate and identify any special-status plants that may occur in the proposed construction zone.

If special-status plants are located during the surveys, exclusionary buffer zones (recommend a minimum 20-foot buffer, where feasible) shall be established around each population site. Mesh fencing shall be installed at the boundary of the exclusionary buffer zone prior to initiation of construction activities.

If complete avoidance cannot be achieved, the City shall submit a site-specific mitigation and compensation program for the affected plants in consultation with the CDFG. The mitigation program shall include the results of the surveys, delineation of suitable habitats for restoration or planting of rare species, procedures for obtaining seed before construction, and performance standards for success of the mitigation program. Sufficient areas exist along Ellis Creek and elsewhere on the site to create or restore plant communities if needed.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

BIO-1c Wildlife Protection Program

Description:	The City shall implement rules at the public areas on Parcels A and B to require dogs to be leashed at all times. In addition, rules will be established requiring the public to remain on established trails.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: Upon completion of construction
	Complete: Throughout the life of the project
Monitoring Agency:	City of Petaluma
Validation:	Copy of rules

BIO-2a Active Raptor and Migratory Bird Nest Protection Program

Description: The City shall retain a qualified biologist to conduct pre-construction surveys to determine if any active raptor or migratory bird nests occur within 500 feet of the project area at least two weeks prior to initiation of construction activities.

If active nests are located in the study area, construction exclusion zones shall be established around each active nest. Appropriate construction exclusion zones shall be established through consultation with CDFG. Construction activities shall be prohibited within exclusion zone until the end of the nesting season.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors. The monitor shall also monitor the nest to determine when the young have fledged and submit weekly reports to the CDFG and the City of Petaluma throughout the nesting season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

BIO-2b Rookery Protection Program

Description: The City shall establish a construction exclusion zone around the rookery located near pond 8 of the water treatment facility. Furthermore, a qualified biologist will conduct pre-construction surveys to determine if any other nests occur within 500 feet of the project area. A construction exclusion zone shall be maintained around each rookery between January 15 and June 15 to ensure that no construction activities occur within 500 feet of an active rookery (personal communication, Wilcox 2001).

A qualified biologist shall monitor the rookery to evaluate potential disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the rookery.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

BIO-4 Prepare a Riparian Census and Conceptual Riparian Mitigation Plan

Description: A qualified biologist shall conduct a census of all riparian woody vegetation from the top-of-bank and/or drip-line of the tree or shrub canopy within the project area of the proposed Ellis Creek bridge and approaches. The census will take place within the staked and flagged areas of the site where ground disturbance will take place. The census will include identification of riparian tree and shrub species, counts of stems, and diameter at breast height for those stems greater than 24-inches in diameter within the construction footprint. The City will prepare a Riparian Mitigation and Monitoring Plan to include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. The plan will be written in sufficient detail for a CDFG 1603 Streambed Alteration Agreement. Mitigation will be on site, if possible, at a ratio of 2:1, namely 2 acres of riparian forest for every acre impacted by the construction of the proposed Ellis Creek Bridge. Mitigation sites will be preserved in perpetuity.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

BIO-7 Create or Restore Wetlands and Waters of the U.S.

Description: The City shall prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. The Plan shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. Mitigation will be on site and in kind, if possible.

Compensatory mitigation for permanent impacts shall be provided at a ratio of 2:1, that is, 2 acres of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

TR-1a Reroute Construction Worker Trips

Description: Before 9:00 AM and after 4:00 PM, and after the new access road is constructed, construction workers shall be required to enter and exit Lakeville Highway at McDowell Boulevard.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start**: At start of construction.

Complete: Upon completion of construction.

Monitoring Agency: City of Petaluma

Validation: Specifications in each construction contract

TR-1b Install Signage to Reroute Employee and Visitor Trips

Description:	The City shall install an informational sign on Lakeville Highway just west of the intersection with McDowell Blvd., indicating that the new wetlands park can be accessed by turning right on McDowell Blvd. In addition, the City shall install a sign as visitors leave the wetlands park to prohibit a right turn into Pine View between 4:00 and 6:00 PM on weekdays.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: Upon completion of construction
	Complete: Throughout the life of the project
Monitoring Agency:	City of Petaluma
Validation:	Copy of signage

4 ENVIRONMENTAL ANALYSIS

Each topic section (e.g., Section 4.1 - Land Use) in this Chapter is organized according to the following format.

ENVIRONMENTAL SETTING

The Environmental Setting describes the existing conditions as they relate to the attributes of the environment that may be affected by the project as of the date of the Notice of Preparation in May 200l. Pursuant to Section 15125 of the state CEQA Guidelines, the environmental settings have been prepared at a level of detail necessary to provide an understanding of the significant effects of the proposed project and its alternatives.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

This section identifies the relevant state, federal, and local environmental standards (e.g., water quality standards, air quality standards, zoning provisions, etc.) and other criteria by which a significant change in the environment can be assessed.

IMPACTS AND MITIGATION MEASURES

The impact analyses in this chapter describe anticipated changes in the environment from the project. The impact analyses have been prepared to comply with Section 15143 of the CEQA Guidelines, which states that the "significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence." The level of significance is identified for each impact based on a comparison with the impact evaluation criteria. Where the project results in impacts that are considered significant with respect to the impact evaluation criteria, mitigation measures are proposed to avoid or minimize the impact where feasible. If impacts cannot be reduced to a level that is less than significant, the impact is identified as significant and unavoidable.

CUMULATIVE IMPACTS

Cumulative effects are discussed for each topic section when the project's incremental effect is "cumulatively considerable," as defined in section 15065(c) of the CEQA Guidelines. "Cumulatively considerable" means that the incremental effects of the project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects. Chapter 2 of this EIR includes a list of the past, current, and probable future projects that are used in the cumulative impacts analysis.

A cumulative impact consists of an impact that results from the combination of the project evaluated in the EIR together with other related projects. For many impacts, the cumulative impacts analysis in this EIR is based upon a list of past, present, and probable future projects

producing related or cumulative impacts. The relevant list of projects can vary from impact to impact depending upon the nature of each environmental resource being examined, the location of the project, and its type.

4.1 LAND USE

This section discusses the consistency of the project with existing and planned land uses and existing zoning. To provide a basis for this evaluation the Setting section provides information on regional land use patterns, General Plans of the jurisdictions within the study area, and existing and planned land uses within the vicinity of project components. Issues related to scenic corridors are evaluated in the Visual Resources Section 4.13.

SETTING

Existing Land Use

At 950 Hopper Street, the site is utilized by the existing wastewater treatment facility.

At 4400 Lakeville Highway the site is used for existing oxidation ponds, disinfection, and discharge via a pipeline and outfall to the Petaluma River. The existing facilities on Lakeville Highway have been annexed into the City, but are surrounded by unincorporated Sonoma County lands.

Parcels A and B, northwest of the existing Lakeville Highway site, and Parcel C to the southeast, are utilized for feed crops. Parcel A has an existing farmhouse that is rented. These properties are within the County.

Land Use near the Sites

The existing wastewater treatment facility is located at 950 Hopper Street. Land uses near the facility consist of a mix of public and industrial users. Immediately west of the site are the city corporation yard and an animal control shelter. On the north side of the facility are Hopper Street, railroad lines, a ditch filled with weedy vegetation, and the backs of the commercial uses that front on Lakeville Highway. Industrial uses surround the public uses on the west, south and east. The Petaluma River lies to the south across the Pomeroy property.

Land use in the general vicinity of the Lakeville Highway oxidation pond site is predominately agricultural, including both crops and grazing. Residential uses are typically associated with the agricultural operations. There are scattered commercial uses along Lakeville Highway; generally, these uses are also associated with agricultural operations.

The City's Lakeville oxidation pond site is an island of incorporated land situated at the far southeastern edge of the City surrounded by unincorporated Sonoma County land. The pond site is located on approximately 160 acres of three parcels of City-owned land that comprise a total of approximately 380 acres southwest of the developed portion of the City along Lakeville Highway. The Petaluma River lies southwest of the oxidation ponds. The oxidation pond site is bordered by a row of eucalyptus trees and Ellis Creek along the west side and a grove of planted poplar trees along the highway frontage. A recycled water pump station is situated behind the grove of trees. Immediately northwest of Parcels A and B is the Oakmead/Northbay Business Park, which includes a number of commercial and office tenants. To the northeast across Lakeville Highway, Brown's Lane provides access to several rural residences and agricultural uses including irrigated agriculture, and a dairy operation. Southwest across the Petaluma River are large lots devoted to forage

production. Parcel sizes near the City's oxidation ponds range from approximately 20 acres up to more than 550 acres.

Planning Jurisdictions

Two jurisdictions, Sonoma County (County) and the City of Petaluma (City), are potentially affected by the project and its alternatives. Each has adopted a General Plan, which includes land use goals, objectives, and policies as well as a Land Use Plan Map showing future land use designations.

Sonoma County

The Sonoma County General Plan (1989, revised 1991 and 1994) is applicable to the unincorporated areas of Sonoma County and is intended to guide decisions regarding future growth, development, and conservation of resources through 2005. The General Plan divides the County into nine Planning Areas (also termed Sub-county Planning Regions) each with its own goals, objectives, and policies. The project is located in the Petaluma and Environs Planning Area. The General Plan is currently going through an update process.

Petaluma

The Petaluma General Plan (1987, revised 1991, 1993, and 1995) identifies development policies for the City and its planning referral area for the period 1987 to 2005, and establishes an urban limit line. The planning referral area encompasses the area within the Petaluma River watershed. The General Plan is currently going through a revision process.

Regional Land Use Patterns

Sonoma County

Existing land use patterns in Sonoma County are generally characterized by city- and community-centered growth, with areas of agricultural use and other open space separating the cities and communities. Within the city and commercial areas, there exists a wide variety of densities of development, ranging from highly urban to semi-rural, typically with larger lots around the fringe of the incorporated areas and in the unincorporated communities.

Agriculture is an important land use in the County, with a diversity of agricultural operations, including vineyards, orchards, dairies, forage crops, specialty crops, and livestock. Other natural resource areas, such as timberlands and the mining of aggregates, are also important elements of the overall land use patterns in portions of the County.

Generally, the planned land use patterns at the countywide level reflect existing development patterns. In Sonoma County, planned land uses are based upon focused growth within relatively compact city and community areas, with community separators to maintain the separate identities of the major cities in the County.

Petaluma

The existing development within the Petaluma area is well established and defined by the urban separator, a visible band of open space, which is continuous on the east side, parallel to

Adobe Road. On Petaluma's south side near the Lakeview Highway site, the urban separator lies at the Urban Limit line, separating agricultural uses from a regional park.

Downtown Petaluma, west of the Petaluma River, is the primary commercial and cultural center, while the higher intensity development including other commercial centers and industrial uses, follows the Highway 101 and Lakeville Highway corridors. Development to the east of these corridors is primarily residential, with interspersed public/semi-public uses (such as schools and parks) and a limited number of local retail centers. Along the eastern edge of this urban development, between Washington Street and Casa Grande Road, is the Petaluma Municipal Airport, which is the major public use in the eastern part of the City. Along the western side of the City are areas of lower density suburban and rural residential areas.

Planned land uses in the Petaluma General Plan maintain the existing established pattern of development, with higher intensity uses in the downtown area and along the Highway 101 and Lakeville Highway corridors.

Land Use Goals, Objectives, and Policies

Table 4.1-1 shows zoning and General Plan designations for the sites that would be affected by the project.

Table 4.1-1

Zoning and General Plan Designation

Site	Jurisdiction	Zoning	General Plan
950 Hopper Street	City of Petaluma	Light Industrial (M-L)	Public and Institutional
4400 Lakeville Highway	City of Petaluma	Agriculture, with flood combining district over portions of property (A-FP-C)	Public and Institutional
Parcel A	Sonoma County	Northern 1/3 – Diverse Agriculture, with flood and biotic resource combining districts over portions of the property (DA-F2) Southern 2/3 – Land Extensive Agriculture, with flood and biotic resource combining districts over portions of the property (LEA-F2)	Land Extensive Agriculture

Table 4.1-1

Zoning and General Plan Designation

Site	Jurisdiction	Zoning	General Plan
Parcel B	Sonoma County	Land Extensive Agriculture, with flood and biotic resource combining districts over portions of the property (LEA-F2)	Land Extensive Agriculture

Source: Parsons 2002

Sonoma County

Sonoma County, which has jurisdiction over Parcels A, B, and C, has zoned the land as diverse agriculture (DA) and Land Extensive Agriculture (LEA). The purpose of the DA zone is to implement the provisions of the DA land use category (Section 2.7.3 of the General Plan) and the policies of the Agricultural Resources Element; and to enhance and protect those land areas where soil, climate, and water conditions support farming, but where it may not be the principal occupation of the farmer – and small acreage intensive farming and part-time farming activities are predominant. The purpose of the LEA zone is to implement the provisions of the LEA land use category (Section 2.7.2 of the General Plan) and policies of the Agricultural Element; and enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land. The LEA designation allows one dwelling unit per 30 acres or one dwelling unit per 60 acres, depending on the area.

The two parcels that would need to be acquired for the polishing wetlands and river access improvements, identified as Parcels A and B, are located northwest of the oxidation ponds between the existing Lakeville site and the Oakmead/Northbay Business Park, in unincorporated Sonoma County. The top third of Parcel A is zoned DA while the bottom two-thirds is zoned LEA. There is an F2 (floodplain) overlay zone and a Biotic Resource overlay zone along Ellis Creek. Parcel B is zoned LEA and also has an F2 overlay zone coving the bottom half of the parcel. The purpose of the F2 district is to “provide for the protection from hazards and damage which may result from flood waters”.

There are no habitat conservation plans or natural community conservation plans in the area.

Petaluma

The following policies, which are contained in the Petaluma General Plan 1987-2005 Land Use and River Elements, are applicable to the project. Specifically, these are:

Land Use Element Objectives

m) Ensure that the water and sewer systems keep pace with growth.

n) Plan long-range for needed roads and infrastructure.

The City's General Plan land use designations at the existing Hopper Street treatment plant site include Public and Institutional. The site is surrounded by land designated as Industrial to the east, west and south, and Thoroughfare Commercial across Hopper Street to the north. The General Plan Circulation Map designates a possible future extension of Caulfield Lane across the site to serve industrial lands along the river. The City has zoned the wastewater treatment plant site, animal control yard, and corporation yard as Light Industrial (M-L). The zoning designation west, south and east is General Industrial (M-G). North across Hopper Street the zoning designation is Highway Commercial (C-H) with a Floodplain-Combining District (FP-C).

At the Lakeville oxidation pond site the General Plan designation is Public and Institutional. The site is zoned as Agricultural, with a Floodplain Combining Overlay (A-FP-C) over a portion of the site (excluding the oxidation ponds). The purpose of the agricultural district is to preserve blocks of agricultural land (both prime and nonprime) in agricultural or open space use. Public and quasi-public buildings or structures are considered conditional uses in an agricultural district. The agricultural zone sets the height regulation for structures at two and one-half stories or 25 feet, except as provided in Section 24-100 of the Petaluma Zoning Ordinance.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

The Governor's Office of Planning and Research has published a guide to developing thresholds of significance to assist in determining whether a project may result in a significant environmental effect (OPR, 1994). A "threshold of significance" is the level at which the Lead Agency finds the effects of a project to be significant. It is a qualitative or quantitative standard based on health based standards, service capacity standards, ecological tolerance, or other standards relating to environmental quality issues such as those listed in the Initial Study checklist, agency regulatory standards, consultation with other agencies, and the Lead Agency's specific thresholds of significance.

Potential land use impacts may occur if:

- the project results in a change in land use, or
- the project results in a loss of open space.

A change in land use is defined as a change from one land use type to another (e.g., from agricultural to industrial use). A loss of open space is defined as the permanent coverage of land by structures, roadways, parking areas or other impervious surfaces.

Impacts may occur directly as a result of project activities (e.g., conversion of land use on a site due to construction of a project component) or indirectly within a larger geographic area over time as a result of implementing the project (e.g., conversion of land uses within an area resulting from the land use change on the project site.)

Based on the above considerations, the following are the evaluation criteria and points of significance used for assessing the impacts of the project on land use:

Table 4.1-2

Evaluation Criteria with Point of Significance – Land Use

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project be inconsistent with the land use plan map of an adopted General Plan?	Acres of land	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
2. Will the project be inconsistent with zoning?	Acres of land	Greater than 0 acres of land	Zoning regulations of Sonoma County; Petaluma
3. Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	a. Acres of MRZ-2 land developed in incompatible uses b. Acres of quarry site designated by the ARM plan developed in incompatible uses	a. Greater than 0 acres of land b. Greater than 0 acres of land	a. General Plan of Sonoma County and the Mineral Land Classification of the Division of Mines and Geology (1989). b. Sonoma County Aggregate Resources Management (ARM) Plan (1994).
4. Will the project introduce inappropriate uses in a Community Separator?	Acres of land within Community Separators developed in inappropriate uses	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
5. Will the project increase potential for conflict as a result of incompatible land uses?	a. Lineal feet of incompatible uses b. Number of housing units of incompatible use	a. Greater than 0 lineal feet. b. Greater than 0 housing units.	Sonoma County General Plan Petaluma General Plan
6. Will the project convert non-urban land to urban uses for Project facilities?	Acres of land converted	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
7. Will the project convert public open space for Project facilities?	Acres of land converted	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
8. Will the project result in loss of homes due to construction of facilities?	Number of homes or agricultural buildings lost	Greater than 0 homes or buildings	Uniform Relocation Assistance and Real Property Acquisition Act

Source: Parsons, 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: LU-1 and 2: Will the project impact land use based on evaluation criteria 1 and 2?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Public and quasi-public buildings and structures are considered conditional uses in an agricultural district, and the water recycling facility and river access improvements would thus be compatible with both the general plan and zoning designations. A Use Permit would need to be obtained from the City of Petaluma, and also from the County of Sonoma if construction were to occur prior to annexation.

The project would provide for treatment of wastewater to meet Title 22 requirements. As such, construction of the project would enable the irrigation program to serve a wider variety of agricultural users. The Lakeville Highway site is conveniently located to serve the surrounding agricultural uses. In this manner, the project would provide agricultural support and long-term preservation of agricultural use. This would be consistent with the Sonoma County and Petaluma general plan policies to stabilize agricultural use at the urban fringe and maintain agricultural open space.

There would be no land use impact at the Hopper Street site. The existing treatment plant facilities at Hopper Street will be demolished, except for the pump station, which would remain. No change in the general type of use as a light industrial/public facility is proposed, and the intensity of use at the site will be reduced. Because the surrounding uses are industrial and commercial, the removal of the plant will not be inconsistent with existing planning or zoning.

Mitigation: No mitigation is necessary.

IMPACT: LU-3: Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?

Analysis: *Water Recycling Facility and River Access Improvements - No Impact*

There is no land classified as MRZ-2 or as a designated quarry area in the project's vicinity. Therefore, there is no potential for adverse impact due to inconsistency with established or potential mineral extraction.

Mitigation: No mitigation is necessary.

IMPACT: LU-4: Will the project introduce inappropriate uses in a Community Separator?

Analysis: *Water Recycling Facility and River Access Improvements - No Impact*

Neither the Hopper Street nor Lakeville Highway site is included in a Community Separator designation in the Sonoma County General Plan Open Space Element.

Mitigation: No mitigation is necessary.

IMPACT: LU-5: Will the project increase potential for conflict as a result of incompatible land uses?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Improvements to be built at the oxidation pond site are similar to the uses currently at the oxidation ponds and would not be incompatible with the agricultural uses to the southeast and across Lakeville Highway. Polishing wetlands and recreational uses to be built on Parcels A and B would be adjacent to Shollenberger Park, the Oakmead/Northbay Business Park and agricultural uses across Lakeville Highway. These uses are designed to interface with Shollenberger Park, and would be compatible with the Business Park and agricultural uses. One of the reasons the City desires to acquire Parcels A and B is to provide a buffer zone between the main facility and commercial or industrial uses. Acquisition for the wetlands and public educational features would prevent future development on Parcels A and B which might be incompatible with primary water recycling facility improvements at the oxidation pond site. This impact is considered less than significant.

Demolition of the plant at Hopper Street would allow for eventual future reuse of this site and thus assist in the attainment of land use objectives contained in the City's General Plan. The Petaluma General Plan recommends the extension of Caulfield Road to accommodate general plan buildout and the Caulfield Lane extension appears to be located at the existing plant site. Demolition of the plant may provide for eventual future extension of Caulfield Lane as recommended in the Petaluma General Plan (Ban, 2001). This potential impact is considered beneficial.

Mitigation: No mitigation is necessary.

IMPACT: LU-6: Will the project convert non-urban land to urban uses for Project facilities?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Acquisition of Parcels A and B, which total about 293 acres (Parcel A is approximately 96 acres and Parcel B is approximately 197 acres), for use as polishing wetlands and river access improvements would change land use from agricultural to wetlands and recreational. The polishing wetlands and river access improvements will fulfill the goals of education, recreation, and habitat creation on the site, and will not function as an urban, developed facility.

The project would not encourage the conversion of other lands from agriculture to urban uses. By providing a reliable source of recycled water to serve local agriculture, the project encourages continued agricultural uses in the project area.

Mitigation: No mitigation is necessary.

IMPACT: LU-7: Will the project convert public open space for project facilities?

Analysis: *Water Recycling Facility and River Access Improvements - No Impact*

No public open space would be used for project facilities. In fact, the polishing wetlands and river access improvements to be created on Parcels A and B would be used for public recreation and education.

Mitigation: No mitigation is necessary.

IMPACT: LU-8: Will the project result in loss of homes due to construction of facilities?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Acquisition and reuse of Parcels A and B would result in the loss of one rental housing unit located on Parcel A. Measure PD-1, Uniform Relocation Assistance, adopted as part of this project, requires the City to develop and approve a relocation assistance program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies of 1970. The affected property owner and tenants, depending on eligibility, would be afforded various services and forms of compensation in accordance with the provisions of this act. With the implementation of this measure, the impact is found to be less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: LU-C1: Will the project have a cumulative potential to impact land uses?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

No cumulative land use impacts have been identified. The impacts of the project have been found to be “no impact” or “less than significant”. The cumulative projects identified in the vicinity are considered compatible with their surrounding land uses, as analyzed in their respective environmental documents. Because some of the cumulative projects include housing, they actually reduce the impact of the loss of the rental unit on Parcel A.

Mitigation: No mitigation is necessary.

REFERENCES

Brown and Caldwell & Jones and Stokes, 1995. *City of Petaluma Wastewater Facilities Project and Long-Range Management Program.* August.

City of Petaluma & Naphtali H. Knox and Associates, Inc, 1995. *Petaluma General Plan.* June 5.

Sonoma County, 1994. *Sonoma County General Plan.* March 1.

4. 2 AGRICULTURE

This section discusses potential loss of important farmland. Analysis includes information on classification of farmlands, data on existing agriculture in the project area, and a summary of Williamson Act contracts.

SETTING

Existing Agricultural Use

The Hopper Street facility is located in a light-industrial part of the City, with no agricultural resources nearby.

The existing oxidation ponds at the Lakeville Highway site are located in a predominately agricultural setting. The site is an island of incorporated land under the jurisdiction of Petaluma and is surrounded by unincorporated land under the jurisdiction of Sonoma County. Although the site is bordered by agricultural uses such as feed crops, alfalfa, and a small vineyard, it is approximately one-quarter mile southeast of the Oakmead/Northbay Business Park.

Parcels A and B lie on the northwestern boundary of the oxidation ponds, between the oxidation ponds and Oakmead/Northbay Business Park. They are under the jurisdiction of Sonoma County and are used for oat, alfalfa, and other feed crop production. Parcel C, to the south-east, is also used as pasture and to grow feed crops.

Relevant Plans and Policies

Both the Petaluma General Plan and the Sonoma County General Plan discuss the importance of preserving agriculture along Lakeville Highway. Also, the California Department of Conservation classifies farmlands into categories in the *Important Farmland Maps* in order to analyze trends involving California's agricultural resources. Lastly, the Williamson Act (Government Code §51200 *et seq.*) permits counties to provide tax incentives to farmers who agree to keep their land in agricultural production. The relevant plans and policies are discussed in the following sections.

City of Petaluma General Plan

The Petaluma General Plan includes objectives and policies that focus on preserving agriculture (City of Petaluma 1995). The General plan states "the City's intent to preserve agriculture involves not making decisions that could be interpreted by speculators to be indicators of urban expansion." The Plan offers the following objectives as a means to promote and safeguard agriculture:

(g) Reduce the pressure for urbanization and conversion of agricultural land to non-agricultural use in the Petaluma Planning Referral Area.

(h) Coordinate City and County land use goals, objectives, and policies to preserve agriculture.

(i) Channel urban development into cities and limit rural residential uses that encroach on agricultural lands.

Policy 14: The City urges Sonoma County to discourage non-agricultural land uses in agricultural areas.

Sonoma County General Plan

The Sonoma County General Plan includes a separate element to address agricultural resource issues (Sonoma County, 1994). Entitled the Agricultural Resources Element, this section states, "the purpose of the element is to establish policies to insure the stability and productivity of the County's agricultural lands and industries."

One of the goals in this element is to stabilize agricultural use at the urban fringe. The General Plan recognizes that rapid urban growth puts pressure on agricultural lands, especially agricultural lands on the perimeter of the City limits. These pressures "tend to discourage new agricultural investment and uses, raise the price of land thus making purchase for farming unrealistic, and increase the likelihood of purchase for nonagricultural use." Goal AR-2 states, "maintain for the timeframe of this plan agricultural production on farmlands at the edges but beyond the urban service boundaries of cities and urban service areas, to minimize the influence of speculative land transactions on the price of farmland and to provide incentives for long term agricultural use." In order to achieve this goal, the following objectives have been established:

AR-2.1: Limit intrusion of urban development into agricultural areas.

AR-2.2: Maintain the urban service boundaries to protect agricultural lands at the urban fringe for continued agricultural production.

Another goal is 2.4, "mitigate conflicts between agricultural and nonagricultural uses in designated agricultural production areas." This matter is crucial because nonagricultural uses are becoming more prevalent both on the urban fringe and in the midst of agricultural areas. The goal regarding this issue is AR-4: "Allow farmers to manage their operations in an efficient, economic manner with minimal conflict with nonagricultural uses." The following objective and policies reflect this goal and are intended to apply only to lands designated within agricultural land use categories:

AR-4.1: Apply agricultural land use categories only to areas or parcels capable of the commercial production of food, fiber and plant material. Establish agricultural production as the highest priority use in these areas or parcels.

AR-4a: The primary use of any parcel within the three agricultural land use categories shall be agricultural production and related processing, support services, and visitor serving uses. Residential uses in these areas shall recognize

that the primary use of the land may create agricultural "nuisance" situations, such as flies, noise, odors, and spraying of chemicals.

AR-4c: Protect agricultural operations by establishing a buffer between the agricultural land use and the residential use at the urban fringe adjacent to an agricultural land use category. Buffers shall generally be defined as a physical separation of 100 to 200 feet and/or may be a topographic feature, a substantial tree stand, water course or similar feature. In some circumstances a landscaped berm may provide the buffer. The buffer shall occur on the parcel for which a permit is sought and shall favor protection of the maximum amount of farmable land.

AR-4d: Apply the provisions of the "Right to Farm" Ordinance to all lands designated within agricultural land use categories.

California Department of Conservation

The California Department of Conservation's Farmland Mapping and Monitoring Program produces maps and statistical data used for analyzing impacts on California's agricultural resources (California Department of Conservation, 1992). The agricultural lands in California are categorized by soil quality and irrigation status, then depicted on a map by symbol. The agricultural categories range from Prime Farmland (the best) to Grazing Land.

Although the local agencies do not differentiate between different *types* of agricultural land and feel that loss of any agricultural land is significant, the California Mapping and Monitoring Program does categorize the lands. Appendix G of the CEQA Guidelines states that a significant impact would occur if Prime Farmland were converted to a nonagricultural use. The state farmland mapping program designates the oxidation pond site at Lakeville Highway as "D-Urban and Built-up Land", which is defined as land containing man-made structures or the infrastructure required for development (e.g., sewage treatment facilities). Parcels A and B, northwest of the oxidation ponds, are designated "L-Farmland of Local Importance", which is defined as land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. Specifically, this designation includes the hay producing areas of the Petaluma Valley.

Williamson Act (Land Conservation Act of 1965)

Some of the agricultural lands in Sonoma County are contracted under the Williamson Act. The contracts lower property taxes on lands that are kept in agricultural use. The property owner enters into an agreement with the county or city and pledges to restrict a determined amount of land to agricultural use only. In return, the county or city agrees to assess the price of the restricted land based on the actual use instead of its potential value assuming full development. This lowers the property tax amount considerably.

To be eligible, the land in question must be: "designated by a city or county as agricultural preserve, scenic highway corridor, or wildlife habitat area, or it must be

actively used for the three years immediately preceding the beginning of the contract as a saltpond, managed wetland, or recreational or open space area."

The lands are under contract for a ten-year period, however the property owner must renew the contract every year. If the property owner decides not to renew the contract, the land use restrictions will continue to be in effect until the remaining nine years have expired. There are provisions for canceling the contract if the reason to do so is consistent with the purpose of the Williamson Act or otherwise found to be in the public interest.

None of the sites have entered into Williamson Act contracts.

Sharpshooter Threat to Vineyards

Over the past decade, the blue-green sharpshooter has become one of the most important insect vectors on the North Coast of California. The insect is a threat to California vineyards due to its ability to spread Pierce's disease (*Xylella fastidiosa)*, a disease that kills grapevines one or two years after infection. An outbreak of the disease began in Napa and Sonoma counties in the 1990s and has also been found in Mendocino and Lake Counties. The disease has cost North Coast growers an estimated $33 million and required the removal and replanting of more than 1,000 acres of vines (University of California, Agriculture and Natural Resources, 2000).

Recently, an outbreak of Pierce's disease struck vineyards in the Temecula Valley in Southern California, costing growers millions of dollars. The importance of this outbreak is that the bacterium was transmitted by the glassy-winged sharpshooter, which was introduced into Southern California around 1989 (University of California, 2000). The glassy-winged sharpshooter is unlike the blue-green sharpshooter in that it is a strong flyer and has the capability of spreading the disease over larger portions of vineyards. The glassy-winged sharpshooter is also more robust than the blue-green sharpshooter and is able to inoculate an entire vine faster (Bruce McArther, 2001).

There is a growing concern that the glassy-winged sharpshooter will spread throughout the state. Because there is no practical cure for Pierce's disease, aggressive approaches have been taken to address and research the disease.

It should be noted that although the glassy-winged sharpshooter prefers riparian vegetation, recent findings have shown that the vector will lay its eggs on nearly any type of vegetation (personal communication, Dan Curtin 2002).

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.2-1

Evaluation Criteria with Point of Significance – Agriculture

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project cause loss of farmland?	Acres of agricultural land lost	Greater than 0 acres	CEQA State of California Department of Conservation Farmlands Mapping Unit Petaluma General Plan Sonoma County General Plan
2. Will the project cause Williamson Act contracts to be canceled?	Number of remainder parcels under Williamson Act contract which are less than 10 acres of status farmland	Greater than 0 remainder parcels smaller than contract criteria	California Land Conservation Act of 1965 Petaluma General Plan Sonoma County General Plan
3. Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Plants not locally grown or purchased from nurseries with approved inspection programs.	Greater than 0 plants	Sonoma County Agricultural Commissioner Sonoma County Viticulture Advisor

Source: Parsons, 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: AG-1: Will the project cause loss of farmland?

Analysis: *Water Recycling Facility and River Access Improvements - Significant*

The Petaluma General Plan and the Sonoma County General Plan include objectives and policies requiring preservation of agricultural lands. Parcels A and B are zoned Land Extensive Agriculture in the Sonoma County General Plan. The intent of this zone is to enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land. The agricultural land on Parcels A and B (approximately 91 acres on Parcel A and approximately 58 acres on Parcel B) would be converted to a nonagricultural use in order to place polishing wetlands river access improvements on the site. Because agricultural land would be permanently converted to other uses, this impact is considered significant.

Mitigation: **AG-1. Maintain Maximum Acreage of Agricultural Production**

The City shall maintain the maximum acreage feasible in agricultural production on Parcels A and B.

After Mitigation: *Significant*

Approximately 70 acres of agricultural production can be maintained on Parcels A and B. It is likely that some proposed trails on Parcel A could not be built, and proposed butterfly habitat on Parcel A would need to be substantially decreased in size in order to accommodate this mitigation measure. Even if approximately 70 acres of agriculture remain, approximately 79 acres would be removed, which still constitutes a significant impact. No further feasible mitigation has been identified.

IMPACT: AG-2: Will the project cause Williamson Act contracts to be canceled?

Analysis: *Water Recycling Facility and River Access Improvements - No Impact*

No Williamson Act contracts exist on the proposed sites.

Mitigation: No mitigation is needed.

IMPACT: AG-3: Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The project includes planting of wetland and riparian species, and there is a small vineyard northeast of the wetland site. If plants that provide breeding habitat for the glassy-winged sharpshooter were utilized in the wetlands or restoration efforts, the risk of increasing sharpshooter populations would increase.

Measure PD-2, Purchase Locally Grown or Inspected Plants, requires that the City shall purchase all plants for the wetlands and restoration efforts from locally grown stock or from a nursery that has an approved monitoring program for the glassy-winged sharpshooter. This measure, adopted as part of the project, will prevent an increase in the risk of sharpshooter populations, and therefore the impact is considered less than significant.

Mitigation: No mitigation is needed.

CUMULATIVE IMPACTS

IMPACT: AG-C1: Will the project cause cumulative impacts to agricultural resources?

Analysis: *Water Recycling Facility and River Access Improvements - Significant*

There are several past, present, and probable future projects along Lakeville Highway that have converted or are converting agricultural uses to various types of development. Although the projects are consistent with the City of Petaluma's

General Plan, they are located in areas that were formerly agricultural land, and they have contributed to the ongoing loss of farmland in Sonoma County. Other cumulative projects have no effect on agriculture. Considerable farmland in the area has been lost in this area over the years, and conversion of Parcels A and B would contribute to this cumulative loss.

Mitigation: No feasible mitigation was identified.

After Mitigation: *Significant*

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4.3 GEOLOGY, SOILS AND SEISMICITY

The geologic, soils, and seismic constraints on improvements and construction of the proposed facilities are addressed in this chapter.

SETTING

Physiography

The project site and all alternatives are located in the Petaluma Valley in Sonoma County, California. The Petaluma Valley lies within the Coast Ranges physiographic province of California. The Coast Ranges are characterized by northwest-southeast trending valleys and mountain ranges that are structurally controlled by faulting and folding. The province terminates in the east where strata dip beneath alluvium of the Great Valley, in the west at the Pacific Ocean, in the north at South Fork Mountain, and in the south at the Transverse Ranges. The Coast Ranges are composed of thick late Mesozoic and Cenozoic sedimentary strata (California Division of Mines and Geology 2001).

The Petaluma Valley lies between Burdell Mountain to the west and the Sonoma Mountains to the east. To the east, Petaluma Valley is separated from Sonoma Valley by the Sonoma Mountains. At its southern edge, Petaluma Valley extends to northern San Pablo Bay. To the north, Petaluma Valley extends into Cotati Valley, just north of Petaluma. The two valleys are separated by a slight topographic rise on the west flank of Sonoma Mountain.

The ground surface elevations in the Petaluma Valley are at sea level on the north side of San Pablo Bay and reach a maximum of several hundred feet above sea level on various small hills. At both the Lakeville Highway and Hopper Street sites, ground surface elevations range from sea level to twenty feet above sea level.

Regional Geology

The Coast Ranges Province is the result of the collision of the Farallon and North American tectonic plates, which occurred 100 to 65 million years ago. More recently, right-lateral shear along the San Andreas fault system has defined the Coast Ranges topography. This strike-slip movement occurs along the San Andreas fault system and has been ongoing during the last 60 million years. Quaternary (the past two million years) geologic activity near the site consists of the motion of several fault systems, most importantly the San Andreas and the Rodgers Creek fault systems. Additionally, sea level fluctuations caused by worldwide climatological changes have impacted the San Pablo Bay and subsequently Petaluma Valley. Fluctuations in sea level have resulted in the deposition and erosion of sedimentary layers in the valley.

The geologic units that underlie the region are depicted on U.S. Geological Survey (USGS) and California Division of Mines and Geology (CDMG) geologic maps (Blake et al. 2000; Wagner and Bortugno 1982). The maps also include descriptions of the strata. The oldest geologic units in the vicinity of the project are the Jurassic to early-Cretaceous Franciscan Complex and the

early-Cretaceous Great Valley Group. The Franciscan Complex consists of folded and faulted sandstones, shale, conglomerate, chert, greenstone, and serpentine rocks. The Great Valley Group consists of marine mudstones, sandstones, and conglomerates. Younger Miocene to Pliocene sedimentary rocks, including the Wilson Grove Formation (marine sandstone, conglomerate, and tuff) and the Petaluma Formation (mostly non-marine claystone, mudstone, and siltstone) were deposited on top of the Franciscan Complex. Also during the Pliocene, volcanic activity resulted in the deposition of the Sonoma Volcanics (basalt, andesite, rhyolite, and tuff) in eastern Sonoma County. More recently, Pleistocene to Holocene alluvium, including the Glen Ellen Formation, was deposited in the northwest-trending valleys. This alluvium is the youngest natural unit in the project area.

Regional Faults

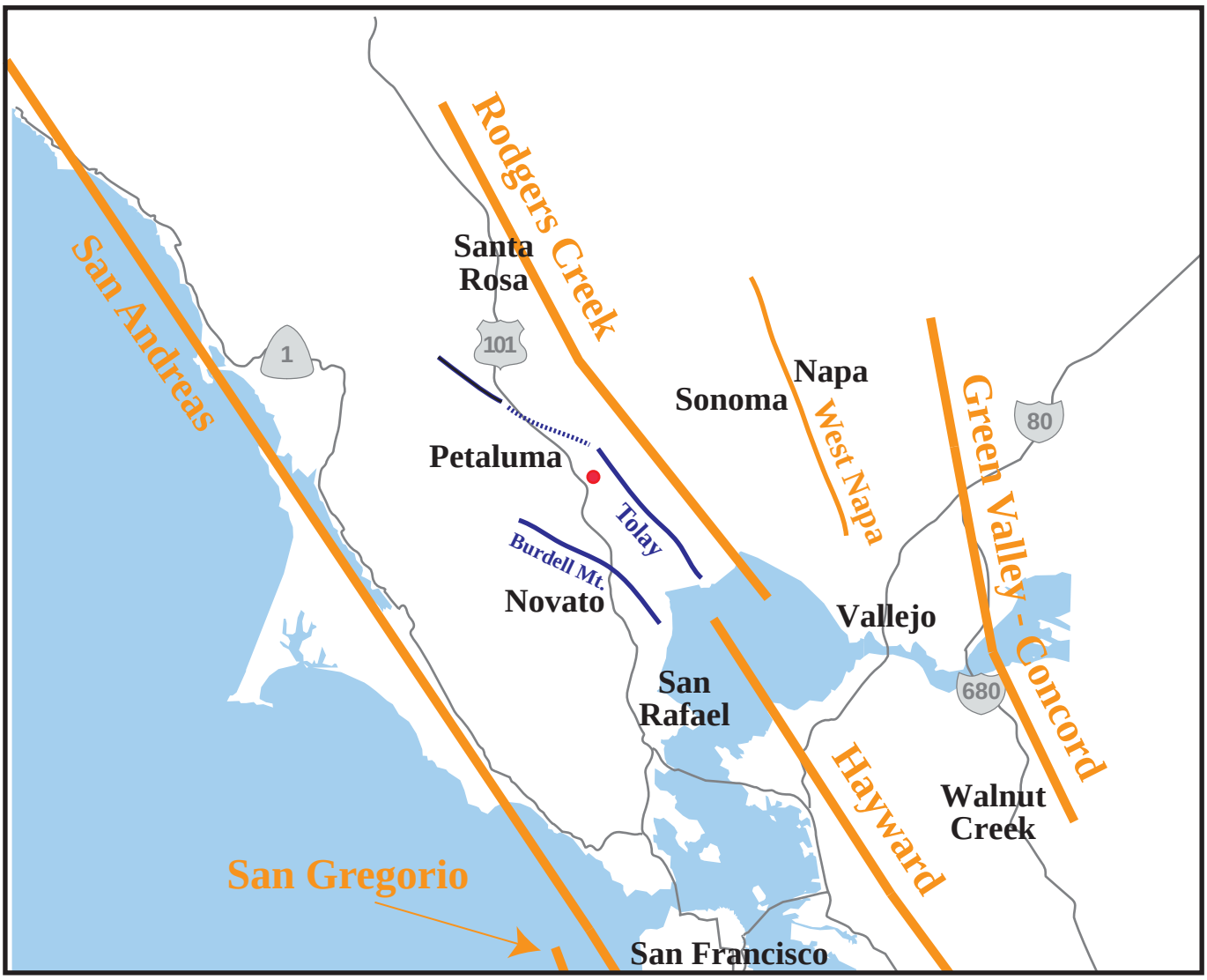
Petaluma Valley is located east of the plate boundary between the Pacific and North American plates. This boundary is defined by the San Andreas fault system. Six strike-slip faults within this system have been slipping at rates greater than 2 mm/yr: the San Andreas, Hayward-Rodgers Creek, Calaveras, San Gregorio, Concord-Green Valley, and Greenville faults. Four of these faults are located within 25 miles of the site (Figure 4.3-1). These faults release almost all of the seismic moment in the region. All of these are active faults as defined by the Alquist-Priolo earthquake fault zone act administered by the California Division of Mines and Geology. In addition, they all have maximum earthquake magnitudes of 6.7 or greater (CDMG 1996 and USGS 1999).

Several other faults within 30 miles of the project area contribute to the site's seismic exposure (Figure 4.3-1). Although these faults have longer recurrence intervals, they are capable of producing moderate to large earthquakes. The West Napa fault zone lies approximately 14 miles east of the project area and the Maacama fault zone (not shown on map) lies approximately 30 miles north of the site. Both of these faults have been active in the Holocene (past 10,000 years) and the West Napa fault was responsible for a magnitude 5.2 earthquake on September 3, 2000. There are also several inactive Quaternary faults in close proximity to the site. Closest of these, the Tolay fault trends northwest from Sears Point to Petaluma and passes just one-half mile from the project area. Although this fault had significant movement within the last two million years, it is not considered active (CDMG 1996). It was removed as an Alquist-Priolo earthquake fault zone in 1982 (Wesnousky 1986).

Site Specific Geology

The Lakeville site is located two miles southwest of the City of Petaluma and extends from the Petaluma River to Lakeville Highway.

As shown on Figure 4.3-2, the site lies on Quaternary alluvium and Quaternary marine fill. The following descriptions of these units and the underlying strata can be found in Blake et al. (2000).



LEGEND

- Holocene Fault (active in last 10 thousand years)
- Quaternary Fault (active in last 2 million years)
- The Lakeville Site
- Highway

N

MILES
0 10 20

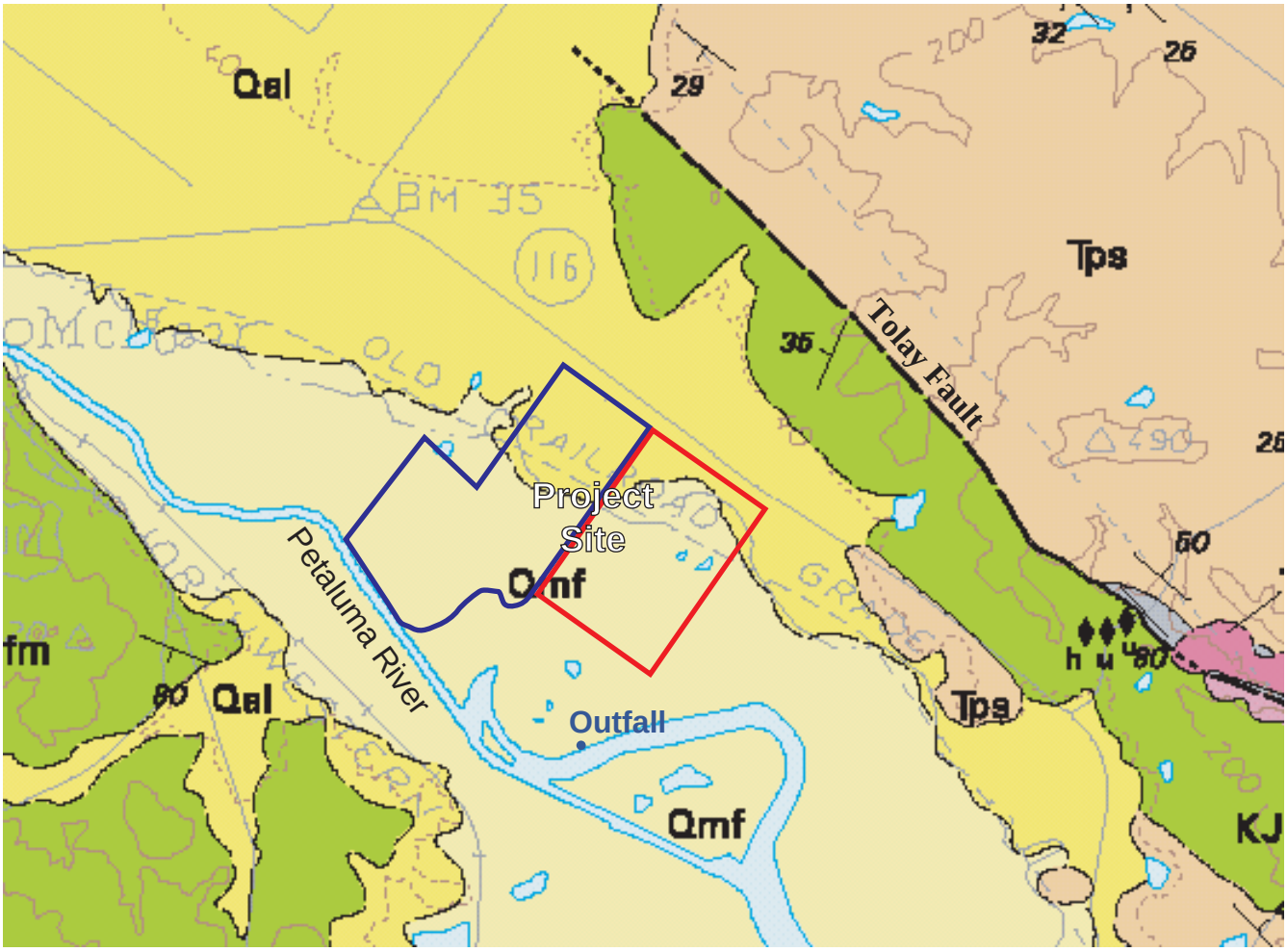
Source: USGS OFR-99-517

City of Petaluma
Water Recycling Facility EIR

REGIONAL FAULT MAP

PARSONS

Figure 4.3-1



Surficial Geology

Qmf	Artificial Fill Over Marine and Marsh Deposits (Quaternary)
Qal	Alluvium (Quaternary)
Tps	Petaluma Formation-Siltstone and Claystone Member (Pliocene)
KJfmf	Metamorphic Rocks (Cretaceous and Jurassic)
	Existing Site Facilities and Ponds (4400 Lakeville Highway)
	Proposed Wetlands

N

0 1 mile

SCALE

Source: Blake et al. 2000

City of Petaluma
Water Recycling Facility EIR

SURFACE GEOLOGY of LAKEVILLE SITE

PARSONS

Figure 4.3-2

Quaternary Alluvium (Qal):

This unit underlies the northeast portion of the site. The alluvium is composed of sand, gravel, silt, and clay. The material is loose to soft and friable.

At the northern portion of the existing site, the alluvium underlies artificial fill that was deposited during construction of the ponds. The alluvium consists of medium stiff to dry stiff clay and medium dense sand and clayey sand. The alluvial deposits have relatively high shear strength and low compressibility.

Quaternary Artificial Fill (Qmf):

This unit is comprised of artificial fill deposited over marine and marsh deposits. The fill varies in character, consisting of clay, silt, sand, rock fragments, organic material, and / or man made debris. This unit is underlain by Quaternary marine and marsh deposits.

Locally the fill is approximately 13 to 16 feet thick at the northern portion of the site and 10 to 15 feet thick at the southern portion of the site. The fill generally consists of stiff to very stiff sandy clays with pockets of dense gravel.

Quaternary Marine and Marsh Deposits (Bay Mud) (Qm):

Although not exposed in the project area, this muddy unit, made up of organic material, silty mud, and sand lies just beneath the Quaternary artificial fill and will likely be exposed during construction activities. This unit is very soft to soft and is locally underlain by the Wilson Grove Formation.

A 3 to 12-foot thick layer of bay mud underlies the fill at the southern portion of the site, increasing from under Pond No 7 and 8 toward Pond No 10. The mud is soft to medium stiff clay with low strength and high compressibility.

Wilson Grove Formation (Twg):

This Pliocene unit does not outcrop in the project area. The Wilson Grove Formation is a structureless to poorly bedded, firm sandstone. The rock is light gray where fresh, weathering to grayish or pale yellowish orange. Grain size is mostly fine-grained to very fine grained with moderate to good sorting, and there are local thin pebble lenses near the base of the unit.

Petaluma Formation-siltstone and claystone member (Tps):

This Pliocene unit outcrops east of the project site and underlies the Quaternary alluvium in places. The Petaluma Formation is an unbedded claystone, siltstone, and mudstone containing thick lenses of friable, cross-bedded, well-sorted sandstone and pebble conglomerate. The pebbles consist of Franciscan lithologies, laminated siliceous shale and chert, and volcanic rock. This unit also includes a structureless vitric tuff bed about 3 to 8 m thick that consists largely of pumice lapilli and glass shards. Fossils of brackish and fresh water mollusks occur locally in the Petaluma Formation.

Sonoma Volcanics (Tsv):

This Pliocene and Miocene volcanic unit includes rock near Burdell Mountain with an age of 11.8 million years. This unit consists of rhyolite lava flows, rhyolite plugs and dikes, andesite and basalt lava flows, and pumiceous ash flow tuff.

Franciscan Complex-metamorphic rocks (KJmf):

These Cretaceous and Jurassic rocks are variably sheared, containing blueschist minerals. The unit is mainly comprised of metagraywacke, but includes metagreenstone, metachert, and minor amounts of metaconglomerate. This unit does not outcrop in the project area.

Soils

Based on the U.S. Department of Agriculture (USDA) Soil Survey of Sonoma County, there are two primary soil associations in the project area (USDA 1972). The Clear Lake-Reyes soil association consists of poorly drained clays and clay loams. The Haire-Diablo soil association consists of moderately well drained to well drained fine sandy loams to clays. These soil types have moderate to high expansion potential and high corrosivity.

Additionally, as shown on Figure 4.3-2, the majority of the site work will encounter artificial fill (Qmf) and alluvium (Qal) in the near surface. The fill consists of stiff to very stiff sandy clay. The upper layer of alluvium consists of medium stiff to stiff clay and dense clayey sand, while at depth the alluvium consists of very stiff to hard clay and dense clayey sand.

Furthermore, the southern portion of the site is likely to encounter soils derived from bay mud (Qm) within the depth of project excavations (these deeper soils are not shown in Figure 4.3-2 because they are not exposed at the ground surface). Bay mud-derived soils are known for having inconsistent and poor engineering properties for foundations and generally have undesirable shrink-swell properties. In addition, bay mud soils are poorly draining, very susceptible to settlement, and commonly corrosive due to localized high organic content, low pH, and presence of sulfur. These native soils make unacceptable engineering materials and are invariably removed or avoided during construction.

Earthquakes and Historical Seismicity

The project area is located in a seismically active region with earthquakes a common occurrence. Since the mid-nineteenth century, hundreds of earthquakes have been felt in Sonoma County and several of these events are known to have caused significant ground shaking. One of the worst was the San Francisco earthquake on April 18, 1906. This earthquake on the San Andreas fault had an estimated magnitude of M7.9. In Petaluma, structural damage from this earthquake was indicative of ground shaking intensity VIII on the Modified Mercalli Scale (considerable damage in ordinary structures with partial collapse; great damage to poorly built structures). In October 1969 two earthquakes (M5.6 and M5.7) on the Rodgers Creek fault caused several million dollars worth of damage in the Santa Rosa area. These earthquakes occurred less than 15 miles from the site.

The project area is located between the San Andreas fault zone and the Rodgers Creek fault zone (Figure 4.3-1). The site is three miles west of the Rodgers Creek fault and 17 miles east of the San Andreas fault. Additionally, the site is within 25 miles of six active faults. Due to their recent activity, these faults present the highest risk to the site.

Recently, the USGS Working Group on California Earthquake Probabilities published a report on the probabilities for large earthquakes on the San Francisco Bay Area faults (USGS 1999). They estimate that there is a 70% probability of a large (magnitude >6.7) earthquake before the year 2030 on one of the Bay Area faults. Separate probabilities for large earthquakes on the individual faults were also calculated, with the Rodgers Creek fault having the highest probability of 32%. The San Andreas fault has a calculated probability of 21% (USGS 1999). Thus, from 2000 to 2030, there is a 50% probability of an earthquake occurring within twenty miles of the project area, and a 70% probability of a regional earthquake that would affect the project area within 30 years.

Geologic Hazards

The most significant hazard associated with any construction in the project area is presented by earthquakes and their associated effects. Earthquakes present both direct and indirect hazards, both of which can occur locally or at remote locations. Direct, local earthquake hazards include damage caused by fault displacements either by ground surface rupture or gradual fault creep. The damage caused by ground shaking is also a direct effect; however, shaking can occur locally or at remote locations. Indirect hazards presented by earthquakes include liquefaction of soil and landslides, both of which are triggered by ground shaking. Analysis of these hazards is based on an understanding of the potential for any or all of these events to occur in the proposed project area.

Fault Rupture and Creep

No active faults run through the Lakeville site. The project does not intersect any known active faults. Thus, displacement caused by fault rupture or creep is unlikely to occur at the proposed sites. The active fault that is closest to the project is the Rodgers Creek fault. It lies about three miles to the east of the project alignment.

Ground Shaking

The severity of ground shaking due to an earthquake is determined by several factors including the size of the earthquake, fault rupture characteristics, and proximity of the earthquake to the site of interest. Additionally, the type of soil or bedrock beneath the site will determine the strength of ground shaking.

Maps depicting the potential for intensity of earthquake shaking have been generated by the Association of Bay Area Governments (ABAG). The current maps utilize Modified Mercalli Intensity (MMI) on a scale that relates to human perception and amount of damage. ABAG predicts Intensity IX for the Lakeville site (Figure 4.3-3). Intensity IX involves violent ground shaking and heavy damage. The effects of Intensity IX are described as “considerable damage to designed structures; well designed frame structures

thrown out of plumb; great in substantial buildings, with partial collapse; underground pipes may be broken". Intensity of ground shaking at the Hopper Street facility would be Intensity IX or higher.

Peak ground acceleration (PGA) has been calculated by the USGS at various grid points in California. The probability of PGA exceedance is typically measured over a period of 50 years. For example, a 10% probability of exceedance in 50 years indicates that there is a 10% chance that the region will experience or exceed its PGA within the next 50 years. For the site, the PGA with a 10% probability of exceedance in 50 years is approximately 0.5g (USGS 2001)[1]. This level of acceleration is high, indicating the severity of the area earthquake hazards.

Maximum Earthquake Magnitudes and Site Proximity of Faults

Estimates of the maximum earthquake magnitudes for active faults within 25 miles of the project area are listed below in Table 4.3-1.

Table 4.3-1

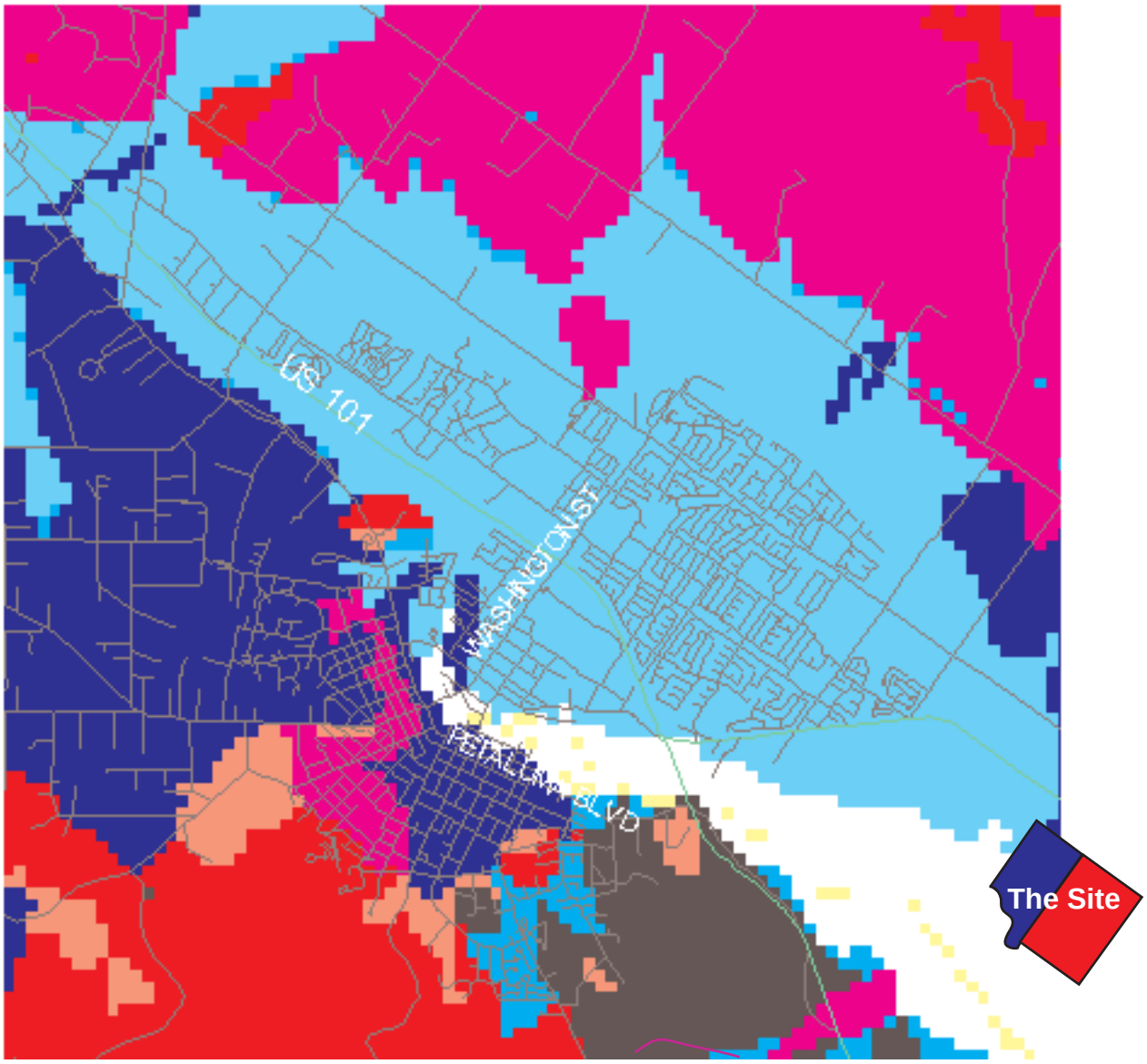
Maximum Earthquake Magnitudes

Fault	Distance [1]	Mmax [2]	Probability of at least one M ≥ 6.7 before 2030[3]
Rodgers Creek	3	7.0	0.32
West Napa	14	6.5	NA
Hayward	14	7.1	0.32
San Andreas	17	7.9	0.21
San Gregorio	23	7.3	0.10
Green Valley / Concord	23	6.9	0.06

Source: Parsons 2002

1 Approximate distance from project area to nearest portion of fault (miles).
2 Moment magnitude (CDMG 1996; Wesnousky 1986), consistent with 1997 UBC.
3 Probability from USGS WGCEP Open File Report 99-517 (USGS 1999).

[1] As a comparison, the maximum PGA from the Loma Prieta earthquake in 1989 was about 0.4g.



Shaking Amplification

- Extremely High
- Very High
- High
- Moderately High
- Moderate
- Moderately Low
- Low
- Very Low

- Existing Site
- Proposed Wetlands
- Highway
- Road

N

0 1 mile

SCALE

Source: ABAG 1995

City of Petaluma
Water Recycling Facility EIR

GROUND SHAKING AMPLIFICATION

PARSONS

Figure 4.3-3

Liquefaction

Liquefaction occurs in water-saturated sediments that are shaken by moderate to large earthquakes. The liquefied soil loses strength and may fail, causing damage to all types of structures. Liquefaction was responsible for much of the damage during the 1906 San Francisco earthquake and the 1989 Loma Prieta earthquake. Liquefaction hazard analysis involves understanding the potential for ground shaking combined with the physical properties and conditions of the soil. In order for liquefaction to occur, two criteria must be met. First, there must be an opportunity for liquefaction to occur, and second, the soil must be susceptible to liquefaction as explained below. Based on the proximity to several active faults and the estimated potential for ground shaking, the project will be located on land that provides liquefaction opportunity. Liquefaction susceptibility represents the degree to which soils will lose their strength when subjected to ground shaking. This loss of strength is governed primarily by the physical properties of the soil, including grain-size distribution, compaction, cementation, saturation, and depth. Loose, sandy, saturated soils typically lack resistance to ground shaking and are thus considered susceptible to liquefaction. Dry, dense, and cohesive soils are generally not considered susceptible to liquefaction.

The shallow water table in the proposed project area creates a saturated soil, prone to liquefaction. Furthermore, based on soil characteristics, several geologic units in the project area are susceptible to liquefaction, especially Quaternary artificial fill. Additionally, Quaternary alluvium lies on top of liquefiable sediments. These units compose the bulk of the material present at the project area.

Earthquake-induced Landslides

Landslides triggered by earthquake ground shaking have historically been the cause for a great deal of property damage and loss of life. Areas most susceptible to earthquake-induced landslides are generally on steep slopes or adjacent to existing landslide deposits. The project area is within a flat valley and there is little change in elevation. Thus, the project area does not lie within a designated earthquake-induced landslide zone. Furthermore, the project area does not lie within any areas containing mapped landslides. Man-made slopes such as impoundment dikes that enclose the ponds would be potentially affected by ground accelerations capable of causing slope instability.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.3-2

Evaluation Criteria with Point of Significance-Geology, Soils and Seismicity

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will project facilities be damaged by unstable slope conditions?	Geotechnical assessment of landslide risk potential	Overall rating of Moderate to High	The rating takes into consideration slope angles, existing slope instability, rock types and geologic structure. Landslides and other slope failure could occur in areas with Moderate to High risk. Low risk areas are expected to have stable slope conditions.
2. Will project facilities be subject to ground rupture due to location near a surface trace of an active fault?	Location of facilities within an Alquist-Priolo earthquake fault zone	Any portion of facilities within zone	Earthquake fault zones are established under the Alquist-Priolo Earthquake Fault Zone Act by the California Division of Mines and Geology (CDMG) to regulate development near active faults to mitigate the hazard of surface rupture.
3. Will project facilities be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?	Geotechnical assessment of potential for liquefaction or more detailed mapping, where available	A rating of High for liquefaction for project facilities	Certain soil types, especially fine, sandy soils underlain by shallow groundwater are prone to liquefaction. The USGS Open File Report 00-444 shows areas of liquefaction susceptibility in the project area.
4. Will earthquake-induced strong ground shaking damage project facilities?	Structural and geotechnical design and construction not in conformance with requirements of applicable building codes (refer to text).	Construction not in conformance with requirements of applicable building codes and geotechnical design practice.	Uniform Building Code (UBC 1997) as amended locally.

Table 4.3-2

Evaluation Criteria with Point of Significance-Geology, Soils and Seismicity

Evaluation Criteria	As Measured by	Point of Significance	Justification
5. Will construction of the project cause off-site water-related erosion?	Construction activities not in compliance with requirements of the project National Pollutant Discharge Elimination System Permit (NPDES), or building and grading codes.	Construction not in compliance with NPDES, or building and grading codes.	Clean Water Act regulations and local building or grading ordinances (refer to text).
6. Will project facilities be exposed to damage due to expansive soils?	Shrink-swell potential as rated in Sonoma County Soil Survey (USDA 1972)	A rating of Moderate to High	USDA Soil Conservation Service (SCS) indicates that shrink-swell potential rated moderate to very high shrinking and swelling can damage buildings, roads, and other structures.
7. Will project facilities be exposed to damage due to construction on corrosive soils?	Corrosion potential as rated in Sonoma County Soil Survey (SCS 1972)	A rating of High for corrosion potential	The SCS indicates that soils with High corrosion can damage uncoated steel and concrete by chemical actions that dissolve and weaken the material.

Source: Parsons. 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: GS-1: Will project facilities be located within an area of unstable slope conditions?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The proposed facilities will not be located in any areas of unstable slope conditions. The project will have low risk of earthquake-induced landslides, as it will not be located on existing steep slopes or in an area of historic landslide activity. Levee stabilization along the Petaluma River will be engineered to increase stability of the levee.

Mitigation: No mitigation is necessary.

IMPACT: GS-2: Will project facilities be subject to ground rupture due to location near a surface trace of an active fault?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The proposed facilities do not intersect any known active faults as defined by the Alquist-Priolo earthquake fault zone act and mapping by the CDMG.

Mitigation: No mitigation is necessary.

IMPACT: GS-3: Will project facilities be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Nearly all of the proposed facilities will be located on potentially liquefiable soil. The entire project area is highly susceptible to liquefaction. Measure PD-3, Liquefaction Protection, adopted as part of this project, requires the City to utilize liquefaction protection such as methods to densify and solidify soil during construction. With implementation of this measure, adopted as part of the project, the impact of liquefaction is less than significant.

Mitigation: No mitigation is necessary**.**

IMPACT: GS-4: Will earthquake-induced strong ground shaking damage project facilities?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Ground shaking in the project area will be very high to extremely high with an estimated peak ground acceleration (PGA) of 0.48g. The probability of exceedance of the PGA is 10% in 50 years. An evaluation of the stability of the existing ponds concluded that the safety factor of the existing ponds under seismic loading is acceptable. Measure PD-4, Seismic Design to Resist Ground Shaking, adopted as part of this project, requires the City to incorporate several specific design features that accommodate lateral movements and flexibility. With incorporation of this measure into project design, ground shaking hazards are found to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: GS-5: Will construction of the project cause off-site water-related erosion?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Site grading could cause erosion, resulting in sedimentation of local water bodies. The grade of the Lakeville sites is nearly flat, so standard erosion control measures will be sufficient to contain water and prevent excess run-off from the oxidation pond site and Parcels A and B. After completion of the project, operation of the facilities will occur in such a manner that no off-site erosion is expected. Replacement of the outfall structure at the edge of the Petaluma River

will require underwater construction, including removal of the existing outfall which may be buried under a layer of silt. Design and construction of new facilities and demolition of the Hopper Street facilities will be in conformance with the National Pollutant Discharge Elimination System (NPDES) General Permit for construction, and will be governed by a Storm Water Pollution Prevention Plan (SWPPP), as required by Measure PD-8. The SWPPP will cover all construction activities and will contain an erosion and sediment control plan. With implementation of Measure PD-8, erosion impacts to water quality are found to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: GS-6: Will project facilities be exposed to damage due to expansive soils?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The majority of soils within the project area contain clay and have a moderate to high shrink-swell potential (USDA 1972). Soils may expand when wet and contract when dry. Measure PD-5, Standard Engineering Methods for Expansive Soils, adopted as part of this project, requires the City to use of standard geotechnical practices for expansive soils, testing according to American Society for Testing and Materials (ASTM) standards, and proper choice of materials. With implementation of Measure PD-6, damage due to expansive soils is found to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: GS-7: Will project facilities be exposed to damage due to construction on corrosive soils?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The project area soils have a high corrosivity rating. Steel, concrete, and other structures could be damaged by the highly corrosive Clear Lake-Reyes soils and the bay mud. Measure PD-6, Standard Engineering Methods for Corrosive Soils, adopted as part of this project, requires the City to analyze samples for corrosivity, remove affected soils, and use construction materials not susceptible to corrosion. With implementation of Measure PD-6, damage from corrosive soils is found to be less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: GS-C1: Will the project have a cumulative potential for geologic or seismic impacts?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

There are no identified significant impacts that could not be fully mitigated with appropriate design measures. Although the project would contribute to

cumulative development of facilities in the region, an area of high seismic risk, these impacts are site specific, and with incorporation of standard seismic design measures would be less than significant. No significant cumulative impacts would occur.

Mitigation: No mitigation is necessary.

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4.4 GROUNDWATER

This section discusses existing groundwater conditions in the project area and potential effects of the project on groundwater.

SETTING

The proposed facility is located within the groundwater resource area known as the Petaluma Valley groundwater basin. This groundwater basin encompasses approximately 60,000 acres extending from Penngrove south to the Marin County line and San Pablo Bay. The groundwater basin includes the Two Rock area to the west and extends to the crest of the Sonoma Mountains, which separate Petaluma Valley from Sonoma Valley.

Description of Hydrostratigraphic Units

The Petaluma Valley groundwater basin occurs as a northwest trending trough underlain by the essentially non-water-yielding Franciscan Complex bedrock. The primary water-yielding units are the Wilson Grove Formation and the alluvial fan and alluvial deposits. The Wilson Grove Formation overlies the Franciscan Complex in the west and central portion of the trough. In this basin, the Wilson Grove Formation has a maximum thickness of over 200 feet. The Wilson Grove Formation does not occur at the eastern margin of the basin where the Petaluma Formation, a relatively low water-yielding unit, directly overlies the Franciscan Complex. Alluvial fan deposits and alluvium generally appear at the surface in low-lying portions of the valley and overlie both the Wilson Grove and the Petaluma formations. The alluvial fan and alluvium have a maximum thickness of approximately 100 feet in this basin.

Although Petaluma Valley is generally considered to be a single groundwater basin, groundwater occurs in vertically and horizontally discontinuous hydrogeologic units. The sands and gravels of the Wilson Grove Formation generally form continuous hydrogeologic units. The other geologic units of the basin generally contain discontinuous coarse-grained lenses. This discontinuity is evidenced by the unique water quality that can be found in relatively isolated hydrogeologic units (DWR 1982).

Generally, the groundwater basin is unconfined at shallow depths, although semi-confined to confined conditions can be encountered deeper in the basin (Cardwell 1958). The depth to groundwater is shallow, ranging from 10 to 25 feet below the ground surface in the spring to 15 to 40 feet in the autumn (Cardwell 1958). The elevation of the water table in the uplands is higher than in the valley floor area, but usually occurs at depths of 50 to 75 feet below ground surface.

Much of the surficial deposits in the agricultural areas surrounding Petaluma are clay rich Clear Lake-Reyes and Haire-Diablo soil associations (USDA 1972). These soils consist of fat clays with varying amounts of peat, sand, and clayey sand derived from continental and marine alluvial processes. The clays reportedly vary from being soft (marine/Bay Mud) to medium to very stiff (continental) and are considered highly to moderately compressible. The sands

reportedly range from being loose to medium dense and generally contain significant quantities of clay (Harza 2000). Soil borings near Pond 2 confirm that the ponds are underlain by clay soils (Brown and Caldwell 1996).

Monitoring Program

In 1995, a geotechnical investigation, which included groundwater sampling was conducted at the Lakeville site (Brown and Caldwell, 1996). Three monitoring wells were constructed and sampled for various chemical constituents in May 1995 and January 1996 (Table 4.4-1). Monitoring wells MW-1, MW-2 and MW-3 are shown on Figure 4.4-1. Depth to groundwater ranged from six to ten feet.

There is no evidence that the existing wastewater treatment ponds are leaking into groundwater according to a 1995 study conducted by Brown and Caldwell (Brown and Caldwell 1996). The monitoring wells indicate that the general mineral constituent concentrations and associated parameters that exceed regulatory limits include: calcium, magnesium, chloride, sulfate, coliform bacteria, conductivity, and dissolved solids. The wells show evidence of salt water intrusion, as seen in the high concentrations of chloride, sodium, and other chemicals commonly found in sea water. Well MW-3, adjacent to Pond 10, contained relatively high ammonia concentrations, but the ammonia has no impact on the beneficial uses of groundwater, because it is too saline to be used as a drinking water source or for irrigation.

Groundwater flow appears to be toward the south-southwest toward the marsh west of Petaluma River at a very gentle gradient of 0.0019 (Brown and Caldwell 1996). Continued piezometer measurements at these wells has indicated some anomalies in the data reported by Brown and Caldwell. Therefore, the current estimated gradient flow is 0.0027, somewhat higher than that estimated previously. There is no available data on vertical gradients.

Groundwater Usage

Groundwater extraction satisfied the City of Petaluma's water needs during the late 1950s and early 1960s. However, problems with salt water intrusion attributed to this municipal use resulted in groundwater pumpage being reduced in 1962 when water deliveries from the Russian River began. In the early 1980s, 15 percent (900 acre-feet/year) of the City of Petaluma's municipal water was supplied by groundwater (DWR 1982). The City currently relies on the Sonoma County Water Agency to supply all of its water needs and City wells are used as an emergency backup. Groundwater remains the primary source of domestic and irrigation water in the unincorporated areas of Petaluma Valley.

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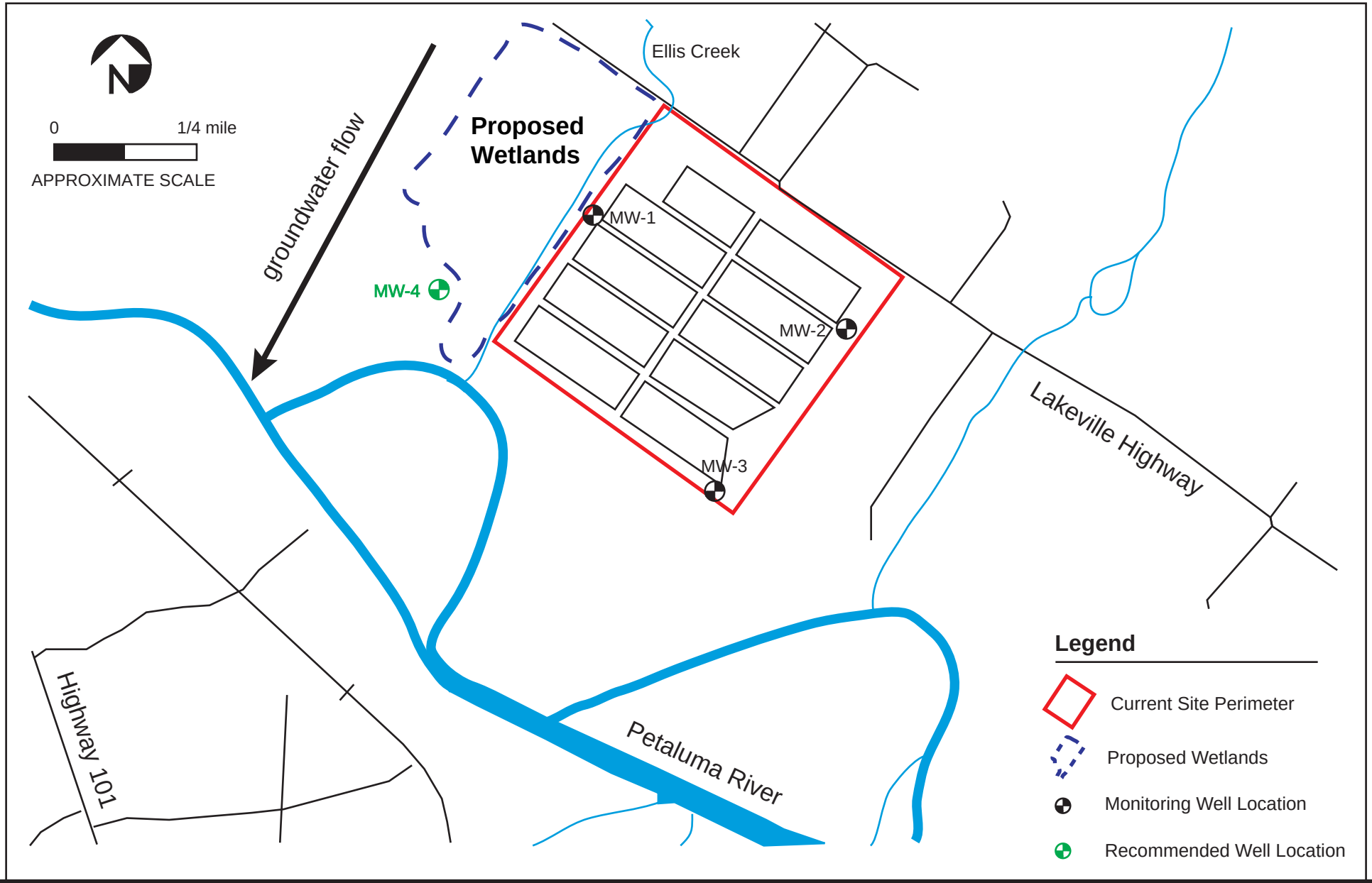

City of Petaluma
Water Recycling Facility EIR

SITE MAP SHOWING GROUNDWATER MONITORING LOCATIONS

PARSONS

Figure 4.4-1

Table 4.4-1

Results of Groundwater Monitoring[1]

City of Petaluma, Lakeville Oxidation Pond Site

Parameter	MW-1		MW-2		MW-3	
	05/19/1995	01/18/1996	05/19/1995	01/18/1996	05/19/1995	01/18/1996
Water Level						
Depth to groundwater	8.25 ft	7.53 ft	9.46 ft	9.2 ft	6.55 ft	7.51 ft
Elevation above msl	8.5 ft	9.2 ft	9.2 ft	9.5 ft	4.7 ft	3.7 ft
Alkalinity						
Carbonate	< 1	< 10	< 1	< 10	< 1	< 10
Bicarbonate	330	340	970	920	1,200	1,100
Hydroxide	< 1	< 10	< 1	< 10	< 1	< 10
Total Alkalinity	330	340	970	920	1,200	1,100
Metals and Cations						
Aluminum	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Calcium	55	47	63	58	260	300
Copper	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Iron	< 0.04	0.09	< 0.04	0.11	< 0.04	0.08
Magnesium	36	35	52	57	1,100	1,000
Manganese	9.3	7.3	0.25	0.13	8.6	11
Potassium	6.1	3.6	2.9	1.6	210	260
Sodium	160	150	760	560	9,000	8,800
Zinc	0.03	0.02	0.02	0.03	< 0.01	0.03
General Chemistry						
Ammonia	2.0	1.3	0.16	0.1	11	9.1
Chloride	150	150	640	490	15,000	15,000
Conductivity (μmhos/cm)	1,600	1,200	4,100	3,000	45,000	38,000
Fluoride	0.40	1.5	0.38	5.1	0.31	52
Nitrate	< 0.05	< 0.5	< 0.05	< 0.5	< 0.05	10
Nitrite	< 0.2	< 5	< 0.2	< 5	< 0.2	100
PH	7.4	7.2	7.1	7.0	6.9	6.8
Sulfate	120	37	100	73	870	820
Surfactants (as MBAS)	0.12	< 0.1	0.12	0.11	< 0.1	0.13
Total dissolved solids	860	720	2,200	2,000	28,000	31,000

Table 4.4-1

Results of Groundwater Monitoring[1]

City of Petaluma, Lakeville Oxidation Pond Site

Parameter	MW-1		MW-2		MW-3	
	05/19/1995	01/18/1996	05/19/1995	01/18/1996	05/19/1995	01/18/1996
Coliform Bacteria						
Total coliform (MPN)	11	DET	8.0	DET	< 2	DET
Fecal coliform (MPN)	< 2	< 2	8.0	< 2	< 2	< 2

Source: Modified from Brown and Caldwell, 1996

[1](all concentrations in mg/L unless noted otherwise)
MPN = most probable number
DET = detected. There was a total coliform bacterial growth present, but because of the growth of other microbial organisms, an MPN number was not possible
msl = mean sea level

EVALUATION CRITERIA WITH POINTS OF SIGNIFICANCE

Table 4.4-2 presents groundwater impact significance criteria.

Table 4.4-2

Evaluation Criteria with Point of Significance – Groundwater

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project degrade groundwater quality at existing drinking water wells, resulting in a public health hazard?	Domestic drinking water wells within ¼ mile of the project site.	Greater than 0 wells.	State and Federal water quality regulations California State Department of Health Services, Office of Drinking Water regulations for the use of recycled water and RWQCB Order 96-011
2. Will the project cause groundwater mounding or increase groundwater levels that cause surface discharge in a non-stream environment?	Projected groundwater levels.	Groundwater levels raised to within 6 feet of the surface	Elevated water tables can damage vegetation, interfere with the operation of leach fields or can result in surface water runoff and flooding.

Table 4.4-2

Evaluation Criteria with Point of Significance – Groundwater

Evaluation Criteria	As Measured by	Point of Significance	Justification
3. Will the project lower groundwater levels at existing wells?	Number of documented wells subject to lower groundwater levels.	Greater then 0 wells	The reduction of groundwater levels can cause existing wells to cease providing water for their intended uses.

Source: Parsons, 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: GW-1: Will the project degrade groundwater quality at existing drinking water wells, resulting in a public health hazard?

Analysis: *Water Recycling Facility – Significant*

Most of the project facilities would have no effect on groundwater. New facilities at the Lakeville site are largely in completely contained structures, and demolition of existing facilities at Hopper Street would be accomplished in such a way as to avoid any discharge to groundwater. The potential groundwater contamination is minimal as the wetlands will be underlain with low permeability clay and placed in an area with surficial clay deposits. The wetlands on the Lakeville site will contain wastewater that has undergone disinfection and secondary treatment. There is one drinking water well within one-quarter mile of the project boundaries.

The oxidation ponds will be operating in a similar manner to their historic usage, and there is no evidence of seepage from the current ponds to groundwater (Brown and Caldwell 1996). However, Measure PD-7, Groundwater Monitoring and Management, adopted as part of this project, requires the City to conduct regular sampling and monitoring to ensure that there will be no adverse effects on groundwater.

Analysis: *River Access Improvements – Less than Significant*

None of the river access improvements include components that could impact groundwater quality, except during construction. Construction impacts would be short-term and would not significantly impact groundwater at adjacent drinking water wells.

Mitigation: *Water Recycling Facility* - **GW-1. Drinking Water Well Protection Program**

The City shall monitor water quality in the nearby drinking water well before and after construction. If changes are detected after construction that are deemed deleterious to public health, one of the following measures, or an equivalent measure, shall be implemented:

- Drill a new well further from the Water Recycling Facility;
- Retrofit the existing well, e.g., provide a deeper casing;
- Provide wellhead treatment system for the constituents that are causing the public health concern.

After Mitigation: *Less than Significant*

The mitigation measure will reduce the risk of contamination at the nearby drinking water well to a less-than-significant level by moving the well, or moving the aquifer that the well draws from, or treating the water.

IMPACT: GW-2: Will the project cause groundwater mounding or increase groundwater levels that cause surface discharge in a non-stream environment?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

As the ponds will continue to operate in a manner similar to the present usage, there will be no increased groundwater mounding from the ponds.

The polishing wetlands would result in local mounding; however, this is inherent in wetlands creation because additional water will be added to cause saturation. This raising of the water table will be conducted by engineering design and it will be localized within the wetlands area on City-owned land.

Mitigation: No mitigation is necessary.

IMPACT: GW-3: Will the project lower groundwater levels at existing wells?

Analysis*:* *Water Recycling Facility and River Access Improvements – No Impact*

Pond improvements, wetlands, and project facilities would not interfere with groundwater recharge and would not use groundwater. The discharge component will not lower groundwater levels.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: GW-C1: Will the project have a potential for cumulative groundwater impacts?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Cumulative development in the project area has contributed to an increase in impervious surface area, affecting groundwater recharge and groundwater quality. However, there are no identified significant project impacts to groundwater. Given the required level of treatment for recycled water and the operational safeguards required by the Department of Health Services and Regional Water Quality Control Board the project is not expected to contribute to degradation of groundwater.

The City's existing irrigation system and future expansion of the system also have potential for impacting groundwater through percolation. However, the quality of the recycled water is comparable to and in some cases better than the groundwater used locally for irrigation. Additionally, use of recycled water is controlled by the Regional Water Quality Control Board, and appropriate irrigation practices are required.

Mitigation: No mitigation is necessary.

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4.5 SURFACE WATER QUALITY

SUMMARY

Because the Surface Water Quality section is long and somewhat technical, a separate summary of the section is provided here. The project will result in construction activities and an increase in the volume of effluent discharged to the Petaluma River and construction activities, both of which have the potential to cause impacts on surface water quality.

SETTING

To determine the impact of increased effluent discharge on the Petaluma River, the quality of both the discharge and the Petaluma River must be known. Water quality data have been collected from the effluent discharge and the Petaluma River and are summarized in Tables 4.5-1 and 4.5-2 for the Petaluma River and discharge, respectively. Effluent data used were collected October through May 1997 through 2001. Petaluma River data used were collected 1993 through 1999 (Regional Monitoring Program data) and 1997 through 2001 (City's monthly self monitoring data) and 2001 (special studies data). Effluent quality was assumed to be the same as current for the evaluation, although the project is expected to improve the effluent quality for some constituents.

Numeric and narrative water quality criteria have been developed by the U.S. EPA and other agencies to protect aquatic life and to protect against aesthetic water quality impacts. The impact of effluent discharge was determined by evaluating the water quality in the Petaluma River resulting from project effluent discharge relative to these criteria. Numeric criteria used to evaluate project impacts are based on the California Toxics Rule and the Basin Plan. Narrative criteria used to evaluate project impacts are from the Basin Plan. Construction activities were evaluated for compliance with local and state storm water quality regulations requiring implementation of effective Best Management Practices.

The canal that exists between the oxidation ponds is currently dredged regularly causing minor water quality disturbance.

IMPACTS ANALYSIS

Effluent Discharge – Numeric Criteria

The impact of the project on the following constituents or groups of constituents with numeric evaluation criteria was determined to be less than significant: bacteria, un-ionized ammonia, dissolved oxygen, pH, antimony, arsenic, cadmium, copper, lead, mercury, selenium, silver, thallium, zinc, and organic priority pollutants other than aldrin, acrolein and acrylonitrile. The impact of the project on the following constituents was determined to be significant before mitigation but less than significant after mitigation: cyanide, chromium, nickel, aldrin, acrolein, dioxin/furan congeners and acrylonitrile. No unavoidable impacts were identified.

Cyanide. The California Toxics Rule saltwater criterion for cyanide is 1.0 µg/L. The cyanide concentrations in effluent have been detected in 13 of 31 samples and all of these samples exceeded the water quality criterion. Most of the detected effluent cyanide values would cause the undiluted receiving water cyanide concentrations to exceed the water quality criterion of 1.0 µg/L. However, the concentrations of cyanide in Petaluma's effluent are fairly typical of effluent treatment facilities, the chemistry of cyanide is complex, and the measurement of cyanide is subject to interference. Therefore, the effluent total cyanide concentrations may not be representative of the actual toxic fraction of cyanide present in effluent and the potential for the project to cause an exceedence of a water quality criterion or objective cannot be evaluated and any conclusions would be speculative.

Chromium. Chromium in effluent was not detected in 21 of 32 samples and was below the water quality criterion of 11 µg/L in all but two samples both during and outside the discharge season. However, the chromium concentrations in two samples exceeded the water quality criterion and the predicted maximum concentration of chromium in the receiving water (resulting from these two high concentrations) exceeds the water quality criterion. Therefore the impact of the project on chromium in the receiving water is considered to be significant. With implementation of mitigation measure WQ-1a: Chromium Monitoring and Source Reduction, the impact of chromium on the receiving water is expected to be less than significant.

Nickel. Nickel in effluent exceeded the water quality criterion of 7.1 µg/L on four of the 32 occasions that it was measured during the discharge season and on two additional occasions during the non-discharge season. For three of these high nickel effluent values, the predicted concentration of nickel in the receiving water would increase significantly. Therefore, the impact of the project on nickel in the receiving water is considered to be significant. However, under most conditions, the concentration of nickel in the receiving water would be reduced by project discharge. With implementation of mitigation measure WQ-1b: Nickel Monitoring and Reduction, the impact of nickel on the receiving water is expected to be less than significant.

Aldrin, 2,3,7,8-TCDD, Acrolein, and Acrylonitrile. Although when aldrin and 2,3,7,8-TCDD were tested for in effluent, the concentrations was always below detection, the detection limits exceeded the respective criteria for aldrin and 2,3,7,8-TCDD so the potential impacts of aldrin and 2,3,7,8-TCDD cannot be evaluated. In addition, acrolein and acrylonitrile have not been tested for in effluent so the potential impacts on the receiving water cannot be evaluated. For this reason, the impact of the project discharge on aldrin, 2,3,7,8-TCDD, acrolein, and acrylonitrile in the receiving water is considered to be significant. However, with implementation of mitigation measure WQ-1d: Constituents not Monitored in Effluent Monitoring and Source Reduction, the impact of aldrin, 2,3,7,8-TCDD, acrolein, and acrylonitrile is expected to be less than significant.

Dioxin/Furan Congeners. Dioxins (chlorinated dibenzodioxins) and furans (chlorinated dibenzofurans) are groups of compounds consisting of several closely related compounds or congeners. The medians concentration of two congeners, 1,2,3,4,6,7,8-HeptaCDD and 1,2,3,4,6,7,8-HeptaCDF, exceed the evaluation criteria. The concentration in the receiving waters is unknown so the resulting concentrations of these congeners with the discharge cannot be predicted. Therefore, the impact of project discharge on dioxin/furan congeners in the receiving water is considered to be significant. With implementation of mitigation measure WQ-1e:

Dioxin/Furan Congener Monitoring and Reduction, the impact of dioxin/furan congeners on the receiving water is expected to be less than significant.

Effluent Discharge – Narrative Criteria

The impact of the project with respect to the following narrative criteria was determined to be less than significant: bioaccumulation of all priority pollutants with the exception of cyanide, biostimulatory substances, color, floating matter, oil and grease, population and community ecology, salinity, sediment, settleable matter, suspended material, sulfide, taste and odor, temperature, toxicity, and turbidity. The impact of project discharge has been determined to be significant based on narrative criteria for bioaccumulation of cyanide. No unavoidable impacts were identified.

Bioaccumulation of Cyanide. The median cyanide concentration was less than 3 µg/L, which may exceed the chronic criterion of 1.0 µg/L. However, cyanide is a regional problem associated with the analytical protocol for cyanide analysis due to matrix inferences. A body of evidence exists to show that cyanide measurements in effluent may be an artifact of the analytical method. However, as discussed above, the effluent total cyanide concentrations may not be representative of the actual bioaccumulatory fraction of cyanide present in effluent and the potential for the project to cause an exceedence of a water quality criterion or objective cannot be evaluated and any conclusions would be speculative.

Construction Activities

Construction activities have the potential to cause discharge of pollutants to waterways through erosion and accidental spills. However, Measure PD-8, Construction Erosion and Spill Control Measures, adopted as part of the project, would result in avoidance of construction impacts on water quality.

SURFACE WATER QUALITY -- SECTION

This section evaluates project impacts of the Petaluma Water Recycling Facility and River Access Improvements to surface water quality. Water quality characteristics of the project wastewater as well as potentially affected surface waters are also described in this section to provide a basis of comparison. The information contained in this section is summarized from the *Antidegradation Analysis for the City of Petaluma, California* (Larry Walker Associates, 2001).

SETTING

This section describes water quality conditions in waterways that are potentially affected by the project. These waterways include the Petaluma River and San Pablo Bay. This section also describes effluent quality from the existing treatment system.

Receiving Waters

Receiving water quality data are shown in Table 4.5-1. Data come from various sources including the Regional Monitoring Program (San Pablo Bay station BD20 and Petaluma River

station BD15 collected 1993 through 1999), the City's monthly National Pollutant Discharge Elimination System (NPDES) permit self-monitoring of the Petaluma River outfall (at station C2B 500 feet downstream of the outfall, collected in months November through April of years 1997 through 2001), and special studies that were conducted in 2001.

The USGS collects and archives stage (water depth) data from stations near Corona Road (designated "CRD") and upstream of the Washington Street Bridge (designated "PTB"), from February 23, 1998, to the present time. The CRD site is upstream of urban Petaluma, while the PTB station is within the city boundaries. The only Petaluma River flow gaging station operated by the USGS was discontinued in 1963. Stage data are given for variable intervals from event-triggered recorders. The upstream limit of tidal influence in the Petaluma River is within City limits, upstream of the confluence of Lynch Creek. Both gage sites are upstream of the treatment facility's outfall. The signal from both data sets yields a seasonal pattern, with sporadically high freshwater flows in the wet season and negligible freshwater flow in the dry season. Tidally driven flow reversals occur in the river reach extending upstream of the treatment outfall, as seen in the fluctuating stage data for station PTB (Larry Walker Associates, 2001).

Effluent Quality and Quantity

Table 4.5-2 presents summary statistics for treatment plant effluent for the October through May discharge seasons for the years 1997 through 2001. Only organic compounds that have been found in detected concentrations in effluent are presented.

Also shown in Table 4.5-2 are the lowest applicable California Toxics Rule or San Francisco Bay Basin Plan criteria (discussed further in the Evaluation Criteria with Points of Significance section below). Since the Petaluma River is estuarine (salinity is not less than 1 ppt or greater than 10 ppt at least 95 percent of the time), the lowest of the salt water or freshwater criteria for the protection of aquatic life are applicable and are shown. Since the Petaluma River and San Francisco Bay are not sources of drinking water, the only applicable human health criteria are for the consumption of organisms. The current permitted discharge capacity is 5.2 mgd average dry weather flow (ADWF). The facility's outfall is located in the Petaluma River, approximately nine miles upstream from San Pablo Bay. Discharge to the Petaluma River is conveyed through a 42-inch outfall and diffuser into shallow water (8.6 feet deep at mean low water). Owing to the tidal influence in this reach of the river and the limited freshwater flows, the discharge is classified as a shallow water discharge and receives no dilution credit. The City is permitted to discharge effluent to the Petaluma River from October 21 to April 30. However, the City typically only discharges effluent to the Petaluma River during the 181-day period from November 1 to April 30. From 1997 through 2000, the City discharged an average of 6.8 mgd over this 181-day period. The City has historically had occasions when discharge in October and May was necessary. Therefore the water quality analysis includes data from these months.

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Total Chlordanes	µg/L	6.1E-05	1.9E-04	3.4E-04	5.4E-05	2.7E-04	7.8E-04						
Total DDTs	µg/L	2.4E-04	6.6E-04	2.4E-03	7.5E-04	1.2E-03	6.8E-03						
Diazinon	µg/L	1.0E-06	4.4E-03	3.1E-02	1.0E-06	6.1E-03	1.4E-02						
Dieldrin	µg/L	1.0E-06	8.0E-05	2.4E-04	1.0E-06	6.4E-05	1.6E-04						
PCBs	µg/L	1.4E-04	3.7E-04	1.5E-03	1.7E-04	4.7E-04	1.4E-03						
PAHs	µg/L	0.0065	0.033	0.090	0.030	0.080	0.505						
Mercury (TR)	µg/L	0.004	0.009	0.047	0.013	0.046	0.126				0.0089	0.0142	0.018
Mercury (D)	µg/L	0.000	0.001	0.003	0.001	0.002	0.035						
Selenium (TR)	µg/L	0.113	0.170	0.330	0.060	0.225	0.410						
Selenium (D)	µg/L	0.100	0.150	0.240	0.104	0.171	0.310						
Arsenic (TR)	µg/L	0.003	0.010	0.058	0.012	0.045	0.140						
Arsenic (D)	µg/L	1.190	1.430	1.950	1.830	2.240	3.280						
Cadmium (TR)	µg/L	0.026	0.040	0.098	0.049	0.092	0.170						
Cadmium (D)	µg/L	0.010	0.029	0.092	0.010	0.045	0.100						
Chromium (TR)	µg/L	2.580	4.50	24.83	4.570	39.59	55.96						
Chromium (D)	µg/L	0.110	0.195	2.470	0.130	0.310	8.790						
Copper (TR)	µg/L	2.200	4.100	10.04	2.860	11.04	20.75				5.27	7.6	11.5

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Copper (D)	µg/L	1.200	1.550	2.540	2.200	3.349	4.770				2.14	5	10.6
Lead (TR)	µg/L	0.300	1.480	4.410	1.190	4.800	7.380						
Lead (D)	µg/L	0.002	0.021	0.253	0.007	0.015	0.991						
Nickel (TR)	µg/L	2.600	6.300	22.90	5.600	28.58	41.30				10.2	16.9	24.5
Nickel (D)	µg/L	1.000	1.630	3.730	1.700	6.505	37.40				5.06	11.6	26.8
Silver (TR)	µg/L	0.003	0.010	0.058	0.012	0.045	0.140						
Silver (D)	µg/L	0.001	0.002	0.004	0.001	0.003	0.012						
Zinc (TR)	µg/L	2.330	7.400	19.67	6.720	27.31	46.36						
Zinc (D)	µg/L	0.200	0.649	1.30	0.200	0.579	8.40						
Ammonia	mg/L as N	0.0	0.03	0.13	0.00	0.05	0.26	0.1	0.73	1.9	0.3	0.675	1.1
Un-ionized ammonia	mg/L as N							0.0004	0.003	0.0072	0.002	0.00575	0.011
NO_3	mg/L as N										0.9	1.2	1.5
NO_2	mg/L as N										0.07	0.10	0.16
PO_4	mg/L as P										0.8	1.0	1.4
TSS	mg/L	7.2	34.2	148.4	32.0	217	414				28	60	120
Temperature	°C	10.3	12.7	16.0	11.4	14.4	22.5	6.1	12.4	19	12.8	15.4	19
pH	--	7.5	7.8	8.3	7.1	7.8	9.0	7	7.4	7.6	7.2	7.5	7.8
Salinity	Ppt	0.5	6.6	22.9	0.3	5.3	22.3	0.2	10.8	38.0	0.7	5.6	15.4
Conductivity	µmhos/cm							338	16,800	59,400			

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Hardness	mg/L							86	1661	4720	310	838	1600
DO	mg/L	0.8	9.5	10.6	1.4	8.1	10.2	5.0	7.2	9.4			
Chl-a	µg/L	0.6	6.9	32.5	2.2	11.3	106.3	0.4	10.5	45.7	<5	28.8	120
Turbidity	NTU							24.8	95.1	220			
Secchi depth	inches							1	7.2	12.5			
Total coliform bacteria								22	797 (median = 500)	>1600			

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

Table 4.5-2

Existing Effluent Quality[a] (October-May, 1997-2001)

(all values in µg/L unless noted)

Constituent	# samples	Min or Detection Limit	Median or 30-day Average	Instantaneous Max	Lowest of CTR[b] or Basin Plan Criteria
Conventional Constituents					
Ammonia-N (mg/L)	26	1.6	8.7	17	NA
Un-ionized ammonia-N (mg/L)	25	0.0085	0.030	0.15	0.025 (median) 0.16 (maximum)
Total Coliform Bacteria (MPN/100 ml)	508	<2	2[c]	>1600	240 (median)[d] 10,000 (maximum)
TSS (mg/L)	332	5	28[c]	77.4	NA
BOD_5 (mg/L)	297	6.6	16.0[c]	40.3	NA
pH	664	6.6	7.4[c]	8.5	≥6.5 and≤8.5
Conductivity (µmhos/cm)	18	307	1,025[c]	1,177	NA
Hardness (mg/L)	26	154	174 median 182 average	250	NA
DO (mg/L)	659	0.6	5.4[c]	0.6 (min)	≥5.0
Oil and Grease (mg/L)	25	2	5.0	14.9	NA
Chl-*a*	24	8.8	220	745	NA
Cyanide	31	<3	<3	17	1.0
Acute Toxicity - minnow (% survival)	26	95	100	100	Median >90% or >70% 10% of the time
Acute Toxicity - stickleback (% survival)	13	40	100	100	Median >90% or >70% 10% of the time
Chronic Toxicity (100/NOEL)	4	NA	1	1	1
Chlorine residual (#hrs>0)	26	0.0	0.0	4.3	NA
Detected Organic Compounds					
Total dioxin compounds	2	0.000078	0.0000088	0.0000099	NA[e]
1,2,3,4,6,7,8-HeptaCDD (pg/L)	3	2.38	2.72 (0.027)[f]	4.6 (0.046)[g]	0.014
OctaCDD (pg/L)	3	6.27	16.9 (0.0017)[f]	41 (0.0041)[g]	0.014
1,2,3,4,7,8-HexaCDF (pg/L)	3	2.04	ND (0.00)[f]	0.991 (0.099)[g]	0.014
1,2,3,4,6,7,8-HeptaCDF (pg/L)	3	1.55	1.5 (0.015)[f]	2.1 (0.021)[g]	0.014
OctaCDF (pg/L)	3	3.85	3.77 (0.00038)[f]	5 (0.0005)[g]	0.014
Bis(2-ethylhexyl)phthalate	14	<5	<5	8	5.9

Table 4.5-2

Existing Effluent Quality[a] (October-May, 1997-2001)

(all values in µg/L unless noted)

Constituent	# samples	Min or Detection Limit	Median or 30-day Average	Instantaneous Max	Lowest of CTR[b] or Basin Plan Criteria
Chloroform	9	<0.5	1.9	5.2	NA
Bromodichloromethane	8	<0.5	<0.8	3.2	46
Bromomethane	8	<0.5	<0.5	1.6	4,000
Dibromochloromethane	8	<0.5	<0.5	0.8	34
Lindane (gamma-BHC)	25	<0.01	<0.01	0.01	0.063
Phenol	15	<5	<5	9	4,600,000
Toluene	8	<0.5	<0.5	0.9	200,000
Metals (Total Recoverable)					
Antimony	1	<5	<5	<5	4,300
Arsenic[k]	32	<2.0	2.0	8.0	36
Cadmium[f]	30	<0.2	<0.20	<2.0	1.6
Chromium[i]	32	<1.0	1.0	200	11
Copper[k]	32	<2.0	4.0	7.0	3.1
Lead[h,k]	32	<2.0	<2.0	3.0	3.9
Mercury[i]	16	0.003	0.006	0.010	0.025
Nickel	32	<3.0	4.9	170	7.1
Selenium	32	0.6	<1	1	5.0
Silver[j,k]	32	<0.5	<0.5	0.8	1.9
Thallium	1	<5	<5	<5	6.3
Zinc	32	<20	20.0	40.0	58

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

[a] The data presented in this table is existing effluent and, for purposes of impacts analysis, project effluent quality.
[b] The CTR is the California Toxics Rule.
[c] Median of 30-day average values.
[d] The bacteria criteria shown here are for contact recreation which is the lowest applicable criterion since shellfish harvesting (requiring a lower objective) is not a beneficial use for the Petaluma River. Although shellfish harvesting is a beneficial use for San Pablo Bay, modeling studies (Larry Walker Associates 2001) have shown that, because of the rapid die-off rate of freshwater coliform, the extent of influence of coliform in the facility's river discharges is less than 5 km upstream and downstream so that the influence of the project discharge on coliform bacteria does not reach San Pablo Bay.
[e] The California Toxics Rule criterion for dioxin is for 2,3,7,8 TCDD which was below detection in all samples.
[f] The value in parentheses is the TEF-normalized median.
[g] The value in parentheses is the TEF-normalized maximum
[h] The freshwater criteria for these constituents are based on hardness. A hardness of 150 mg/L $CaCO_3$ was used to calculate these criteria. This was the 10th percentile hardness (the value exceeded 90 percent of the time) in the Regional Monitoring Program data set for Petaluma River.
[i] Effluent concentrations of mercury shown are October through May values since the implementation of ultra-clean sampling and analytical techniques in June 1999.
[j] The criterion shown is the saltwater CMC since no CCC exists.
[k.] The criteria shown are for dissolved metals.

Regulatory Framework

The following sections outline the regulatory framework of federal, State, and local laws that is the basis for determining the points of significance during the evaluation of impacts under the California Environmental Quality Act.

Surface water quality is regulated to protect aquatic life and human health according to the provisions of the Federal Clean Water Act (and associated federal regulations) and the California Porter-Cologne Water Quality Control Act, referred to respectively as the Federal and State Acts. The State Act established the nine Regional Water Quality Control Boards (Regional Boards) and the State Water Resources Control Board (State Board). In California, the discharge permitting provisions of the Federal Act have been delegated by the U.S. EPA to the State and Regional Boards.

Numeric and narrative water quality criteria have been developed by the U.S. EPA and other agencies to protect aquatic life and to protect against aesthetic water quality impacts. Specific regulations that relate to inland surface waters are described below.

California Toxics Rule

The U.S. EPA's California Toxics Rule was promulgated on May 18, 2000. The criteria largely reflect the existing criteria contained in the U.S. EPA's 304(a) Gold Book (Water Quality Criteria 1986) and its National Toxics Rule adopted in December 1992 [57 Federal Register 60848] and revised in December 1998, and those of earlier state plans (the *Inland Surface Waters Plan* and the *Enclosed Bays and Estuaries Plan* of April 1991, since rescinded). With promulgation of the California Toxics Rule these federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the Clean Water Act.

State Implementation Policy

The State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy), was adopted by the State Board on March 2, 2000 and became effective on May 22, 2000. The goal of the State Implementation Policy is to establish a standardized approach for permitting discharges of toxic pollutants to non-ocean surface waters in a manner that promotes statewide consistency. As such, the State Implementation Policy is considered to be a tool to be used in conjunction with watershed management approaches and, where appropriate, the development of Total Maximum Daily Loads to ensure achievement of water quality standards.

Basin Plan

The project area lies within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board. The Regional Board is responsible for the protection of beneficial uses of water resources within the San Francisco Bay Region. The Regional Board uses planning, permitting, and enforcement authorities to meet this responsibility, and has adopted the Water Quality Control Plan for the San Francisco Bay Basin (1995),

to implement plans, policies, and provisions for water quality management. Beneficial uses of surface waters are described in the Basin Plan and are designated for major surface waters and their tributaries. The designated beneficial uses for the Petaluma River and San Pablo Bay are shown in Table 4.5-3.

Table 4.5-3

Beneficial Uses for the Petaluma River and San Pablo Bay (indicated by an X)

Beneficial Use	Petaluma River	San Pablo Bay
Navigation (NAV)	X	X
Water Contact Recreation (REC-1)	X	X
Non-Contact Water Recreation (REC-2)	X	X
Wildlife Habitat (WILD)	X	X
Migration of Aquatic Organisms (MIGR)	X	X
Spawning, Reproduction, and/or Early Development (SPWN)	X	X
Preservation of Rare and Endangered Species (RARE)	X	X
Ocean, commercial, and sport fishing (COMM)		X
Industrial service supply (IND)		X
Warm Freshwater Habitat (WARM)	X	
Cold Freshwater Habitat (COLD) -	X	
Marine Habitat (MAR)	X[a]	

Source: Basin Plan, 1995

[a]The Basin Plan incorrectly designated the Petaluma River as Marine Habitat.

Section 303(d) of the Clean Water Act

Section 303(d) of the Clean Water Act (CWA) requires states to identify waters where the permit standards, any other enforceable limits, or adopted water quality standards are still not attained. Lists of prioritized impaired water bodies are known as the "303(d)" lists and must be submitted to the U.S. EPA every two years. The Petaluma River is listed under 303(d) as impaired for nutrients, pathogens, and sediment. San Pablo Bay is listed as impaired for chlordane, copper, DDT, diazinon, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, nickel, PCBs, PCBs (dioxin-like), and selenium. Total Maximum Daily Loads (TMDLs) have only been established for mercury in San Pablo Bay. Compliance of the project with load limits to be established for 303(d) listed constituents other than mercury cannot be evaluated since it is unknown what the load allocations will be. The impact of project discharge on allocated mercury loads is evaluated under the numeric criteria section.

Antidegradation Policies

The U.S. EPA established the basic federal antidegradation policy in 1968, with the first water quality standards included in 1975 regulations (40 CFR 131.12). The policy mandates that states develop an antidegradation policy and sets minimum standards for the state policies. The California policy was adopted in 1968 as a resolution of the State Water Resources Control Board (Resolution No. 68-16). The resolution is a statement of policy with respect to maintaining high quality waters in California. The state policy requires that changes in water quality will not unreasonably affect beneficial uses.

In 1990, the Executive Director of the State Water Resources Control Board issued the Administrative Procedures Update *Antidegradation Policy Implementation for NPDES Permitting* (APU 90-004) (Antidegradation Implementation Policy). The Antidegradation Implementation Policy was intended to provide guidance to Regional Boards for implementing the state and federal antidegradation policies relative to the NPDES permitting process. The Antidegradation Implementation Policy is thus the basis for evaluating both the federal and State antidegradation policies since the U.S. EPA has delegated authority for NPDES permitting in California to the State.

The policy sets forth two levels of analysis – a simple analysis and a complete analysis. A "simple" analysis may be employed where a Regional Board determines that:

- A "reduction in water quality will be spatially localized or limited with respect to the waterbody; e.g. confined to the mixing zone"; or
- A "reduction in water quality will be temporally limited and will not result in any long-term deleterious effects on water quality; e.g., will cease after a storm event is over"; or
- The "proposed action will produce minor effects which will not result in a significant reduction of water quality; e.g., a POTW has a minor increase in the volume of discharge subject to secondary treatment"; or
- "The proposed activity, which may potentially reduce water quality, has been approved in the General Plan of a political subdivision and has been adequately subjected to the environmental and economic analyses in an environmental impact report (EIR) required under the California Environmental Quality Act (CEQA)."

Following the administrative procedures for Antidegradation Policy Implementation for NPDES Permitting, a "complete" antidegradation analysis is not warranted if these considerations are deemed minor. The second level of review is only necessary if the new facility's discharges would result in:

- A substantial increase in mass emissions of a constituent, or
- Significant mortality, growth impairment, or reproductive impairment of resident species.

The document "*Antidegradation Analysis for the City of Petaluma, California*" (Larry Walker Associates, 2001) describes the antidegradation analysis performed for the

project and is the basis for the water quality impacts evaluation presented here. It was determined that the criteria were met for a simple analysis.

City of Petaluma General Plan

The River Element of the City's General Plan includes the following objective:

River Element Objective

h) Improve the quality of the water in the Petaluma River.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.5-4

Evaluation Criteria with Point of Significance – Surface Water Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project discharge cause numeric-based criteria to be exceeded?	Concentration	Varies	U.S. EPA (California Toxics Rule) criteria; Basin Plan criteria
2. Will the project discharge cause narrative-based criteria to be exceeded?	Varies	Varies	Basin Plan narrative criteria
3. Will project construction result in a substantial degradation of surface runoff quality?	Compliance with local and state storm water quality regulations requiring implementation of effective Best Management Practices	Any failure to implement effective, reasonable and appropriate measures	State of California General NPDES Permits for Discharges of Storm Water Associated with Construction and Industrial Activities. CEQA Checklist

Source: Parsons, 2002

Numeric Criteria

Numeric criteria are based on the California Toxics Rule and the Basin Plan. The California Toxics Rule and Basin Plan numeric criteria for the protection of aquatic organisms have both saltwater and fresh water criteria. Since the Petaluma River is estuarine, the lowest of the salt water or freshwater criteria for the protection of aquatic life was used to evaluate impacts (as stipulated in the California Toxics Rule). In addition, organisms in the receiving water will be exposed to wastewater for varying lengths of time. For this reason, the chronic criteria (criterion continuous concentration in the California Toxics Rule and 4-day average criteria in the Basin Plan) were used where available since these are more stringent than acute criteria. The lowest

applicable California Toxics Rule or Basin Plan criteria are shown in Table 4.5-2 for constituents detected in effluent. Since the Petaluma River and San Francisco Bay are not sources of drinking water, the applicable human health criteria are for the consumption of organisms. Many of the organic compounds for which California Toxics Rule criteria exist have been tested for in Petaluma's effluent and found to be below detection. Some criteria are lower than technically achievable detection limits.

The USEPA Technical Support Document for Water Quality-Based Toxics Control (USEPA, 1991) suggests a general rule for exceedance frequency of once per three years for toxic pollutant water quality criteria based on literature on ecosystem recovery from disturbance. This frequency of exceedance was used to evaluate impacts for constituents with criteria for the protection of aquatic life. Human health criteria are based on long-term consumption of water and or organisms. Therefore, median values were used to evaluate impacts for constituents with only human health criteria.

The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Water Resources Control Board, 2000) provides minimum levels (MLs) for constituents for the purposes of determining compliance with effluent limitations for priority pollutants whose criteria are lower than achievable detection limits. ML is defined as "the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed". For the water quality impacts evaluation, if a constituent is always below detection and the detection limit is equal to or below either the water quality objective or the ML, the impact on the receiving water is considered to be less than significant and not discussed further in this document (Table 4 in Larry Walker Associates, 2001 contains non-detected California Toxics Rule organic compounds with detection limits below their respective criteria). Table 4.5-5 shows constituents found in less than detectable concentrations in effluent but the detection limit exceeded the water quality objective. Table 4.5-5 compares the detection limit with the water quality objective and ML for each constituent. Table 4.5-6 shows constituents with California Toxics Rule criteria or Basin Plan objectives that have not been tested for in Petaluma's effluent.

Table 4.5-5

Effluent Constituents Below Detection Limits - Comparison with Water Quality Objectives and Minimum Levels

CTR[a] constituent	Human Health Criteria For Consumption of Organisms[b], µg/L	Effluent Analytical Detection Limit, µg/L	SWRCB Minimum Level, µg/L[c]
Aldrin[d]	0.00014	0.01	0.005
2,3,7,8-TCDD	0.000000014	0.00000054 – 0.0000023	NA
3,3 Dichlorobenzidine	0.077	5	5
4,4'-DDD	0.00084	0.01	0.05
4,4'-DDE	0.00059	0.01	0.05
4,4'-DDT	0.00059	0.01	0.01
Benzidine	0.00054	1	5
Benzo(a)Anthracene	0.049	0.3	10
Benzo(a)Pyrene	0.049	0.3	10
Benzo(b)Fluoranthene	0.049	0.3	10
Benzo(k)Fluoranthene	0.049	0.3	10
Bis(2-Chloroethyl)Ether	1.4	1	10
Chlordane	0.00059	0.02	0.1
Chrysene	0.049	0.3	10
Dibenzo(a,h)Anthracene	0.049	0.3	10
Dieldrin	0.00014	0.01	0.01
Heptachlor	0.00021	0.01	0.01
Heptachlor Epoxide	0.00011	0.01	0.01
Hexachlorobenzene	0.00077	1	5
Hexachloroethane	8.9	1	5
Indeno(1,2,3-cd)Pyrene	0.049	1	10
Polychlorinated biphenyls	0.00017	0.1	0.5
Toxaphene	0.00075	0.1	0.5

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

[a] CTR is the California Toxics Rule
[b] The Human Health Criteria for Consumption of Organisms is the applicable CTR criterion for constituents in Table 4.5-5.
[c] The highest value tabulated in the State Implementation Plan.
[d] The analytical detection limit exceeds the Minimum Level for this constituent.

Table 4.5-6

Constituents Not Tested for in Effluent

Constituent	Human Health Criteria for Consumption of Organisms[a], µg/L/Basin Plan Objective
Acrolein	780
Acrylonitrile	0.66

Source: Merritt-Smith Consulting, 2002

[a] The Human Health Criteria for Consumption of Organisms is the applicable CTR criterion for constituents in Table 4.5-6.

Narrative Criteria

The following narrative criteria from the Basin Plan were used to evaluate project impacts on water quality.

Bioaccumulation. Many pollutants can accumulate on particles, in sediment, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.

Biostimulatory Substances. Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses. Changes in chlorophyll *a* and associated phytoplankton communities follow complex dynamics that are sometimes associated with a discharge of biostimulatory substances. Irregular and extreme levels of chlorophyll *a* or phytoplankton blooms may indicate exceedence of this objective and require investigation.

Color. Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.

Floating Material. Waters shall not contain floating material, including solids, liquids, foams, and scum in concentrations that cause nuisance or adversely affect beneficial uses.

Oil and Grease. Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.

Population and Community Ecology. All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and

life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

Salinity. Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.

Sediment. The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Controllable water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.

Settleable Material. Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.

Suspended Material. Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Sulfide. All water shall be free from dissolved sulfide concentrations above natural background levels. Sulfide occurs in Bay muds as a result of bacterial action on organic matter in an anaerobic environment. Concentrations of only a few hundredths of a milligram per liter can cause a noticeable odor or be toxic to aquatic life. Violation of the sulfide objective will reflect violation of dissolved oxygen objectives as sulfides cannot exist to a significant degree in an oxygenated environment.

Tastes and Odors. Waters shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.

Temperature. Temperature objectives for enclosed bays and estuaries are as specified in the "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California," including any revisions to the plan. In addition, the following temperature objectives apply to surface waters:

- The natural receiving water temperature of inland surface waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.

- The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature.

Toxicity. All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species. There shall be no acute toxicity in ambient waters. Acute toxicity is defined as a median of less than 90 percent

survival, or less than 70 percent survival, 10 percent of the time, of test organisms in a 96-hour static or continuous flow test.

There shall be no chronic toxicity in ambient waters. Chronic toxicity is a detrimental biological effect on growth rate, reproduction, fertilization success, larval development, population abundance, community composition, or any other relevant measure of the health of an organism, population, or community. Chronic toxicity generally results from exposures to pollutants exceeding 96 hours. However, chronic toxicity may also be detected through short-term exposure of critical life stages of organisms.

At a minimum, compliance will be evaluated using the bioassay requirements contained in Chapter 4 (of the Basin Plan).

The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

Turbidity. Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 nephelometric turbidity units (NTU).

IMPACTS AND MITIGATION MEASURES

Evaluation Methodology

Receiving Water Quality

The new water recycling facility will be designed to handle combined commercial, industrial and domestic wastewater flows generated through build-out of the City's adopted 1987 General Plan and the unincorporated Sonoma County community of Penngrove. The average dry weather flow for the new water recycling facility is projected at 6.7 mgd. River discharges will occur during the same time period in general as current discharges (City is permitted to discharge to Petaluma River from October 21 to April 30). The new water recycling facility is described in Chapter 2, Project Description, and will comprise extended aeration, secondary clarifiers, oxidation ponds, wetlands, and UV and hypochlorite disinfection. The new water recycling facility will also include filtration for production of tertiary recycled water for reuse during the irrigation season.

The impact analysis pertains to the permitted river discharge period. Out–of-season discharges occurred on five occasions during 1995 through 2000 due to weather related conditions (wet springs leading to less use and less evaporation from the storage ponds) and alterations in storage needs related to construction projects. However, the worst-case conditions assessed in this section are applicable to an extended period considering that exceptional discharges could occur. Thus, the fundamental findings from this analysis would not be different for discharges in early October (up to three weeks earlier than the

current permitted discharge period begins) and May (up to one month later than the current permitted discharge period ends).

The impacts analysis was conducted based on current effluent quality. However, effluent quality is expected to be improved with the project. Specifically, the proposed facility is expected to reduce effluent suspended solids below 30 mg/L before discharge to the river. In addition, ammonia and total nitrogen are expected to be reduced with the project. The secondary facilities will provide nitrification and partial denitrification, reducing total nitrogen in the ponds to 11-15 mg/l. Currently ammonia concentrations in the pond effluent can range from 1 mg/l to 19 mg/l (Predesign Report, TM No. 4). Ammonia in the pond effluent will be further reduced in the wetlands. Final effluent discharged to the river will have ammonia values less than 8 mg/l. Concentrations of some metals also will also be reduced in the wetlands. However, nickel is not appreciably removed in the existing treatment process, nor is nickel removal efficiency expected to improve with the new facility.

To assist in the evaluation of potential impacts of the project's increased discharge on receiving water quality, a numerical model was used to analyze the dilution characteristics of the facility's discharges to the Petaluma River, and the fate and transport of conservative and non-conservative constituents in the receiving waters. The model, initially developed by Resource Management Associates, Inc., simulates flow, salinity, water quality and sediment transport in streams and estuaries. The Bay is represented in two dimensions (depth averaged) while the Delta and tributaries (including the Petaluma River) are represented in one dimension (as if lines). For all model simulations, present and future discharges from the facility were the current (5.2 mgd) and future (6.7 mgd) permitted capacities, respectively. Effluent concentrations for both present and future discharge scenarios were computed from monthly effluent monitoring records for the past three years. Effluent flow rate is directly correlated with River flow. Thus, although wet season effluent flows are typically higher than the ADWF, the ADWF approximates conditions during the critical dry period being simulated. This simulation period represents the minimum practical dilution effect on the permitted effluent discharges and thus presents a worst-case scenario. This model and the calibration exercise are described in detail in the *Antidegradation Analysis for the City of Petaluma, California* (Larry Walker Associates, 2001).

The model simulated effects on salinity, a tracer representative of conservative constituents, two tracers representative of non-conservative constituents (with different decay rates), copper, and nickel in the Petaluma River and the entire Bay-Delta system. For nickel and copper, a small dataset was used to calibrate background loads into the Petaluma River. Results should therefore be interpreted more for extent of influence and relative changes in concentration than for the concentrations computed. The results of these simulations are presented in part below. The complete results are described in the *Antidegradation Analysis for the City of Petaluma, California* (Larry Walker Associates, 2001).

Salinity. Due to increased treatment plant flows, salinity in the Petaluma River is expected to decrease by 0.7 to 1.2 parts per thousand (ppt) with an average decrease of 1

ppt. Peak salinity reduction on a tidally averaged basis occurred between the outfall location and about 3 km upstream of the outfall. Increased discharge for the future condition moved the 10 ppt line approximately 600 m downstream for the tidal and flow conditions present during the simulation period. The 10 ppt line represents the location downstream from which only salt water criteria apply. For the low-flow scenarios explored with the model, practically the entire tidally-influenced reach of the Petaluma River would be classified as salt water.

Conservative Tracer Simulations. The conservative tracer simulation represents mixing characteristics of effluent constituents under worst-case conditions of no decay, loss, or sequestering. Tracer concentration can be interpreted as percent wastewater. Values thus represent the proportion of effluent water mixed into the ambient receiving water. During the modeled period the average existing tracer concentration (representing average wastewater concentrations in the receiving water) was 23.0 percent, and the predicted future average tracer concentration under project conditions was 28.5 percent. The maximum present tracer concentration was 27.1 percent and the maximum future tracer concentration was 33.4 percent, a 6 percent increase in wastewater proportion of the river water. This condition occurs between the outfall location and about 3 km upstream of the outfall.

Non-conservative Tracer Simulations. The non-conservative tracer simulations were designed to show the impact of decay on constituent concentrations in the Petaluma River. As with the conservative tracer simulations, tracer concentration can be interpreted as percent wastewater. Two different non-conservative tracers were used: one with a decay rate typical of coliform die-off (tracer-1) and one with a decay rate typical of ammonia oxidation (tracer-2). On a tidally averaged basis, the maximum tracer-1 concentrations were 1.3 percent for the present discharge rate and 1.7 percent for the future discharge rate, occurring at the outfall location. On a tidally averaged basis, peak tracer-2 concentrations were 6.0 percent for the present discharge rate, and 7.7 percent for the future discharge rate, occurring at the outfall location.

Copper. Because average permitted copper concentrations are lower than ambient conditions, the effluent, on average, provided dilution. On a tidally-averaged basis, the incremental effect of the increased discharge will be to decrease ambient copper concentrations by up to 0.19 µg/L.

Nickel. Because permitted effluent nickel concentrations are lower than ambient conditions, the effluent, on average, provided dilution. On a tidally averaged basis, peak reductions in dissolved nickel concentrations resulting from the increased effluent flow rate range from 0.59 µg/L at the outfall to 0.65 µg/L approximately 2.5 km upstream (at slack after flood tide). Virtually no change in concentration occurs downstream of the 5-km mark.

The impacts of project discharge of chromium, copper, and nickel in the receiving water were further evaluated since the instantaneous maximum effluent concentrations of these constituents exceed their respective water quality criteria and, in the case of copper and nickel, the current median receiving water concentrations also exceed the water quality

criteria. For this analysis, the initial receiving water concentrations are assumed to be the median concentrations found in San Pablo Bay at the mouth of the Petaluma River which are similar to the median concentrations at other stations in the receiving water. The initial receiving water concentrations used are the dissolved concentrations for chromium and copper because the water quality criteria are dissolved criteria. However, the water quality criterion for nickel is a total recoverable criterion, so the total recoverable concentration of nickel was used for the initial receiving water concentration. Two predicted concentrations were evaluated for each metal; one using median initial receiving water concentrations and median effluent concentrations and one using median initial receiving water concentrations and maximum effluent concentrations. In all cases the maximum predicted percentage wastewater (minimum dilution) in the Petaluma River (33.4 percent) was assumed.

Bioaccumulation

Bioaccumulation is an accumulation or build-up of potentially toxic compounds in organisms. This necessitates repeated exposure to the constituent in question. In addition, constituents with median concentrations below detection makes evaluation of bioaccumulation risk highly speculative. Therefore wastewater constituents that were usually below detection (median concentration below detection) were eliminated from further evaluation for bioaccumulative effects.

Potential bioaccumulation of metals and organic compounds in organisms exposed to project discharge was evaluated using California Toxics Rule chronic criteria for the protection of aquatic life (also called the criterion continuous concentration or CCC) for metals and pesticides, and bioconcentration factors and log octanol/water partition coefficients for non-pesticide organic priority pollutants. For the chronic criteria, the lowest of either the fresh or salt water criteria was used. A hardness of 150 mg/L was assumed for freshwater criteria (Larry Walker Associates, 2001).

Aquatic life chronic criteria are developed using toxicity tests and also bioaccumulation information. The chronic criteria are equal to the lowest of the Final Chronic Value, the Final Plant Value, and the Final Residue Value. The Final Residue Value is an estimate of bioaccumulation/bioconcentration to a toxic level. Therefore, if the median concentration in effluent does not exceed the aquatic life chronic criterion, it was concluded that bioaccumulation is unlikely and the impact of project discharge on bioaccumulation in organisms is less than significant. If the median concentration in effluent exceeds the aquatic life chronic criterion, bioaccumulation is likely and the impact of project discharge on bioaccumulation in organisms is significant.

Aquatic life chronic criteria have not been promulgated for many organic compounds. For these constituents, the potential to bioaccumulate was based on the compounds bioconcentration factors and log octanol/water partition coefficients. Bioconcentration factors less than 30 and log octanol/water partition coefficients of less than 3 indicate a low bioaccumulation potential (Franke, et al., 1994). If an organic compound in effluent with a detected median had bioconcentration factors less than 30 and log octanol/water partition coefficients of less than 3, bioaccumulation was considered unlikely and impact

on bioaccumulation in organisms was considered to be less than significant. If an organic compound in effluent with a detected median had bioconcentration factors greater than 30 and log octanol/water partition coefficients of greater than 3, bioaccumulation was considered likely and impact on bioaccumulation in organisms was considered to be significant. Bioconcentration factors and log octanol/water partition coefficients were obtained from the National Library of Medicine database SRC Chemfate.

This evaluation of bioaccumulation is for organisms in the receiving water (the Petaluma River) and not the wetlands, which are part of the treatment process. Bioaccumulation potential in the wetlands is evaluated in Section 4.8, Biological Resources.

IMPACT: WQ-1: Will the project discharge cause numeric-based criteria to be exceeded?

Analysis: *Water Recycling Facility*

Bacteria – Less Than Significant. The Basin Plan objectives for water contact recreation are the bacteria objectives applicable to the project. The median Basin Plan total coliform objective is <240 MPN/100 mL. The Petaluma River has a median total coliform value of 500 MPN/100 mL while effluent has a median total coliform value of 2 MPN/100mL. Therefore, effluent will tend to reduce total coliform numbers in the Petaluma River. The Basin Plan maximum total coliform objective is no sample >10,000 MPN/100 mL. The maximum total coliform number in raw effluent (>1600 MPN/100 mL) probably does not exceed this objective. Therefore, the impact of the project on total coliform bacteria in the receiving water is expected to be less than significant.

The Basin Plan objectives for fecal coliform bacteria are a log mean <200 MPN/100 mL and a 90th percentile <400 MPN/100 mL. Fecal coliform bacteria are not monitored in the effluent. However, the data for total coliforms can be compared to the fecal coliform objectives as a conservative representation since fecal coliforms are a subset of total coliforms. The total coliform numbers were in compliance with the average water quality objective (log-mean of 200 MPN/100mL) for fecal coliforms more than 98 percent of the time. The 90th percentile value for total coliform is 17 MPN/100mL, more than an order of magnitude lower than the 90th percentile objective of 400 MPN/100mL for fecal coliform. In addition, as discussed above, total coliforms tend to dilute the river's concentration of total coliforms. This is likely also the case with fecal coliforms. Therefore, the impact of the project on fecal coliform bacteria in the receiving water is expected to be less than significant.

Mitigation: No mitigation is necessary.

Analysis: *Un-ionized Ammonia – Less than Significant*. The Basin Plan annual median un-ionized ammonia objective is 0.025 mg-N/L. The median effluent concentrations of un-ionized ammonia for the 1998-1999 and 1999-2000 discharge periods (0.066 and 0.035 mg/L, respectively (Larry Walker Associates, 2001)) exceeded the water quality objective for median un-ionized ammonia in the receiving water

(annual median of 0.025 mg/L). However, because of the low concentrations of ammonia in the receiving water – where the objectives apply – and the decay of un-ionized ammonia in the receiving water (Larry Walker Associates, 2001), un-ionized ammonia in the receiving water resulting from project discharge is predicted to be less than the Basin Plan median objective. The Basin Plan objective for maximum un-ionized concentrations is 0.16 mg-N/L. Effluent concentrations of un-ionized ammonia never exceeded this objective. In addition, ammonia is expected to be reduced from current concentrations with the project. Thus, the impact of the project on un-ionized ammonia in the receiving water is expected to be less than significant.

Mitigation: No mitigation is necessary.

Analysis: *Dissolved Oxygen – Less than Significant*. The Basin Plan Objective for dissolved oxygen for San Pablo Bay downstream of Carquinez Bridge is 5.0 mg/L. Undiluted effluent is, at times, less than this objective. The reduction in ambient dissolved oxygen with increased project discharge can be computed from the change in dilution from 27.1 percent wastewater to 33.4 percent wastewater. For the minimum effluent dissolved oxygen concentration (0.6 mg/L), average ambient dissolved oxygen can be expected to decrease from 7.2 mg/L to 5.3 mg/L which exceeds the minimum dissolved oxygen water quality criterion. The average biochemical oxygen demand (BOD) of discharged effluent is currently 16.0 mg/L, and is expected to be similar or lower from the new facility with use of extended aeration. This indicates that BOD from the project discharge will not cause a reduction in dissolved oxygen over current conditions. Therefore, the impact of the project on dissolved oxygen in the receiving water is expected to be less than significant. The potential impact of an increase in discharge of nutrients, which can lead to increased algal biomass, which can, in turn, lead to a reduction in dissolved oxygen, is discussed under narrative criteria – (biostimulatory substances) below.

Mitigation: No mitigation is necessary.

Analysis: *pH – Less than Significant*. The range of pH of effluent falls within the Basin Plan objectives for pH (6.5 and 8.5) and is not expected to be altered with the project. Therefore the impact of the project on pH in the receiving water is expected to be less than significant.

Mitigation: No mitigation is necessary.

Analysis: *Cyanide*. The California Toxics Rule saltwater criterion for cyanide is 1.0 µg/L. The cyanide concentrations in effluent have been detected in 13 of 31 samples and all of these samples exceeded the water quality criterion. Cyanide is not included on Table 4.5-1 (Receiving Water Quality) because cyanide data were not collected by the Regional Monitoring Program in recent years. However, data from earlier Regional Monitoring Program collections showed cyanide to be below detection throughout San Francisco Bay (detection limit = 1 µg/L). Assuming an average wastewater concentration of 28.5 percent and both 1 µg/L and 0.0 µg/L cyanide in the receiving water, most of the detected effluent cyanide values would cause the receiving water cyanide concentrations to exceed the

water quality criterion of 1.0 µg/L. However, the concentrations of cyanide in Petaluma's effluent are fairly typical of wastewater treatment facilities and there is on-going research to understand the mechanisms and factors that contribute to the apparent production of cyanide at such facilities. In very pure water, the predominant form of cyanide is hydrogen cyanide (HCN), which is somewhat volatile and is the most toxic form of cyanide. In the presence of metals such as those found in effluent, some of the cyanide forms metal complexes, which are very stable and much less toxic than HCN. Therefore, the effluent total cyanide concentrations may not be representative of the actual toxic fraction of cyanide present in effluent. In addition, the current analytical methods for measuring total cyanide are subject to interference from nitrate and nitrite in effluent. This interference causes artificially high cyanide results. The San Francisco Regional Water Quality Control Board concludes "Cyanide is a regional problem associated with the analytical protocol for cyanide analysis due to matrix inferences. A body of evidence exists to show that cyanide measurements in effluent may be an artifact of the analytical method. This question is being explored in a national research study sponsored by the Water Environment Research Foundation (WERF)" (from the City of Benicia NPDES Permit No. CA 0038091. Because of the uncertain nature of the cyanide measurements, the San Francisco Regional Water Quality Control Board established interim NPDES permit limits of 25 µg/L for the City of Benicia and 18 µg/L for Central Contra Costa Sanitary District. The maximum cyanide concentration measured in Petaluma's effluent is 17 µg/L. Toxic effects from cyanide in the City's effluent have never been demonstrated in toxicity tests (see the toxicity narrative water quality criterion below). The City has recently conducted a cyanide reduction study (City of Petaluma, 2000) that did not identify any cyanide sources in the service area nor any pattern of cyanide generation within the treatment process. Because of the uncertainty in the actual cyanide concentration in effluent and the lack of evidence of toxicity from effluent cyanide, the potential for the project to cause an exceedence of a water quality criterion or objective cannot be evaluated and any conclusions would be speculative.

Mitigation: No mitigation is necessary.

Analysis: *Antimony, arsenic, cadmium, copper, lead, mercury, selenium, silver, thallium, and zinc – Less than Significant.* The maximum concentration of most of the metals (antimony, arsenic, mercury, lead, selenium, silver, thallium, and zinc) in Petaluma's effluent do not exceed their respective water quality criteria (see Table 4.5-2 for water quality criteria) and thus the impact of discharge of these metals is predicted to be less than significant. Although when tested, the concentration of cadmium is always below detection in effluent, on one occasion the detection limit slightly exceeded its water quality criterion. However, for all other measurements, the detection limit of cadmium is below the water quality criterion. Thus, the impact of the project on antimony, arsenic, cadmium, mercury, lead, selenium, silver, thallium, and zinc in the receiving waters is less than significant.

The concentration of metals in effluent used for this evaluation are the existing effluent concentrations. The new facilities, including polishing wetlands, are anticipated to reduce many metals to lower levels than the existing facilities. In the Sacramento Constructed Wetlands Demonstration Project (Sacramento Regional Wastewater Treatment Plant, 2000), silver, cadmium, copper, mercury, lead, and zinc consistently exceeded mass removal rates of 60 percent for 1994 through 1998. It is expected that metals removal in the project's constructed wetlands will be on the same order as was found for the Sacramento Wetlands Project. Concentration and mass removal rates for arsenic, chromium, and nickel steadily declined over the monitoring period. The cause of the decreased removal performance for arsenic, chromium, and nickel is likely related to their presence in the wetland in a predominantly soluble form, and chemical conditions that inhibits their removal from solution (Sacramento Regional Wastewater Treatment Plant, 2000).

The maximum observed concentrations of chromium, copper, and nickel in Petaluma's effluent exceed their respective water quality criteria. Predicted concentrations of these metals in the receiving water using these maximum observed values may exceed their water quality criteria. Table 4.5-7 shows the predicted concentrations of these three metals in the receiving water.

Table 4.5-7

Predicted Concentrations of Chromium, Copper, and Nickel in the Receiving Water
(concentrations in µg/L)

Constituent	Water Quality Criteria (maximum allowable concentration)	Predicted Receiving Water Concentration	
		Median[a]	Maximum[b]
Chromium	11	0.54	67.0
Copper	3.1 (5.3 [c])	3.5	4.5
Nickel	7.1	20.7	75.8

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

a. Based on using median observed receiving water and effluent concentrations and minimum river dilution of 33.4% (maximum percent wastewater).
b. Based on using median observed receiving water and maximum effluent concentrations and minimum river dilution of 33.4% (maximum percent wastewater).
c. Water quality criterion using Water Effect Ratios developed in accordance with EPA guidance.

Total copper in effluent frequently exceeded the water quality criterion of 3.1 µg/L which is a saltwater criterion. The San Francisco Regional Water Quality Control Board in it's rationale for de-listing copper from the 303(d) list for San Pablo Bay, determined that from 50 Water Effect Ratios developed in accordance with EPA guidance, the lower 5th percentile value of 1.7 yields a CTR objective

of 5.3 µg/L for San Pablo Bay. The predicted concentration of copper in the receiving water (see Table 4.5-7) does not exceed this criterion. Therefore, the impact of the project on copper in the receiving water is less than significant.

Mitigation: No mitigation is necessary for antimony, arsenic, cadmium, copper, lead, mercury, selenium, silver, thallium, and zinc.

Analysis: *Chromium - Significant.* Chromium in effluent was not detected (<1 µg/L) in 21 of 32 samples and was below the water quality criterion of 11 µg/L in all but two samples both during and outside the discharge season. However, the chromium concentrations in samples collected in October and November 1999 (200 µg/L and 50 µg/L, respectively) exceeded the water quality criterion. Chromium concentrations were also high in the plant influent during this time. The predicted maximum concentration of chromium in the receiving water (resulting from the October and November 1999 high concentrations) exceeds the water quality criterion. Therefore the impact of the project on chromium in the receiving water is considered to be significant.

Mitigation: **WQ-1a. Chromium Monitoring and Source Reduction.**

The City shall implement a Chromium Monitoring Program to determine if the concentration of chromium in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of chromium to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of chromium during the discharge season exceed the lowest CTR or Basin Plan criterion for chromium (currently 11 µg/L), the City shall implement a Chromium Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for chromium and will provide for enforcement of these limits. Typical chromium sources are industries involving the following uses of chromium: fabrication of alloys; preparation of alloy steels to enhance corrosion and heat resistance; fabrication of plated products for decoration or increased wear resistance; production of non-ferrous alloys to impart special qualities to the alloys; textile industry use in dyeing, silk treating, printing, and moth proofing wool; leather industry use for tanning; photographic fixing baths; and fuel additives and propellant additives.

After Mitigation: *Less than Significant*

The mitigation described above would result in avoidance of discharge related water quality impacts.

Analysis: *Nickel - Significant.* Nickel in effluent exceeded the water quality criterion of 7.1 µg/L on 4 of the 32 occasions that it was measured during the discharge season. Two of these exceedences, including the maximum concentration, were found in samples collected in October and November 1999. Nickel concentrations were also high in the plant influent during this time. Using maximum effluent and initial receiving water concentrations, project discharge causes the predicted

concentration of nickel to increase with the value exceeding the water quality criterion. Therefore, the impact of the project on nickel in the receiving water is considered to be significant. However, under most (median) conditions, the concentration of nickel in the receiving water would be reduced by project discharge. In addition, the current Basin Plan criterion for nickel is out of date. Implementation of the California Toxics Rule dissolved criterion and the use of a translator for nickel as described in Larry Walker Associates (2001) would likely result in a less than significant impact of effluent nickel on the receiving waters for all but the October/November 1999 nickel concentrations. However, because the conditions that resulted in the high October/November 1999 nickel concentrations may also occur with the project, the impact of the project on nickel in the receiving water is considered to be significant.

The City has an industrial monitoring and pretreatment program and actively works to identify sources of high metals concentrations. In 2000 and early 2001, three industries were identified that were doing batch discharges of parts washing tanks, which can be sources of high metals concentrations. These industries have since stopped their batch discharges. In 2001, the City also worked with two additional industries to reduce metals in their discharges: a feed company changed their cleaning operation to reduce nickel concentrations and a printing company added pretreatment to reduce copper and nickel concentrations. The City will continue to work with its industrial dischargers to reduce metals discharges to the plant. The effluent nickel concentrations seen in 2001 averaged 3.7 µg/L, a decrease from previous years.

Mitigation: **WQ-1b. Nickel Monitoring and Source Reduction Program.**

The City shall implement a Nickel Monitoring Program to determine if the concentration of nickel in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of nickel to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of nickel during the discharge season exceeds the lowest CTR or Basin Plan criterion for nickel (currently 7.1 µg/L), the City shall implement a Nickel Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for nickel and will provide for enforcement of these limits. Typical nickel sources are manufacturing processes involving the following uses of nickel: plating; for various alloys such as new silver, Chinese silver, German silver; for coins, electrotypes, lightning rod tips, electrical contacts and electrodes, spark plugs, machinery parts; as a catalyst for hydrogenation of organic substances; in the manufacture stainless steels and nickel chrome resistance wire; and for coloring glass.

After Mitigation: *Less than Significant*

The mitigation described above would result in avoidance of discharge related water quality impacts.

Analysis: *Metals M0ass Loadings – Less than Significant*. With the exception of the TMDL established for mercury in San Francisco Bay, no water quality objectives have been established for metals loads. Copper, mercury, and nickel loadings to San Pablo Bay were evaluated in the *Antidegradation Analysis for the City of Petaluma, California* report (Larry Walker Associates 2001). These loadings were used to assess the incremental loadings increases from the facility's proposed discharges to San Pablo Bay. Percent contributions of municipal dischargers and the facility to total annual mass loading to San Pablo Bay are presented in Table 4.5-8.

Table 4.5-8

Percent of Estimated Total Annual Mass Loads to San Pablo Bay Contributed by Municipal Discharges and Petaluma

Constituent	Percent from Municipal Dischargers	Percent from Petaluma at 5.2 mgd	Percent from Petaluma at 6.7 mgd
Copper	1.42%	0.008%	0.011%
Mercury	1.29%	0.003%	0.004%
Nickel	1.52%	0.008%	0.010%

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

Municipal dischargers are estimated to contribute a small percentage of the total mass loads of copper, mercury, and nickel to San Pablo Bay. As shown in Table 4.5-8, the proposed increase in Petaluma's discharge capacity from 5.2 mgd to 6.7 mgd would result in a potential increase of at most 0.003 percent in Petaluma's contribution to San Pablo Bay's total annual mass loading of copper, mercury and nickel. Therefore, the impact of discharge on loads of priority pollutants to San Pablo Bay are expected to be less than significant.

Copper, mercury, and nickel loadings to San Francisco Bay were evaluated by Larry Walker Associates (2001). Percent contributions of these metals from municipal dischargers and from the Petaluma facility to total annual mass loading for the entire Bay are presented in Table 4.5-9.

Analysis of the total annual mass load estimates indicates that municipal dischargers are estimated to contribute less than 5 percent of total copper, mercury, and nickel loads.

The facility's current contribution to total mass loads is estimated to be less than 0.01 percent for all metals assessed. The proposed increase in Petaluma's discharge capacity from 5.2 mgd to 6.7 mgd would result in a potential increase in the facility's contribution to Bay loading of at most 0.003 percent, assuming maintenance of current effluent quality. The percent increase in loadings from

other wastewater constituents is expected to be similar to those for copper, mercury, and nickel. Therefore, the impacts of discharge on loads of priority pollutants to San Francisco Bay are expected to be less than significant.

Table 4.5-9

Percent of Estimated Total Annual Mass Loads to the San Francisco Bay Estuary Contributed by Municipal Discharges and Petaluma

Constituent	Percent from Municipal Dischargers		Percent from Petaluma at 5.2 mgd		Percent from Petaluma at 6.7 mgd	
	Min	Max	Min	Max	Min	Max
Copper	1.59%	5.06%	0.003%	0.010%	0.004%	0.013%
Mercury	0.87%	2.37%	0.002%	0.005%	0.003%	0.007%
Nickel	3.26%	3.53%	0.010%	0.010%	0.012%	0.013%

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

The facility's current contribution to total mass loads is estimated to be less than 0.01 percent for all metals assessed. The proposed increase in Petaluma's discharge capacity from 5.2 mgd to 6.7 mgd would result in a potential increase in the facility's contribution to Bay loading of at most 0.003 percent, assuming maintenance of current effluent quality. The percent increase in loadings from other wastewater constituents is expected to be similar to those for copper, mercury, and nickel. Therefore, the impacts of discharge on loads of priority pollutants to San Francisco Bay are expected to be less than significant.

A proposed TMDL has been developed for mercury in San Francisco Bay. Table 33 in *Mercury TMDL for San Francisco Bay Estuary* (SFRWQCB, 2000) lists the annual average concentration target and the wasteload allocation for mercury in Petaluma's effluent. The maximum effluent concentration of mercury of 0.01 µg/L (for both the discharge and non-discharge season since the implementation of ultra-clean sampling and analytical techniques in June 1999) is less than the TMDL average mercury concentration target of 0.015 µg/L for Petaluma's discharge. Even if the highest concentration measured (0.01 µg/L) were discharged continuously, the annual mass load would be 0.06 kg/year which is less that the TMDL wasteload allocation of 0.5 kg/year for Petaluma's discharge.

Mitigation: No mitigation is necessary.

Analysis: *Organic Priority Pollutants – Significant for aldrin, 2,3,7,8-TCDD, acrolein and acrylonitrile; Less than Significant for other organic priority pollutants.* Most organic priority pollutants are below detection in Petaluma's effluent with the detection limit below either their respective water quality criterion or their ML.

Therefore, the impact of the project on non-detected organic priority pollutants in the receiving water is expected to be less than significant. The following organic priority pollutants are the only ones that have been detected in effluent during the 1997-2001 river discharge periods:

- Bromodichloromethane
- Bromomethane
- Chloroform
- Dibromochloromethane
- Lindane (gamma-BHC)
- Phenol
- Toluene
- Bis(2-ethylhexyl)phthalate
- Dioxin/furan congeners

With the exception of bis(2-ethylhexyl)phthalate, the maximum concentration of these compounds in undiluted effluent does not exceed their water quality criteria. Therefore, the impact of the project on bromodichloromethane, bromomethane, chloroform, dibromochloromethane, lindane (gamma-BHC), phenol, and toluene in the receiving water is expected to be less than significant. Bis(2-ethylhexyl)phthalate was detected in only one of twelve samples. Because it is a common lab contaminant and was detected on only one occasion, it appears unlikely that the City's effluent is or will be a significant source of this compound. Therefore, the impact of the project on detected priority pollutant organic compounds is expected to be less than significant. Nonetheless, mitigation is provided for continued monitoring of bis(2-ethylhexyl)phthalate. If it is determined that bis(2-ethylhexyl)phthalate in effluent causes the receiving water concentrations of this substance to exceed the California Toxics Rule criterion, source control will be implemented.

Mitigation: **WQ-1c. Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction**

The City shall implement a Bis(2-ethylhexyl)phthalate Effluent Monitoring program to determine if the concentrations of bis(2-ethylhexyl)phthalate in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of bis(2-ethylhexyl)phthalate results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for bis(2-ethylhexyl)phthalate. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

Analysis: *Priority Pollutants Not Tested for in Effluent, or With a Detection Limit Greater Than the ML - Significant.* Although when aldrin and 2,3,7,8-TCDD were tested for in effluent, the concentration was always below detection, the detection limit exceeded the State Implementation Policy ML (for aldrin) or the water quality criterion (for 2,3,7,8-TCDD) so the potential impacts of aldrin and 2,3,7,8-TCDD

cannot be evaluated. In addition, acrolein and acrylonitrile have not been tested for in effluent (Table 4.5-6) so the potential impacts on the receiving water cannot be evaluated. For this reason, the impact of the project discharge on aldrin, acrolein, and acrylonitrile in the receiving water is considered to be significant.

Mitigation: **WQ-1d. Constituents not Monitored in Effluent Monitoring and Source Reduction.**

The City shall implement an Unmeasured Priority Pollutant Monitoring to determine if the concentrations of aldrin, 2,3,7,8-TCDD, acrolein, and acrylonitrile in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of any of these compounds results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for that compound. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

After Mitigation: *Less than Significant*

The mitigation described above would result in avoidance of discharge-related water quality impacts.

Analysis: *Dioxin/Furan Congeners - Significant.* Dioxins (chlorinated dibenzodioxins) and furans (chlorinated dibenzofurans) are groups of compounds consisting of several closely related compounds or congeners. As noted in Table 4.5-2, the California Toxics Rule established a criterion of 0.014 picograms/L for one dioxin congener (2,3,7,8-TCDD), and this congener was below detection in all samples. However, some congeners that are also suspected to contribute to toxic effects in organisms. have been detected in the effluent. The State Implementation Policy provides toxic equivalency factors (TEFs) for 17 dioxin/furan congeners. The TEFs express the relative toxicities of the congeners compared to 2,3,7,8-TCDD whose TEF equals 1.0. Table 4.5-10 shows the concentration of detected congeners, their respective TEFs, and their concentrations normalized for each TEF. The median of their concentrations normalized for TEF can be compared to the evaluation criterion for 2,3,7,8-TCDD of 0.014 picograms/L. The medians of the TEF-normalized concentration of two congeners, 1,2,3,4,6,7,8-HeptaCDD and 1,2,3,4,6,7,8-HeptaCDF, exceed the evaluation criterion for 2,3,7,8-TCDD. The concentration in the receiving waters is unknown so the resulting concentrations of these congeners with the discharge cannot be predicted. Therefore, the impact of project discharge on dioxin/furan congeners in the receiving water is considered to be significant. However, toxic effects from dioxin/furan congeners in the City's effluent have never been demonstrated (see the toxicity narrative evaluation criterion below). Typical non-atmospheric sources of dioxins and furans include industrial chlorination processes such as the manufacture of polyvinyl chloride products.

Table 4.5-10

Dioxin/Furan Congeners Detected in Petaluma's Effluent (concentrations in pg/L)

Congeners	**TEF[a]**	**Jan. 99**		Feb. 00		**Feb. 01**		
		Results	TEC[b]	Results	TEC[b]	Results	TEC[b]	Median TEC
1,2,3,4,6,7,8-HeptaCDD	0.01	4.6	0.046	ND	ND	2.72	0.0272	0.0272
OctaCDD	0.0001	41	0.0041	ND	ND	16.9	0.00169	0.00169
1,2,3,4,7,8-HexaCDF	0.1	ND	ND	ND	ND	0.991	0.0991	ND
1,2,3,4,6,7,8-HeptaCDF	0.01	2.1	0.021	ND	ND	1.5	0.015	0.015
OctaCDF	0.0001	5	0.0005	ND	ND	3.77	0.000377	0.000377

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

[a] TEF – Toxic Equivalency Factors from the State Implementation Policy – used to compare the toxicity of congeners to 2,3,7,8-TCDD
[b] TEC – Toxic Equivalence Concentration = the TEF normalized concentration

Mitigation: **WQ-1e. Dioxin/Furan Congener Monitoring and Source Reduction Program.**

The City shall implement a Dioxin/Furan Congener Monitoring Program to determine if the concentration of dioxin/furan congeners in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of dioxin/furan congeners to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If the TEF normalized concentration of three consecutive samples of a dioxin/furan congener exceeds the lowest CTR or Basin Plan criterion for 2,3,7,8-TCDD (currently 0.014 µg/L) or any future CTR or Basin Plan criterion established for that congener, the City shall implement a Dioxin/Furan Congener Source Reduction Program for non-atmospheric sources of dioxin/furan congeners. Under this program, the City will establish local pretreatment limits for non-atmospheric sources of the dioxin/furan congener and will provide for enforcement of these limits.

After Mitigation: *Less than Significant*

The mitigation described above would result in avoidance of discharge related water quality impacts.

Analysis: *River Access Improvements – No Impact*

These improvements have no discharge component and therefore have no impact

Mitigation: No mitigation is necessary.

IMPACT: WQ-2: Will the project discharge cause narrative-based criteria to be exceeded?

Water Recycling Facility

Analysis: *Bioaccumulation. Significant.* Table 4.5-11 shows the median concentrations of metals and organic compounds with detected median concentrations in Petaluma's effluent. Also shown in Table 4.5-12 are the available CTR aquatic life chronic criteria (lowest of freshwater or marine criteria) and available bioconcentration factors and log octanol/water partition coefficients for organic compounds with detected medians and without a chronic criterion.

The median concentrations of all metals except copper in Petaluma's effluent were lower than their respective chronic criteria. Therefore, the impact of the project on bioaccumulation of these metals is less than significant.

Bioaccumulation of copper is dependent on the form of the copper in the water column as described below (excerpted from Tetra Tech, Inc., 1999).

Since phytoplankton form the base of the food web, phytoplankton accumulation of metals is the major route of entry into the rest of the food web. Uptake of copper across the phytoplankton cell membrane depends on the concentration of either the free metal ion or the sum of the free ion and labile inorganic complexes, which are the bioavailable forms of the metals. Metals complexed to strong organic ligands or adsorbed to suspended particles are not available for uptake since they cannot cross the cell membrane. Dissolved copper consists of free metal ions, inorganic and weak organic complexes, which are bioavailable, and strong organic complexes, which are not bioavailable.

Thus, dissolved copper represents a somewhat conservative estimate of bioavailable copper since it includes strong organic complexes that are not bioavailable. Table 4.5-7 shows the estimated dissolved copper concentration of effluent in the receiving waters. The median concentrations do not exceed the chronic criteria using Water Effect Ratios developed in accordance with EPA guidance. Therefore, the impact of the project on bioaccumulation of copper is less than significant.

Chloroform has bioconcentration factors ranging from 3.0 - 8.3 and a log octanol/water partition coefficient of 1.97. Bioconcentration factors less than 30 and log octanol/water partition coefficients of less than 3 indicate a low bioaccumulation potential (Franke, et al. 1994). Therefore, the potential of chloroform to bioaccumulate is low and the impact of the project on bioaccumulation of chloroform is less than significant.

Table 4.5-11

Effluent Quality, Bioconcentration Factors, Log Octanol/Water Partition Coefficients, and Evaluation Criteria

Constituent	Median Effluent Concentration	Bioconcentration Factor	Log Octanol/Water Partition Coefficient	Evaluation Criteria (maximum allowable value)
Mercury[a]	0.006			0.012[b]
Arsenic	2.00			36[c]
Chromium	1.00			11[c]
Copper	4.00			3.1[c] (5.3[d])
Lead	2.00			3.9[c]
Nickel	4.00			8.2[c]
Zinc	20.00			81[c]
Cyanide	<3			1.0[c]
Chloroform	1.9	3.0 – 8.3	1.97	30/3[e]
Dioxins/Furans	Various	NA	NA	30/3[e]

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

[a] Effluent concentrations of mercury shown are October through May values since the implementation of ultra-clean sampling and analytical techniques in June 1999.
[b] No California Toxics Rule chronic criterion exists. The value shown is the National Toxics Rule chronic criterion (CFR 40.136, July 1, 1999). NTR chronic criteria are derived as described for California Toxics Rule criteria.
[c] Chronic criteria – CTR. The lowest of the freshwater or marine criteria were used. For hardness dependent freshwater criteria, a hardness of 150 mg/L $CaCO_3$ was used. This was the 10th percentile hardness (the value exceeded 90 percent of the time) in the Regional Monitoring Program data set for Petaluma River.
[d] Water quality criterion using Water Effect Ratios developed in accordance with EPA guidance
[e] The bioconcentration factor criterion is listed first followed by the log octanol/water partition coefficient criterion.

As described under the numeric criteria section above, dioxins and furans have been tested for on three occasions in Petaluma's effluent. On all occasions 2,3,7,8-TCDD was below detection but the medians of several dioxin/furan congeners were detectable and the medians of TEF-normalized concentration of two congeners, 1,2,3,4,6,7,8-HeptaCDD and 1,2,3,4,6,7,8-HeptaCDF, exceed the evaluation criterion for 2,3,7,8-TCDD. Although 2,3,7,8-TCDD has the potential to bioaccumulate, information on the bioaccumulation potential of the detected congeners, including their bioconcentration factors and log octanol/water partition coefficients, is unavailable. Therefore, the potential for the project to cause bioaccumulation of these constituents is unknown so the impact is considered to be significant.

The median cyanide concentration was <3 µg/L which exceeds the chronic criterion of 1.0 µg/L. However, as discussed in the numeric criteria section, there is much uncertainty in the actual cyanide concentration in effluent so the potential for the project to cause bioaccumulation cannot be evaluated and any conclusions would be speculative.

Mitigation: **WQ-1e. Dioxin/Furan Congener Monitoring and Source Reduction Program.**

The mitigation measure described for discharge of dioxin/furan congeners (WQ-1e) will also mitigate against impacts of bioaccumulation of dioxins and furans in the receiving water environment resulting from discharge.

After Mitigation: *Less than Significant*

The mitigation described above would result in avoidance of discharge related water quality impacts.

Analysis: *Biostimulatory Substances – Less than Significant.* Although all wastewater discharge contains nutrients that could potentially stimulate growth of algae, project discharge is not predicted to cause an increase in algal growth for the following reasons:

- Light Limitation. The low transparency of the Petaluma River water indicates that light is the growth-limiting factor controlling algae concentrations. Monthly Secchi depth data indicate that light sufficient for algae growth, approximately equivalent to three times the Secchi disk depth reading (Horne and Goldman, 1994), penetrates less than 2 ft below the water surface. This turbid condition isolates the river bottom and the majority of the overlying water column from light conditions conducive to photosynthesis.
- N:P ratios. Nitrogen and phosphorus are the main nutrients required for algal growth. A ratio of nitrogen to phosphorus below approximately 10:1 indicates a shortage of nitrogen (relative to phosphorus) for algal growth. The dissolved inorganic nutrient data collected during the translator study (Larry Walker Associates, 2001) showed an N:P ratio for dissolved inorganic species (the major bioavailable forms) that averaged 1.9:1. This indicates that, after light, nitrogen is the next most likely factor to limit algal growth. As discussed in the **Error! Reference source not found.** section, the concentration of total nitrogen is expected to be reduced with the project (including a reduction of ammonia from a maximum of 19 mg/L to a maximum of 8 mg/L). Therefore, the annual loads of nitrogen to the Petaluma River from project discharge are expected to decrease. Since the Petaluma River is 303(d) listed for nutrients, this load reduction in nitrogen will provide a net benefit to the environment.

Mitigation: No mitigation is needed.

Analysis: *Color – Less than Significant.* Apparent color in the receiving water is monitored under Petaluma's NPDES permit. Current effluent discharge does not cause coloration in the receiving water that is a nuisance or that adversely affects beneficial uses. Increasing the discharge rate and treatment plant upgrades is not expected to change coloration in effluent so no adverse impact on color is

predicted. Therefore, the impact of the project on color in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Floating Matter – Less than Significant.* Floating matter in the receiving water is monitored under Petaluma's NPDES permit. Current effluent discharge does not cause receiving water to contain floating material in concentrations that is a nuisance or adversely affects beneficial uses. Increasing the discharge rate and treatment plant upgrades is not expected to change floating matter in effluent so no adverse impact on floating matter is predicted. Therefore, the impact of the project on floating matter in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Oil and Grease – Less than Significant.* Oil and grease in the receiving water is monitored under Petaluma's NPDES permit. The current effluent discharge does not cause the receiving water to contain oils, greases, waxes, or other materials in concentrations result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance or adversely affects beneficial uses. Increasing the discharge rate and treatment plant upgrades is not expected to change oil and grease concentrations in effluent so no adverse impact on oil and grease is predicted. Therefore, the impact of the project on oil and grease in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Population and Community Ecology – Less than Significant.* Numeric and other water quality objectives are designed to protect aquatic organisms and thus, population and community ecology. Therefore, the impact of the project on Population and Community Ecology is addressed with other narrative and numeric criteria.

Mitigation: No mitigation is needed.

Analysis: *Salinity – Less than Significant*. Model results indicate a very slight decrease in salinity with project conditions relative to existing conditions. As discussed in Section 4-8, this may result in a net benefit to several of the special-status aquatic species (Tidewater goby, Delta smelt, Sacramento splittail, California red-legged frog, and western pond turtle), and would probably have no impact on the other special status aquatic species. Thus, the impact of the project on salinity in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Sediment – Less than Significant.* From 1997 through 2001, effluent had a median TSS concentration of 31 mg/L with a maximum of 77.4. The proposed facility is expected to reduce effluent suspended solids to consistently below 30 mg/L before discharge to the river. The median TSS concentration of TSS in the receiving water in the vicinity of the outfall was 50 mg/L. Thus, the effluent will

tend to dilute the TSS in the receiving water and the impact of the project on TSS in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Settleable Matter – Less than Significant*. Settleable matter in the receiving water is monitored as particulate matter under Petaluma's NPDES permit. The current effluent discharge does not cause receiving water to contain substances in concentrations that result in the deposition of material that cause a nuisance or adversely affects beneficial uses. Therefore, the impact of the project on settleable material in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis *Suspended Material – Less than Significant*. Suspended material in aquatic systems is composed primarily of suspended sediment and planktonic algae. Therefore, the impact of the project on suspended material is covered under sediment and biostimulation objectives.

Mitigation: No mitigation is needed.

Analysis: *Sulfide – Less than Significant.* Sulfide is not currently monitored in Petaluma's effluent. However sulfide generally only exists in very low dissolved oxygen conditions (under oxygenated conditions it is in the sulfate form). As described under the dissolved oxygen section above, project discharge is not expected to significantly reduce dissolved oxygen. Therefore, the impact of the project on sulfide in the receiving water is considered to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Tastes and Odors – Less than Significant*. Taste and odor producing substances in the receiving water are monitored as part of toxic or other deleterious substances under Petaluma's NPDES permit. The current effluent discharge does not cause receiving water to contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh, or other edible products of aquatic origin or that cause a nuisance or adversely affects beneficial uses. Increasing the discharge rate and treatment plant upgrades is not expected to change taste- or odor-producing substances in effluent so no adverse impact on taste- or odor-producing substances is predicted. Therefore, the impact of the project on taste- or odor-producing substances in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Temperature – Less the Significant.* Water temperature in the treatment ponds is roughly equivalent to receiving water temperatures, because both waters are affected by the same environmental conditions. This conclusion is supported by monitoring of outlet temperatures during the period January 18 – March 27 which indicate maximum temperature differences of 2 °C. Thus, the impact of the project on temperature in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Toxicity – Less than Significant.* Acute toxicity in Petaluma's effluent is tested for monthly during the discharge season as part of Petaluma's NPDES permit. Since 1997, the median acute toxicity was 100 percent survival for both minnows and sticklebacks. The minimum survival for minnows was 95 percent. The minimum survival for sticklebacks was 40 percent, but that occurred in only one case (8 percent of the time) (personal communication, McCord 2002) The next lowest survival for sticklebacks was 80 percent. Therefore greater than 70 percent survival occurred more than 10 percent of the time. Chronic toxicity was conducted four times. In all tests, 100 percent wastewater produced no observed effect for both larval survival and larval growth tests. Therefore, the impact of the project on acute and chronic toxicity in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Turbidity – Less than Significant.* Turbidity in aquatic systems results primarily from suspended sediment and planktonic algae. Therefore, the impact of the project on turbidity is covered under sediment and biostimulation objectives.

Mitigation: No mitigation is needed.

Analysis: *River Access Improvements – No Impact*

These improvements have no discharge component and therefore have no impact

Mitigation: No mitigation is necessary.

IMPACT: WQ-3: Will project construction result in a substantial degradation of surface runoff quality?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Construction activities, particularly the proposed polishing wetlands and filtration/disinfection facilities that will be located at the Lakeville Highway site that is near Ellis Creek have the potential to cause discharge of pollutants to waterways through erosion and accidental spills. In addition, replacement of the outfall and levee stabilization have the potential to cause temporary sediment disturbance during construction in the Petaluma River. Measure PD-9, Construction Erosion and Spill Control Measures, adopted as part of this project, requires the City develop and implement measures designed to prevent significant construction impacts to water quality. With implementation of this measure, impacts will be reduced to less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: WQ-C1: Will the project have a cumulative potential to cause numeric or narrative-based criteria to be exceeded?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Future projects in the watershed include the San Francisco Regional Water Quality Control Board Total Maximum Daily Loads (TMDL) for the Petaluma River and a number of development projects in the City of Petaluma. The TMDLs are being developed to meet requirements of Clean Water Act section 303(d), which addresses waters that are not expected to meet water quality standards after application of technology-based requirements by point sources, by requiring states to identify these waters and to develop TMDL for them, with oversight from the U.S. Environmental Protection Agency. A TMDL is the amount of loading of a constituent from all sources that a water body can receive and still meet water quality standards. The San Francisco Regional Water Quality Control Board is currently in the process of establishing TMDLs for nutrients, sediments and pathogens in the Petaluma River. This effort is expected to be completed in 2005. Establishment of TMDLs would not have any adverse effects on the project area, but could have implications for the City's discharge to the Petaluma River. The overall effect of the establishment of TMDLs would be to improve the water quality in the river, so there would be no cumulative adverse effects.

Development projects in the area have the potential for cumulative construction-period water quality impacts. Preparation of Storm Water Pollution Prevention Plans would be required for all of the cumulative projects in the area. This would reduce construction period impacts to less than significant.

Mitigation: No mitigation is required.

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4.6 HYDROLOGY

This section identifies potential impacts on surface water hydrology, including flooding and stream bank erosion.

SETTING

The Petaluma River Basin drains parts of Sonoma and Marin Counties, California, and flows southward into San Pablo Bay, a section of San Francisco Bay. The drainage area of the river and its tributaries is about 146 square miles.

Over half of the basin is mountainous or hilly, one-third is valley and about 10 percent is salt marsh along the lower 11 miles of the river. Elevations in the basin range from Sonoma Mountain, at 2,295 ft above National Geodetic Vertical Datum (NGVD), to zero ft NVGD. In general, the hilly sections of the basin lie above the 100-foot contour. The elevations of the marshlands in the lower reaches of the basin range from about zero to three feet NGVD. Annual rainfall ranges from about 20 inches at the river mouth to about 50 inches at the highest elevations. The basin average is about 26 inches, of which 95 percent falls from November through April.

Average annual flow in the Petaluma River at the USGS gage at Denman Flat near Petaluma (Gage no. 1145900) is 17 cfs, with a typical range of 0 to 64 cfs (Table 4.6-1). Average wet weather flow is about 34 cfs (Table 4.6-1).

Tidal influence from San Pablo Bay extends upstream of the City of Petaluma toward Denman Flat. Table 4.6-2 shows average and 10-year 100-year and 500-year tide elevations in the Petaluma River at the Highway 101 Bridge (U.S. Army Corps of Engineers 1994).

The City of Petaluma presently discharges secondary effluent to the tidal part of the Petaluma River between October 21 and April 30 only, at a rate of up to 15.2 mgd. The discharge amounts to about 20 percent of the average monthly runoff during the wet season.

The FEMA's Flood Insurance Study for the City of Petaluma (1979) contains an analysis of flooding in the Petaluma River. Characteristic floods in the Petaluma River Basin are normally of short duration, lasting three or four days. Floods may develop within 24 hours after the beginning of a flood-producing storm and normally recede within one day after the end of the storm. Tributaries rise rapidly so flooding begins a few hours after occurrence of heavy rainfall. Although floods have been recorded as early as November and as late as April, most occur between December and March. Flooding, mainly in the form of sheet flows, can occur along the entire length of the Petaluma River. The City of Petaluma Flood Insurance Study (1979) estimated the peak discharges and elevations for the 10-year, 50-year, 100-year, and 500-year storms for the Petaluma River at Highway 101 Bridge and for San Pablo Bay at the Petaluma River, respectively.

Table 4.6-1

Average Monthly Flow in the Petaluma River at Denman Flat near Petaluma, CA
USGS Gage No. 11459000

Month	Average (cfs)	Maximum		Minimum	
		(cfs)	Year	(cfs)	Year
Oct	1	12	1963	0	1962
Nov	2	31	1951	0	1962
Dec	38	220	1956	0	1960
Jan	59	212	1956	0.5	1957
Feb	64	271	1958	3	1953
Mar	28	81	1958	2	1959
Apr	14	112	1958	0	1959
May	0.5	1	1956	0	1961
June	0	0	1953	0	1962
July	0	0	1963	0	1963
Aug	0	0	1955	0	1963
Sept	0	0	1955	0	1963
Annual Average	17	45[1]		2[1]	

Source: USGS data for period of record 1939-1963

Notes:

1. Maximum and minimum values are calculated for the period 1939-1963, not from the particular monthly values shown above.

Table 4.6-2

Tide Elevations in the Petaluma River at the Highway 101 Bridge

Tide Event	Tide Elevation (NGVD)
Mean lower low water	-2.7
Mean higher-high water	3.4
10-year	6.0
100-year	6.5
500-year	6.8

Source: U.S. Army Corps of Engineers 1994

The flood discharges and elevations are summarized in Table 4.6-3. The estimated 100-year flood elevation in the area of the Lakeville wastewater treatment facilities is 7.0 feet (NGVD 1929) and is controlled by San Pablo Bay (Winzler & Kelly Technical Memorandum, 2001). The existing flood plain is approximately 3,000 feet wide in the project reach (Winzler & Kelly Technical Memorandum, 2001).

Table 4.6-3

Flood Discharges and Elevations in the Petaluma River and in San Pablo Bay at the Mouth of the Petaluma River

Storm Event	Petaluma River at Highway 101 Bridge Peak Flood Discharges (cfs)	Flood Elevations in San Pablo Bay at the Petaluma River (feet)
10-year	4,300	6.1
50-year	6,800	6.4
100-year	8,000	6.5
500-year	11,000	6.7

Source: FEMA, 1979

EVALUATION CRITERIA WITH POINTS OF SIGNIFICANCE

Table 4.6-4

Evaluation Criteria with Point of Significance – Hydrology

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project discharge cause flooding anywhere along the Petaluma River?	Increase in the 100-year flood elevation.	Greater than 0.1-foot increase.	Federal Emergency Management Agency (FEMA) uses 1 foot as a guideline for significance. Sonoma County Water Agency generally does not consider increases of less than 0.1 feet significant during project review.
2. Will the project discharge cause streambank erosion in the Petaluma River?	Percentage increase in the average stream power of the Petaluma River.	Greater than 1-percent increase.	Erosion of the material in the stream channel is dependent on stream power. A 1-percent power increase is considered minimal and insignificant. Any resulting erosion increase will be small relative to natural erosion rate variations.
3. Will non-discharge project components cause flooding?	Increase in the peak water surface elevation due to reduction in flood plain area caused by new wetlands. Or Increased impacts of levee failure.	Greater than 0.1-foot increase. Greater depth or velocity of water relative to failure scenario for the existing ponds.	Federal Emergency Management Agency uses 1 foot as a guideline for significance. Sonoma County Water Agency generally does not consider increases of less than 0.1 feet significant during project review.
4. Will non-discharge project components cause streambank erosion?	Increase in the average power in the stream due to reduction in flood plain area caused by new wetlands.	Greater than 1-percent increase.	Erosion of the material in the stream channel is dependent on stream power. A 1-percent power increase is considered minimal and insignificant. Any resulting erosion increase will be small relative to natural erosion rate variations.

Source: Parsons 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: H-1: Will the project discharge cause flooding anywhere along the Petaluma River?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The existing peak day rate for discharge of secondary effluent is 15.2 mgd (23.5 cfs). Peak day flow approximates the maximum sustained rate of discharge to the Petaluma River that would be expected under flood conditions. With implementation of the project, the peak day reclaimed water discharge rate is estimated to increase to 16.0 mgd (24.8 cfs). Thus the project will increase the discharge, and thus the flow in the River at flood stage by 1.3 cfs or 0.02 percent. The existing flood plain (from review of the FIRM maps) is approximately 3,000 feet wide in the project reach. Estimating the depth of flow for the additional peak reclaimed water plus the depth of the 8,000 cfs, 100-year flood gives an increase in depth of approximately 0.006 feet. The estimated flood elevation increase of 0.006 feet is less than the 0.1-foot point of significance; therefore the impact is considered to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: H-2: Will the project discharge cause streambank erosion in the Petaluma River?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Stream power, which represents the power of the River to erode its banks, is represented by the following equation:

W = Weight of Water *x* Velocity *x* Channel Slope

The project will not appreciably affect the weight of water in the Petaluma River, nor will it affect channel slope. The velocity is expected to increase from 0.5731 to 0.5732 fps, for an increase of 0.0001 fps or 0.02 percent. This increase is considered negligible and is less than the 1-percent point of significance; therefore the impact is considered to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: H-3: Will non-discharge project components cause flooding?

Analysis: *Water Recycling Facility – Less than Significant*

This section evaluates the potential effect of non-discharge project components on the 100-year flood due to flood plain volume reduction.

The 100-year flood elevation in the vicinity of the project area is 7 feet NGVD. The polishing wetlands on Parcels A and B are located above this elevation. The

wetlands that will be constructed in Ponds No. 9 and 10 for algae removal will be placed in existing ponds that are already located above the 7 feet NGVD elevation line. Therefore, neither the polishing wetlands nor the wetlands used for algae removal would affect flood flows or flood elevations. A report prepared by Harding Lawson and Associates (HLA 1996) summarizes the effect that a failure of the existing oxidation ponds would have on downslope (i.e. down-river) areas in terms of increased water surface elevation and velocity. The HLA report is provided in Appendix B. The effect of levee failure depends primarily on:

- The volume of water that is released. HLA (1996) indicates that the volume of water in the existing ponds is approximately 807 acre-feet or 263 million gallons. The polishing wetlands are expected to have less than 100 acre-feet of water and thus generate less risk to downslope properties in the case of berm failure.

- How rapidly the water is released from the failed levee, which, in turn, depends on water depth behind the levee. HLA (1996) indicates that water depth in the existing ponds is four to eight feet. The 2-to 4-foot wetland depth is less than the ponds.

In addition, current regulatory requirements for wetland levee construction are as stringent or more so than those in place at the time the ponds were constructed, so the integrity of the wetland levees will be at least as great as that of the pond levees.

Since the volume of water in the wetlands is less than that in the ponds, water depth in the wetlands is less than that in the ponds, and the wetland levee integrity will be equal to or better than the ponds, the impact of the wetlands on flooding due to levee failure is considered be less than significant.

Analysis: *River Access Improvements – Less than Significant*

The two docks in the Petaluma River and Ellis Creek, the levee stabilization, and the four habitat islands will displace a small amount of flood plain capacity, but the effect will be much less than the 0.1 foot increase in flood levels threshold for significance, even considering the effect of discharge and the Water Recycling Facility impacts.

Mitigation: No mitigation is necessary.

IMPACT: H-4: Will non-discharge project components cause streambank erosion?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Water velocity will not increase in the Petaluma River or elsewhere as a result of non-discharge project components. Thus, the non-discharge project components will cause power to increase by an amount that is less than the 1-percent point of significance; therefore the impact is considered to be less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: H-C1: Will the project have a cumulative potential to cause flooding or erosion?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

No nexus exists between cumulative projects and potential project related flooding or streambank erosion. Flood control projects proposed by the Sonoma County Water Agency are generally outside the area that would be affected by the proposed project. Other projects approved by the City of Petaluma would be required to meet development regulations, and would not therefore be expected to increase flooding or erosion.

Mitigation: No mitigation is required.

REFERENCES

FEMA (Federal Emergency Management Agency). 1979. *Flood Insurance Study for the City of Petaluma, California Sonoma County.*

Harding Lawson Associates. 1996. *Inundation Analysis Wastewater Treatment Oxidation Ponds City of Petaluma, California*. December 19.

U.S Army Corps of Engineers. 1994. Petaluma River, City of Petaluma, California. Section 205 Detailed Project Report for Flood Control. Appendix A. Basis of Design.

Winzler & Kelly. 2001. Technical Memorandum. *Analysis of Impacts of Peak Wastewater Flows During Flood Flows on the Petaluma River.*

4.7 PUBLIC HEALTH AND SAFETY

This section discusses public health and safety issues associated with the production of recycled water for irrigation, potential to expose workers or the public to hazards from a known hazardous waste site, potential release of hazardous materials, construction safety hazards, and disease vectors. Policies and regulations regarding water recycling, hazardous materials and hazardous waste management, construction hazards, and vector control are presented.

SETTING

Water Reuse

The project will produce disinfected secondary effluent for restricted (agricultural) reuse and disinfected tertiary recycled water for unrestricted reuse (urban). The recycled water would conform to the State's recycled water regulations, which are contained in Title 22 of the California Code of Regulations (Title 22, California Code of Regulations §60301, *et seq.*). Uses approved for unrestricted use by Title 22, and practiced in many California cities (e.g., Santa Rosa, San Jose, Carmel/Monterey and San Diego), include irrigation of parks and playgrounds, schoolyards, residential landscaping, food crops and golf courses (Title 22, California Code of Regulations §60304). Recycling of water for other purposes, including commercial applications and industrial process water, is also allowed by California regulations (Title 22, California Code of Regulations §60307) and is widely practiced. Recycling of disinfected secondary effluent for agricultural use is allowed by Title 22 and is currently used by the City of Petaluma during the summer period.

Untreated wastewater contains bacteria, viruses, and parasites that must be removed to allow safe use of recycled water. Title 22 criteria are intended to prevent exposure to these organisms by any of the possible mechanisms: skin contact, ingestion, or inhalation of infectious agents in water or by direct contact with a contaminated object. Recycled water is treated to an appropriate level to protect surface water and to prevent transmission of pathogens through aerosols (small particles of water suspended in air) from spray irrigation. Conventional and widely practiced water and wastewater treatment processes are capable of reducing microorganisms to acceptable levels. In fact most pathogens are virtually eliminated from recycled water.

The potential for pathogenic contamination from fecal sources is expressed as the number (measured by the Most Probable Number [MPN]) of coliform bacteria present in water sources. Coliform bacteria occur naturally in the intestines of warm-blooded animals and are easy to identify. Although they are not pathogenic, untreated wastewater contains high concentrations of coliform, up to 10 to 20 million coliform bacteria per 100 milliliters (10 to 20 million MPN per 100 milliliters). Primary and secondary wastewater treatment processes usually remove 90 percent or more of the pathogenic organisms in wastewater. Tertiary treatment removes most of the remaining pathogens.

For irrigation of areas used by the public and for other water reuse applications where workers or the public may come into contact with recycled water, Title 22 specifies provision of disinfected tertiary recycled water, which is wastewater that has been oxidized, filtered and subsequently disinfected. Oxidation stabilizes organic matter, reduces odor and adds oxygen to the wastewater. Filtration clarifies the water by removing small particles. Disinfection removes microorganisms that may cause disease. The regulations specify that disinfected tertiary recycled water must have a median coliform level that does not exceed 2.2 MPN per 100 milliliter over a period of seven days, and a maximum coliform level that does not exceed 23 MPN per 100 milliliter more than once in a 30-day period. No sample can exceed an MPN of 240 total coliform bacteria per 100 milliliters.

In addition to pathogens, raw wastewater contains chemical constituents including heavy metals and organic compounds. Wastewater treatment processes remove almost all the heavy metals in wastewater. Treatment processes successfully remove biodegradable organic compounds, but stable organic compounds are resistant to conventional methods of wastewater treatment. Levels of stable organic compounds are minimized by controlling industrial dischargers. The quality of the treatment plant's current effluent and proposed tertiary recycled water with regards to metals and organic compounds is discussed in Section 4.5, Surface Water Quality.

Hazardous Waste

Hazardous substances that have been released to the environment (e.g., due to spills and leaking underground storage tanks) have the potential to adversely affect public health if they are encountered unexpectedly during the construction phase of the project or during operations over the project's lifetime. At the Federal level, the storage and handling of hazardous substances is regulated under the Resource Conservation and Recovery Act, which follows hazardous substances from "cradle to grave" and regulates hazardous waste generators; transporters; and treatment, storage, and disposal facilities. California has been authorized by the EPA to administer its own Resource Conservation and Recovery Act program. The cleanup of sites contaminated by releases of hazardous substances (hazardous wastes) is regulated primarily by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, which was amended by the Superfund Amendment and Reauthorization Act of 1986, and by similar state laws. Known hazardous waste release sites are subject to oversight by federal, state, and/or local agencies.

The Cortese List is compiled annually by the California Governor's Office of Planning and Research pursuant to Government Code Section 65962.5. It identifies sites with potential and confirmed environmental contamination by hazardous waste. The address of the Hopper Street facility (950 Hopper Street) is on the Cortese List, however the listed address appears to be an error. The Cortese List indicates that the site is the responsibility of the San Francisco Bay Regional Water Quality Control Board (Regional Board). The Regional Board does not have a case file for 950 Hopper Street but does have records for the Petaluma Corporation Yard at 840 Hopper Street, which is adjacent to the Hopper Street facility. The Corporation Yard was the site of a leaking underground storage tank. The case file for 840 Hopper Street was closed on November 12, 1996.

A potential source of hazardous substances at the Hopper Street site is lead, which historically was used as a pigment and drying agent in oil based paint. Although the legal limit for lead concentrations in paint was lowered to 0.06% (a trace amount) in 1978 by the U.S. Consumer Product Safety Commission, and was lowered voluntarily by some manufacturers prior to that, many structures built prior to the 1980s may still contain undercoats of lead-based paint. Because the facility was originally constructed in 1938, many older buildings may have one of more coatings of paint that contain lead. Additionally, weathering and routine maintenance of paint on these buildings may have contaminated nearby soils with lead. Lead-based paint was noted on structures to be demolished at 950 Hopper Street during a 1994 Phase I Site Assessment (Baseline 1994).

Asbestos containing material (ACM) is commonly found in structures built prior to the 1980s. Typical ACM includes resilient floor covering, siding, asphalt roofing products, gaskets, and cement products (e.g., stucco). Current Federal and California laws and regulations require that specific work practices be followed to abate the hazard associated with exposure to ACM during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require that the owner of the building and/or the contractor notify applicable State and local agencies (i.e., Bay Area Air Quality Management District in the San Francisco Bay Area) and/or EPA Regional Offices before all demolitions, or before renovations of buildings that contain certain threshold amounts of asbestos. ACM was noted in structures to be demolished at 950 Hopper Street during the1994 Phase I Site Assessment.

Hazardous Materials Storage, Use and Disposal

Materials such as fuels, motor oils, and paints may be used during construction of new buildings, digesters, storage ponds and other facilities. Sodium hypochlorite (bleach) is used for disinfection and would continue to be used at the treatment plant for disinfection of secondary effluent for river discharge and agricultural reuse (although disinfection for tertiary treated recycled water would be changed to ultraviolet light). While these are commonly used materials, if handled improperly (fuels, for example, are flammable) they could endanger workers and the public, and are considered hazardous materials. Compliance with Federal and State hazardous materials laws and regulations minimizes the risk to the public presented by these potential hazards. These laws and regulations include California's statutes such as the Accidental Release Prevention and Hazardous Waste Control Laws, and Federal statues such as the Resource Conservation and Recovery Act (discussed in the preceding paragraphs), the Emergency Preparedness and Community Right-to-Know Act and the Clean Air Act.

In California the Accidental Release Prevention Law regulates the storage and use of "acutely hazardous materials" and is intended to protect the public from materials that can produce toxic clouds after fires, explosions or other accidents. Since 1996 this law has provided consistency with the Federal Emergency Preparedness and Community Right-to-Know and Clean Air Acts. It allows local oversight of both the State and Federal programs. In the project area the Sonoma County Department of Emergency Services Hazardous Materials Division, the Petaluma Fire Department, and the local Certified Unified Program Agencies implement the Accidental Release Prevention Law. California's Accidental Release Prevention Program addresses both federally regulated substances and a number of additional chemicals identified by the State.

Anhydrous ammonia, which can volatilize and thus affect off-site receptors, is stored at the Lakeville facility. An Offsite Hazard Assessment to evaluate the potential effect of a worst case release of ammonia gas from the facility was performed in 1999 (City of Petaluma, 1999). The assessment determined that no public receptors were present within the area where toxic effects might be experienced.

The Sonoma County Department of Emergency Services and the Petaluma Fire Department, in their capacity as Certified Unified Program Agencies, enforce hazardous materials regulations in the project area by reviewing plans and inspecting the hazardous materials and hazardous waste storage areas of businesses (e.g., hazardous waste generators and haulers, and facilities with underground tanks or large quantity storage). They can issue citations or take other appropriate enforcement actions in the event that they discover a violation.

Vector Control

Mosquitoes are both pests and vectors of disease to humans and animals. Mosquito populations can increase rapidly, especially during the warmer summer months. Twenty-two species of mosquitoes are known to occur in Marin and Sonoma Counties. Several of these have the potential to breed and to reproduce as a result of the construction and operation of project components (e.g., wetlands and storage ponds).

The California Health and Safety Code provides authority for mosquito abatement districts to provide advice and control mosquito production on private and public lands and to assess the landowner for the cost of that control. The districts also have the authority to hold hearings and assess civil penalties to abate nuisance and potential health threats to the public (California Health and Safety Code, Sections 2270-2294). The Marin/Sonoma Mosquito and Vector Control District and the Vector Biology and Control Branch of the California Department of Health Services are responsible for overseeing the mosquito prevention program within the project area. The primary objective of the Marin/Sonoma Mosquito and Vector Control District is to suppress the mosquito population below the threshold level required for disease transmission or nuisance tolerance level.

The Marin/Sonoma Mosquito and Vector Control District has produced several documents addressing mosquitoes and other biting arthropods associated with wastewater reclamation or disposal projects. These documents provide project design criteria for mosquito prevention as well as guidelines for proper management of wastewater reclamation or disposal projects. The design criteria include minimizing the amount of over-irrigation, ponding, or tail water, thereby significantly reducing the need to treat these sites with pesticides and the subsequent need to provide the Marin/Sonoma Mosquito and Vector Control District with compensation for that control effort.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

The evaluation criteria for hazardous materials and hazardous waste management are based on standards promulgated by the Federal Government and by the State of California (Table 4.7-1).

Table 4.7-1

Evaluation Criteria with Point of Significance – Public Health and Safety

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project expose the public to chemicals, radionuclides, pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?	Proposed measures not in compliance with Title 22 regulations for the use of recycled water or the treatment plant's NPDES permit.	Greater than 0 occurrences	California Title 22 regulations governing the use of recycled water and Clean Water Act.
2. Will the project expose workers or the public to hazards from a known hazardous waste site?	Ground disturbance near a hazardous waste site(s).	Less than 500 feet	CEQA guidelines; Resource Conservation and Recovery Act; and Comprehensive Environmental Response Compensation and Liability Act (as amended by the Superfund Amendments and Reauthorization Act)
3. Will the project increase potential exposure of the public to hazardous materials due to a chemical release?	Increase in use or storage of hazardous materials not in accordance with State and Federal hazardous materials or waste regulations.	Greater than 0 occurrences	California and Federal hazardous materials and waste regulations (including handling of materials containing lead-based paint or asbestos during construction or demolition). Public Safety sections of local General Plans
4. Will the project expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Use of heavy machinery, vehicles or equipment; or creation of excavations in public areas not in accordance with State construction safety regulations.	Greater than 0 occurrences	California Construction Safety Regulations (see text)

Table 4.7-1

Evaluation Criteria with Point of Significance – Public Health and Safety

Evaluation Criteria	As Measured by	Point of Significance	Justification
5. Will the project increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	Creation of mosquito habitat.	Greater than 0 acres of new mosquito habitat.	Marin/Sonoma Mosquito and Vector Control District criteria for mosquito abatement

Source: Parsons 2002

Water Recycling

The evaluation criterion is based on California Department of Health Services standards governing water recycling. The California Department of Health Services has established treatment requirements for a variety of recycled water uses. These requirements are believed to be capable of reducing pathogenic constituents to acceptable levels. The California Department of Health Services recently revised the regulations governing water reuse and those changes were incorporated into the California Code of Regulations in December 2000 (Title 22, California Code of Regulations §60301 *et seq.*).

The Title 22 requirements for unrestricted use currently require disinfected tertiary recycled water (i.e., secondary treatment of wastewater plus the advanced treatment processes of filtration and disinfection). The disinfected tertiary recycled water must be oxidized, filtered and disinfected. For uses such as the irrigation of parks, schoolyards and playgrounds, (i.e., that involve human contact with recycled water) a median coliform level that does not exceed 2.2 MPN per 100 milliliters over a period of seven days and a maximum coliform level that does not exceed 23 MPN per 100 milliliters more than once in a 30-day period must be achieved.

Hazardous Waste

The hazardous waste criterion is based on the CEQA requirement that lead agencies consult the Hazardous Waste and Substances Sites List compiled pursuant to Section 65962.5 of the California Government Code to determine whether the proposed project is located on a listed site. The list is compiled by the Regional Water Quality Control Boards, the DTSC, and the California Integrated Waste Management Board.

Hazardous Materials

The hazardous materials storage and use criterion is based on the requirements of State and Federal regulations (e.g., California Health and Safety Code §25500 *et seq.*). These regulations require local agencies such as city and county environmental health services departments or fire departments to administer programs for storing and handling of hazardous materials.

Construction Hazards

The criteria for safety hazards during construction are based on safety regulations (Title 8, CCR §1500 to §1938) regarding construction sites. While the regulations have been promulgated to protect workers in the construction industry, the project could pose safety hazards in areas accessible to the public. The criteria have been developed to protect the public in areas where they may encounter construction activities.

Vector Control

The criterion for disease vectors is based on the requirements of the Marin/Sonoma Mosquito and Vector Control District and the Vector Biology and Control Branch of the California Department of Health Services, which are responsible for overseeing the mosquito prevention program within the project area. The Marin/Sonoma Mosquito and Vector Control District has issued criteria for mosquito prevention in wastewater reclamation or disposal projects.

IMPACTS AND MITIGATION MEASURES

IMPACT: PHS-1: Will the project expose the public to chemicals, radionuclides, pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The production of recycled water for reuse would not create a public health and safety impact because the quality of the Recycled Water Facility's water would meet or exceed criteria adopted by the California Department of Health Services to be protective of human health. Recycled water would be tested in accordance with California's laws and regulations governing water reuse to assure that the water quality meets the State's health standards. In addition, no public health problems have been reported as a result of water reuse in the more than sixty years that it has been practiced in California.

The public would potentially be exposed to recycled water in the polishing wetlands, which are proposed to be part of a public education/recreation area. Public exposure would, however, meet all requirements of Title 22. The recycled water in the wetlands will be disinfected, and required signage will be included stating "Recycled Water – Do Not Drink". Access to the wetlands will be controlled by a gate between the parking lot and wetland trails. Low fencing may also be used around the polishing wetlands to discourage any public contact.

Access to the algae removal wetlands will be restricted. These wetlands will be located within the existing treatment plant site and visitors will need to sign in and be accompanied. Water in the algae removal wetlands will not be disinfected, but will be secondary-treated.

The project includes measures to ensure appropriate levels of treatment for all recycled water with which the public might come in contact. In addition,

appropriate signage and access control will prevent inappropriate contact with recycled water. With incorporation of these measures no significant impacts are expected.

Mitigation: No mitigation is necessary.

IMPACT: PHS-2: Will the project expose workers or the public to hazards from a known hazardous waste site?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

A 1994 Phase I Site Assessment noted that because the treatment facilities at 950 Hopper Street used unlined sludge lagoons, the underlying soil materials may contain metals and other substances found in sewage influent (Baseline Environmental Consulting 1994). Measure PD-9, Conduct Phase II Site Assessment at Hopper Street, adopted as part of this project, requires the City to conduct a Phase II Site investigation to assess the potential for contamination beneath the lagoons.

Proposed demolition activities at the Hopper Street facility that could be affected by the potential release or contamination beneath the lagoons include excavations to removal of foundations or other structures near the lagoons. These activities might require soil excavation and possibly dewatering, which may expose or otherwise encounter hazardous materials. Specific project impacts resulting from encountering hazardous materials during project activities include potential exposure of workers and the public to toxic materials, further contamination of air, soil and water, and removal and/or disposal of hazardous materials. The latter requires transportation of contaminated material, getting waste accepted for disposal, and management of contaminated groundwater. Measure PD-10, Monitor Soil and Groundwater during Construction for Evidence of Hazardous Waste, adopted as part of this project, requires the City to monitor for subsurface contamination in compliance with the California Department of Occupational Safety and Health (Cal/OSHA) in areas suspected of containing soil or groundwater contamination. In addition, measure PD-11, Containerize and Test Suspect Soil and Groundwater Prior to Disposal, adopted as part of this project, requires the City to contain in Baker tanks or similar containment devices groundwater brought to the surface as a result of dewatering in areas where contamination of soil and groundwater is suspected or known.

Any requirements for disposal of contaminated soil and water shall be determined before the start of demolition. The contractor shall be informed of any sites in the vicinity of the proposed demolition area, and shall be responsible for implementing the demolition-period mitigation measures described below, as necessary.

The 1994 Phase I Site Assessment reported that buildings at 950 Hopper Street contained lead-based paint. Demolition of the buildings could release lead-contaminated dust to the air, which may expose workers or the public to these hazardous substances.

Asbestos containing material (ACM) is commonly found in structures built prior to the 1980s. Typical ACM includes resilient floor covering, siding, asphalt roofing products, gaskets, and cement products (e.g., stucco). Current Federal and California laws and regulations require that specific work practices be followed to abate the hazard associated with exposure to ACM during demolitions and renovations of all structures, installations, and buildings (excluding residential buildings that have four or fewer dwelling units). In addition, the regulations require that the owner of the building and/or the contractor notify applicable State and local agencies (i.e., Bay Area Air Quality Management District in the San Francisco Bay Area) and/or EPA Regional Offices before all demolitions, or before renovations of buildings that contain certain threshold amounts of asbestos. ACM was noted in structures to be demolished at 950 Hopper Street during the1994 Phase I Site Assessment. Measure PD-12, Inspect and Test for Lead-based Paint and ACM, adopted as part of this project, requires the City to inspect (and test as necessary) all buildings subject to demolition for ACM and lead-based paints.

Mitigation: No mitigation is necessary.

IMPACT: PHS-3: Will the project increase potential exposure of the public to hazardous materials due to a chemical release?

Analysis: *Water Recycling Facility – Less than Significant*

Anhydrous ammonia is currently stored at the Lakeville Highway facility and similar (or lesser) amounts would be stored as part of the project. An Offsite Hazard Assessment (City of Petaluma, 1999) to evaluate the potential effects of a worst case release of ammonia gas from the storage area has determined that no public receptors are present within the area where toxic effects would be experienced. Because no increase in storage is planned as part of the project, the less-than-significant outcome of the assessment would not change as a result of the project.

Minor amounts of hazardous materials would be used during construction of the facilities (e.g., fuel for vehicles). Compliance with Federal and State hazardous materials laws and regulations would minimize the risk to the public presented by these potential hazards. Because the project proposes to use UV disinfection to meet urban reuse requirements and the existing and a new sodium hypochlorite/sodium bisulfite system for river discharge and agricultural reuse, there would be a slight reduction in hazardous materials deliveries to the site.

Analysis: *River Access Improvements – No Impact*

No hazardous chemicals will be used during operations, and therefore no impacts have been identified.

Mitigation: No mitigation measures are required.

IMPACT: PHS-4: Will the project expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Project facilities will be constructed (or demolished) in areas that are generally inaccessible to the public. Although heavy equipment (e.g., backhoes, excavators, and/or trucks) will be used to construct the project facilities, general construction safety practices such as site fencing or barricades will protect the public from these hazards during construction activities. Construction activities will not impact public safety. Trails along polishing wetland berms or along the Petaluma River levees are wide and well marked; fencing is not necessary for public safety.

Mitigation: No mitigation measures are required.

IMPACT: PHS-5: Will the project increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?

Analysis *Water Recycling Facility and River Access Improvements – Less than Significant*

The creation of wetlands and the impoundment of water in ponds creates potential habitat for mosquitoes. Storage ponds with a large surface area to volume ratio and with irregular shorelines (e.g., for wetlands) are more likely to create mosquito habitat than deeper impoundments. The Marin/Sonoma Mosquito and Vector Control District monitors the existing wastewater oxidation ponds and adjacent wetlands. Monitoring of the ponds for mosquito populations would continue at newly constructed facilities.

The Marin/Sonoma Mosquito and Vector Control District promotes and uses an integrated pest management system to control mosquito populations. The first step of the system is to identify the environmental conditions that keep mosquito population growing and healthy. Eliminating those conditions will reduce the insect's population size. In addition, a variety of biological, physical and chemical methods are available to control mosquito populations. Biological control agents include mosquitofish, and naturally occurring predators such as backswimmers, beetles and flatworms. The Marin/Sonoma Mosquito and Vector Control District also may apply a microbial insecticide derived from bacteria (known as Bti), an insect growth regulator (methoprene), and a light mineral oil to control mosquito larvae. Measure PD-13, Mosquito Prevention, adopted as part of this project, requires the City to comply with the Marin/Sonoma Mosquito and Vector Control District's criteria for mosquito prevention in wastewater reclamation projects.

Water features associated with the project may provide habitat for other aquatic insects such as midges. However, according to the Marin/Sonoma Mosquito and Vector Control District, local species of midges are non-biting and do not constitute a public health problem. Although midges resemble mosquitoes in size and appearance, they do not have biting mouth parts.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: PHS-C1: Will the project have a cumulative impact on public health and safety?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The project would not contribute to any significant cumulative impacts associated with hazardous materials use, existing hazardous waste sites, recycled water production, construction safety hazards or disease vectors in the project area.

Hazardous materials and hazardous waste would be managed in compliance with Federal, State and local laws and regulations. The recommended mitigation measures would reduce hazardous materials and hazardous waste impacts to levels that are less than significant. Remediation of hazardous waste and other hazardous substances (e.g., lead-based paint) as required by the mitigation measures would reduce the cumulative potential for exposure and remediate potential sources of contamination. The conversion to UV disinfection for recycling would decrease the use of sodium hypochlorite for disinfection and thus reduce the potential for cumulative exposures to hazardous materials.

Recycled water would be handled in a manner compliant with the State's laws and regulations governing the wastewater reuse, thus there would be no cumulative impact from increased production of recycled water, or from future expanded use of recycled water.

None of the identified construction safety impacts would increase cumulative safety hazards. Construction would occur on property owned by the City of Petaluma to which access can be controlled. All activities would be performed in accordance with California's laws and Cal/OSH regulations.

Additional ponds and wetlands would be managed according to the requirements of the Marin/Sonoma Mosquito and Vector Control District, as are other facilities in the project area. After mitigation the impact is less than significant and the additional ponds and wetlands would not contribute to cumulative impacts.

Mitigation: No mitigation is necessary.

REFERENCES

Baseline Environmental Consulting, Inc., 1994. Phase I Site Assessment for 950 Hopper Street.

Brown and Calwell & Jones and Stokes, 1995. *City of Petaluma Wastewater Facilities Project and Long-Range Management Program.* August.

California Code of Regulations Title 22, §60301.

California Code of Regulations Title 22, §60304.

California Code of Regulations Title 22, §60307.

City of Petaluma & Naphtali H. Knox and Associates, Inc, 1995. *Petaluma General Plan.* June *5.*

City of Petaluma, 1999. Offsite Hazard Assessment for the California Accidental Release Prevention Regulations.

Sonoma County, 1994. *Sonoma County General Plan.* March 1.

4.8 BIOLOGICAL RESOURCES

This section describes and evaluates impacts to aquatic and terrestrial resources (including wetlands), plant communities, wildlife habitats, and special-status species.

SETTING

Project Sites

The existing wastewater treatment plant is located at Hopper Street within the City of Petaluma adjacent to the Petaluma River's Basin Cut-off channel, just upstream and west of the U. S. Highway 101 bridge. The other site is located southeast of Petaluma, outside the developed portion of the City along Lakeville Highway, just upstream from Cloudy Bend of the Petaluma River near where Ellis Creek enters the river. At Lakeville Highway, there are existing oxidation ponds and three parcels (Parcels A, B, and C).

To evaluate the biotic resources including wetlands, and describe plant communities of potential siting areas, existing reports were reviewed and data were collected. In addition, reconnaissance level field studies were conducted of Parcels A and B at Lakeville Highway. Parcel C was not evaluated in the field at the request of the landowner who denied access to the property. In all cases, the resources were determined in a preliminary way by interpreting a 1999 color aerial photograph of the area (Pacific Aerial Surveys 1999).

Recent Studies of the Area

Focused surveys that describe the biotic resources of portions of the project areas include:

- Jones & Stokes Associates 1995. Preliminary Delineation of Waters of the U.S., Including Wetlands, for the Petaluma Wastewater Facility and Reservoir Sites.

- Brown & Caldwell and Jones & Stokes Associates 1995. Petaluma Wastewater Facilities Project and Long Range Management Program, Revised Draft EIR, (including Special Status wildlife and plant surveys reported in Appendix B-1 of the Draft EIR).

- Jones & Stokes Associates 1998. Results of California Red-legged Frog Survey at the Proposed Demonstration Wetlands Project (letter of March 20, 1998 to City of Petaluma Planning Department).

- Prunuske Chatham, Inc. 1998. Riparian Plant Community Enhancement in the Petaluma River Watershed, March 1998 technical report to the Southern Sonoma County Resource Conservation District Petaluma Watershed Enhancement Plan.

On April 11, 2001 a general reconnaissance wetland and wildlife survey was conducted on Parcels A and B. The survey was conducted by walking through the various vegetation community types and documenting the mandatory indicators of wetland hydrology, soils, and vegetation, and all wildlife species observed. The site can generally be subdivided into the

following vegetation communities: agricultural, coastal brackish water marsh, ornamental plantings, ruderal/disturbed, and black cottonwood riparian forest. During the course of the survey the following weather variables were recorded: wind about 15 to 25 miles per hour (mph), cloud cover about 100 percent, temperature approximately 60 degrees Fahrenheit, and precipitation mostly dry (very short, light drizzle initially). Due to the relatively strong winds the likelihood of observing bird species was greatly reduced. Bird surveys are typically not conducted at wind speeds above 10 to 15 mph. A field visit to identify wetlands was conducted on Parcels A and B and the existing treatment plant site on July 31, 2001. Additional wetlands fieldwork was conducted within the treatment plant site on February 19, 2002. Parcel B and additional areas on the treatment plant site will be subject to further wetlands field studies on February 28, 2002. The wetland delineation subconsultant subdivided the coastal brackish water marsh vegetation type into several habitats that differ in land use and salinity, from freshwater to saltwater. For purposes of vegetation mapping for this document and the subsequent analysis of impacts all of the site wetlands and aquatic areas are generically termed "marsh" regardless of historic land use or salinity.

Wildlife Habitat

Wildlife habitat provides cover, food, and water necessary to meet the biological requirements of one or more individuals of an animal species. Changes in habitats and changes in essential habitat elements that relate to reproduction, foraging, and cover requirements may impact abundance, distribution, diversity, and interactions between wildlife species. The wildlife habitat in the project area is identified herein based on the habitat classification system developed by the California Department of Fish and Game (CDFG) for the California Wildlife Habitat Relationships (CWHR) program (Bailey 1982, Grenfell 1988, Mayer & Laudenslayer 1988, Zeiner et al. 1988, 1990a). Descriptions of wildlife habitats appear in the section on plant communities.

Table 4.8-1 identifies the CWHR habitat type that corresponds with each plant community found in the project area. The plant communities in the project area are described below and the corresponding wildlife habitats listed in Table 4.8-1 are also described in terms of the assemblage of wildlife species that they typically support.

Plant Communities

The plant community descriptions and nomenclature conventions used in this analysis employed *The Jepson Manual* (Hickman 1993), Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), and *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995). During the reconnaissance survey, wildlife observations were documented, which are listed below for each community in which they were observed (see Figure 4.8-1, Plant Communities)

Agricultural

Vegetation on Parcel A and upper Parcel B consists primarily of oats (*Avena sativa*) inter-cropped with fava bean (*Vicia faba*) or expanses of Italian ryegrass (*Lolium multiflorum*). Species observed in this community include barn swallow (*Hirundo*

rustica), red-winged blackbird (*Agelaius phoeniceus*), savanna sparrow (*Passerculus sandwichensis*), mallard (*Anas platyrhynchos*) with young; and western meadowlark (*Sturnella neglecta*). Three long-billed curlews (*Numenius americanus*) were observed in flight over this community.

Parcel C appears to be plowed and therefore is agricultural. However, marsh is also apparent on the site as determined from 1999 aerial photography.

Table 4.8-1

Plant Community/Wildlife Habitat Relationship System Habitat Type Comparison

Plant Community	Corresponding CWHR Habitat
Agricultural	Cropland
Ornamental Landscape	Eucalyptus
Ruderal/Disturbed	Urban
Coastal Brackish Marsh (including Aquatic)	Saline Emergent Wetland and Aquatic
Black Cottonwood Riparian Forest	Valley Foothill Riparian

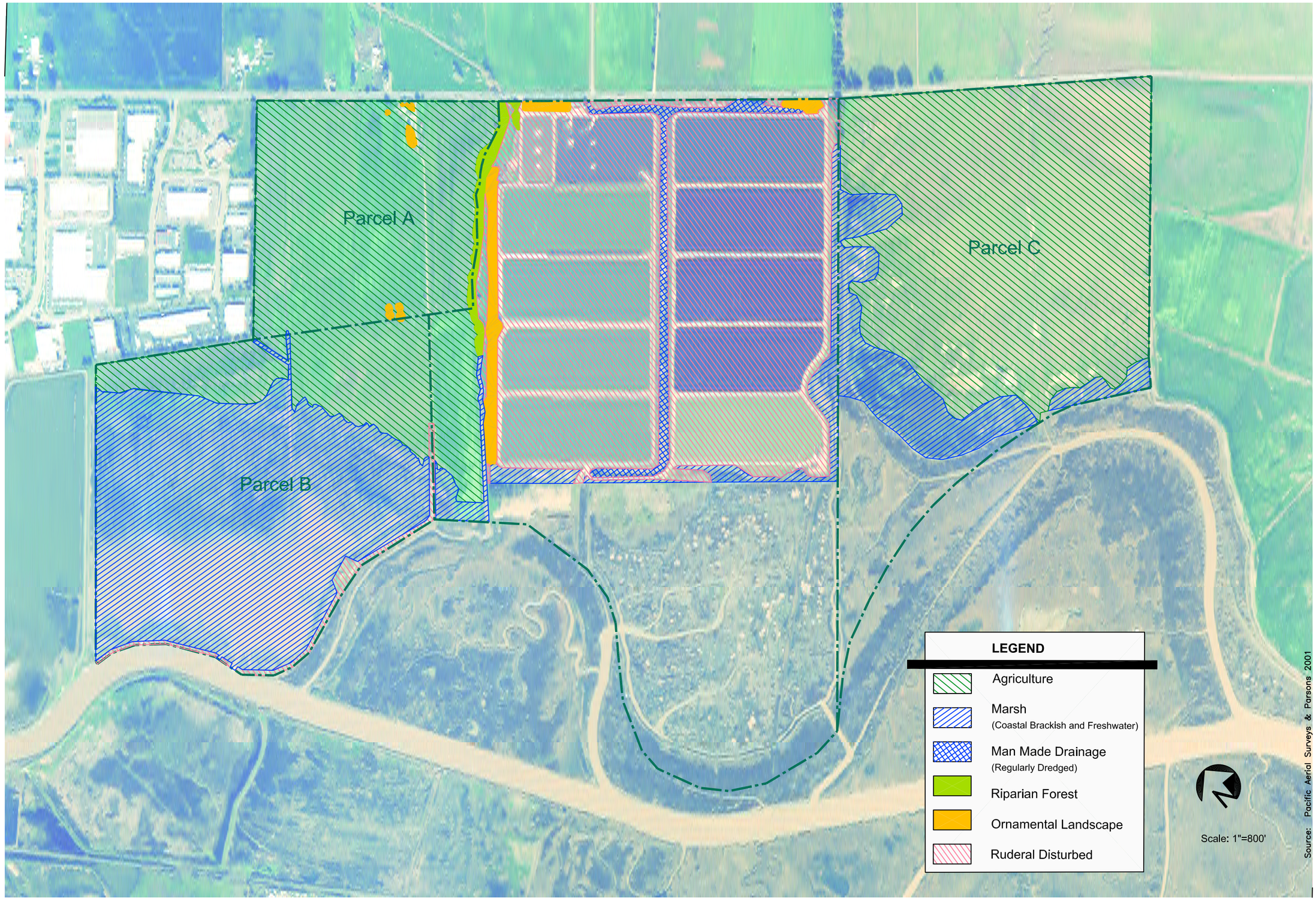
Source: Holland (1986); Mayer and Laudenslayer, Jr. (1988)

Coastal Brackish Marsh

Small channels are interspersed throughout the agricultural lands of Parcels A and B and are lined by cattails (*Typha latifolia*) and tules (*Scirpus californicus*). Species observed in these channels included song sparrow, cinnamon teal (*Anas cyanoptera*), and red-winged blackbird. Dominant plant species include saltgrass (*Distichlis spicata*) and alkali heath (*Frankenia salina*) with scattered pickleweed (*Salicornia virginiana*). Several ditches or canals drain the agricultural areas. These are vegetated with annual semaphore grass (*Pleuropogon californicus*), Douglas meadowfoam (*Limnanthes douglasii* ssp. *douglasii*), and in the wettest portions, flowering quillwort (*Lilaea scilloides*). Parcel C may contain marsh habitat. Evidence for the occurrence of this vegetation type was taken from the February 11, 1999 color aerial photograph of the site (Pacific Aerial Surveys 1999).

Ornamental Landscape

This community type is comprised primarily of eucalyptus (*Eucalyptus globulus*) stands, but also contains English ivy (*Hedera helix*) and other ornamental species including Lombardy poplars (*Populus nigra*) on the north side of the existing oxidation ponds. The two principal eucalyptus stands are located along the edge of the business park adjacent to Parcels A and B and along the western edge of the oxidation ponds. Species observed included red-winged blackbird, California towhee (*Pipilo crissalis*), house finch, European starling (*Sturnus vulgaris*), Anna's hummingbird (*Calypte anna*), and Bullock's oriole (*Icterus bullockii*).



PARSONS
Figure 4.8-1

PLANNING-LEVEL VEGETATION MAP

City of Petaluma
Water Recycling Facility EIR

File: 739461\graphics\EIR\Vegetation-aerial
Date: 04/08/02

A large rookery used by great blue herons, great egrets, snowy egrets and cormorants is located in the eucalyptus stand adjacent to, and facing, the treatment plant.

Ruderal-Disturbed

This community type occurs on the Parcels A and B along the dirt roads, existing oxidation ponds, and in minimal amounts along the boundaries of the site adjacent to the business complex and in the area surrounding an old cattle ramp. Plant species observed in the vegetation community at the project site include fennel (*Foeniculum vulgare*), common knotweed (*Polygonum arenastrum*), horseweed (*Conyza canadensis*), Italian thistle (*Carduus pycnocephalus*), yellow star-thistle (*Centaurea solstitialis*), bristly ox-tongue (*Picris echioides*) birdfoot trefoil (*Lotus corniculatus*), bur clover (*Medicago arabica*), white sweet clover (*Melilotus alba*), cheeseweed (*Malva parviflora*), Bermuda buttercup (*Oxalis pes-caprae*), Himalaya blackberry (*Rubus discolor*), ripgut brome (*Bromus diandrus*), and Italian ryegrass.

Wildlife species observed in this community type included white-crowned sparrow (*Zonotrichia leucophrys*), turkey vulture (*Cathartes aura*), mourning dove (*Zenaida macroura*), red-winged blackbird, house finch (*Carpodacus mexicanus*), black phoebe (*Sayornis nigricans*), and California slender salamander (*Batrachoseps attenuatus*).

The Hopper Street and Lakeville Highway facilities both contain extensive ruderal-disturbed habitat.

Black Cottonwood Riparian Forest

The Ellis Creek riparian forest of Parcels A and B is dominated by black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), buckeye (*Aesculus californica*) and Pacific willow (*Salix lasiolepis* ssp. *lasiandra*) with an understory of creeping snowberry (*Symphoricarpos mollis*) and creeping blackberry (*Rubus ursinus*). Where the groundwater table nears the surface of the woodland floor, slough sedge (*Carex obnupta*) was found.

Wildlife species observed included American crow (*Corvus brachyrhynchos*), yellow-rumped warbler (Audubon's race) (*Dendroica coronata*), Bullock's oriole, song sparrow (*Melospiza melodia*), American goldfinch (*Carduelis tristis*), Turkey vulture, mallard with young, *Accipiter* sp., tree swallow (*Tachycineta bicolor*), bushtit (*Psaltriparus minimus*), California towhee, black-tailed jackrabbit (*Lepus californicus*), and black-tailed deer (*Odocoileus hemionus*). Mud-nesting swallow nests were observed beneath the Lakeville Highway bridge that spans Ellis Creek. At the time of the survey no swallows were observed in proximity to the nests. A large nest was also observed near the top of a black cottonwood. The nest appeared to be of the size commonly used by red-tailed hawks (*Buteo jamaicensis*). At the time of the survey the nest appeared to be inactive, and no activity was observed within the vicinity of the nest. Two American crows were observed carrying nesting material collected along Ellis Creek towards the eucalyptus stand adjacent to the treatment plant. Ellis Creek may provide nesting habitat for a variety of bird species. The bed of Ellis Creek is composed almost entirely of silt,

with only minimal amounts of cobble present. It does not appear to be suitable as a steelhead-spawning stream and this observation is supported by earlier reports (USDA, SSCRCD 1999).

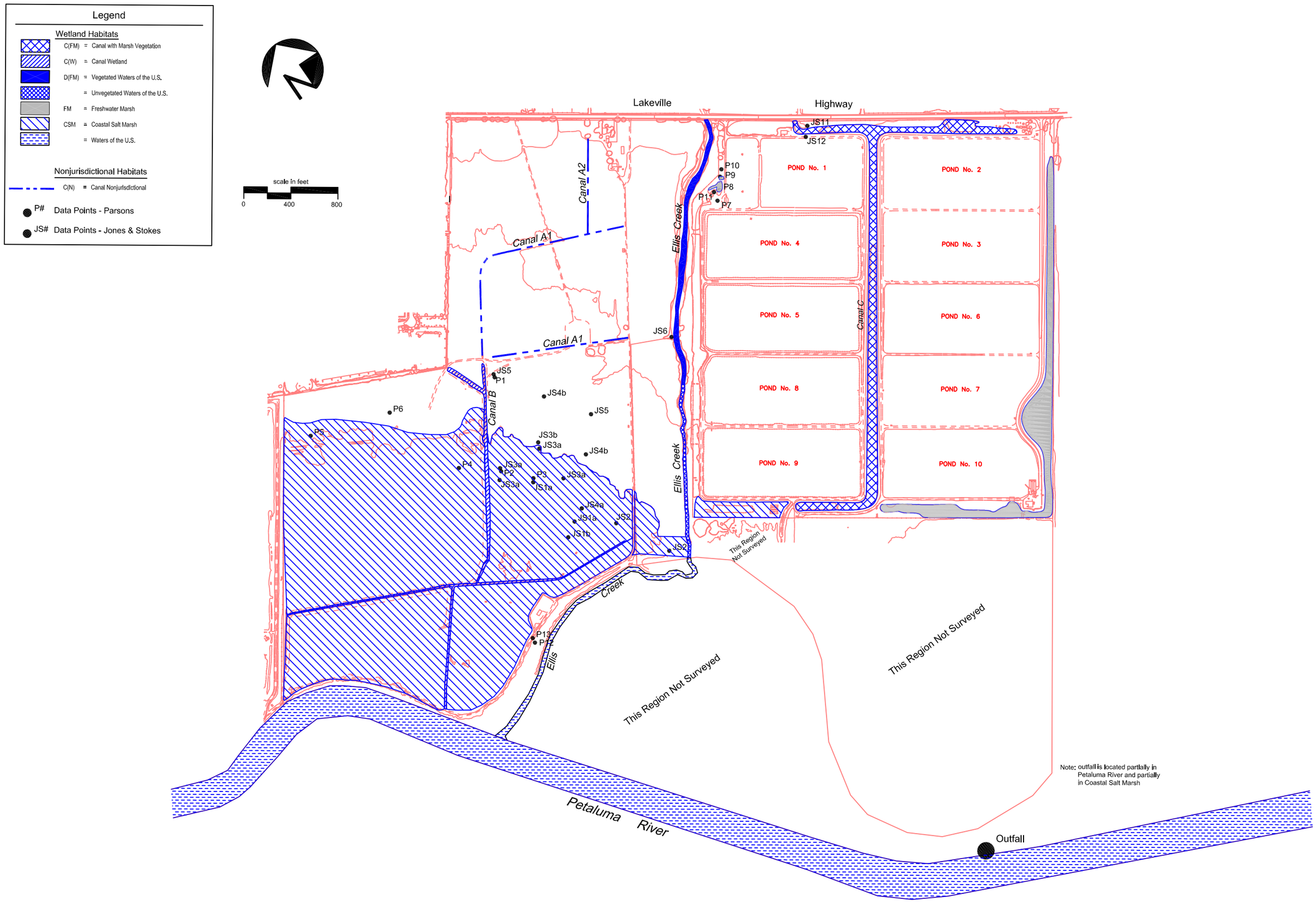
Wetlands and Waters of the U.S.

The Hopper Street and Lakeville Highway facilities contain artificial wetlands, commonly known as oxidation ponds. These areas were not studied during the April 11, 2001 field reconnaissance survey but were later studied by the wetland delineation subconsultant. Wetlands and waters of the U.S. on the treatment plant site and Parcels A and B are identified on Figure 4.8-2.

The southerly portion of the Lakeville Highway site, specifically Parcel B, consists of tidally influenced salt marsh divided from the north half by a historic railroad grade and existing sewer main. The salt marsh consists of upland-wetland transitional areas dominated by saltgrass and alkali heath with scattered pickleweed. The National Wetlands Inventory (NWI) classifies most of Parcel B as a palustrine farmed wetland/upland area, and maps specific palustrine emergent wetlands in two locations (USFWS 1985). These areas are vegetated with obligate wetland plants such as annual semaphore grass, Douglas meadowfoam, and in the wettest portions, flowering-quillwort. According to the U.S. Fish & Wildlife Service (USFWS) obligate wetland plants are species found in wetlands 99% of the time.

Hydric soils on all four parcels were mapped by the Natural Resources Conservation Service (NRCS) as the Clear Lake, Gullied Land, and Reyes series. Along Ellis Creek, where silt banks have accumulated in the fringing riparian and on the creek edge, Gullied land series soils have been mapped by the NRCS. These are silt deposits derived from upstream Gullied land series soils. Those portions of the site closer to the Petaluma River and tidal wetlands of San Pablo Bay contain Reyes series soils. These are poorly drained silty clays of salt marshes and tidal wetlands of the southern end of the site. In addition to the Clear Lake and Reyes series soils described above, Parcel C contains upland clays and loams including Diablo and Haire series soils (Miller 1972).

The Lakeville Highway site has experienced many years of altered hydrologic regimes. In historic times, tidal action of the bay together with periodic flooding by the Petaluma River estuary created extensive salt- and brackish water marshes at the southern end of Parcels B and C. Farmers and dairy operators made attempts to dike the Petaluma River many years ago. An historic railroad grade also contributed toward the blockage of hydrology both from bay and river sources and from sheet flow coming off the hills of the north end of San Pablo Bay. Both the railroad and agricultural levees have now been breached as shown in the 1999 aerial photograph of the site (Pacific Aerial Surveys 1999). As a consequence of disrepair of the agricultural levees, hydrology of the site approximates historic conditions that existed before agricultural concerns altered the landscape.



Source: Jones & Stokes, Valerius Environmental Consulting

PARSONS

Figure 4.8-2

PLANNING-LEVEL WETLANDS and WATERS of the US

City of Petaluma
Water Recycling Facility EIR

File: 739461\graphics\EIR\Wetlond-11x17 Date: 05/22/02

Ellis Creek is classified as a water of the U.S. with a distinct top-of-bank and riparian woodland fringe. The NWI classifies the Ellis Creek system as an intermittent riverine streambed. The Petaluma Watershed Enhancement Plan states that the lower reach of Ellis Creek is an excavated channel designed for flood control (USDA, SSCRCD 1999). To the south, the Petaluma River/San Pablo Bay wetlands form a sinuous wetland edge. These are tidally influenced wetlands at or about the five-foot contour line. The NWI classifies these tidal marshes as intertidal estuarine, emergent with a regularly flooded tidal regime (USFWS 1985).

There is a drainage classified as a canal with freshwater marsh vegetation that carries drainages from two culverts under Lakeville Highway and proceeds between the existing oxidation ponds to a holding pond at the west end of the oxidation pond site. When the pond fills up, it overtops the berm and flows out to the Petaluma River. This canal is dredged regularly to remove vegetation and provide adequate drainage through the oxidation pond site. Dredging currently has minor impacts to vegetation and wetlands habitats.

Parcel A, now partially cropped, contains several narrow agricultural ditches. These narrow, poorly maintained ditches possess the three mandatory wetland indicators (wetland vegetation, hydric soils, and ponding [as ascertained by algal mats and scum accumulations]). The majority of the upper half of Parcel A contains numerous topographic micro-depressions that contain a smattering of obligate and facultative wetland plant species. Several ditches drain the agricultural areas of Parcel A, which is mapped as upland by the NWI. Parcel C may also contain wetlands. The 1995 Draft EIR states that, *"A substantial portion of the 98-acre Brazil parcel also appears to be a Corps jurisdictional wetland."* (Brown & Caldwell and Jones & Stokes Associates 1995). The 1985 NWI classifies much of Parcel C as a palustrine-farmed wetland. This parcel is not affected by the preferred project, but is included in several alternatives.

Despite the disrepair of the agricultural levees, it appears that the approximate wetland edges generally correspond with the earlier wetland delineation performed by Jones & Stokes Associates and Loran May (Jones & Stokes Associates 1995). This delineation was certified by the Corps in 1995. The Corps file number is 20581N39. Since the 1995 wetland delineation has expired, the site was redelineated.

The following habitats appear to qualify as jurisdictional wetlands:

- Freshwater and Pickleweed Marsh areas;
- Areas designated as "Agricultural Field (wetland)" that includes remnant pickleweed marsh. These areas occur below the 5-foot contour interval in the lowest portions of the agricultural hayfields;
- Areas designated as "Canal with Freshwater Marsh Vegetation"; and
- Areas designated as "Canal (wetland)"

Portions of Ellis Creek within the ordinary high water mark (OHWM) that are not vegetated qualify just as "Waters of the U.S." However, within the study area Ellis Creek is vegetated and

therefore qualifies not only as "waters" but also as "wetlands" since, by definition, wetlands are vegetated. The Corps takes jurisdiction over the OHWM of creeks or drainages that are either navigable waters of the U.S., or tributary to navigable waters. The Petaluma River is a navigable water of the U.S. and Ellis Creek is a tributary to the Petaluma River.

Nonjurisdictional wetland habitats include the vegetated irrigation canals within the plowed hayfields that were excavated on dry land and do not connect to a water of the U.S. Upland habitats consist of annual grasslands and plowed agricultural fields.

Jurisdictional areas are preliminary and subject to review and modification by the regulatory branch of the Corps.

Aquatic Habitat

Information on aquatic habitat and fisheries resources in and near the project site was obtained from sources including the Brown and Caldwell and Jones and Stokes (1995) Revised Draft EIR, the Petaluma General Plan (1997), the Initial Study for this project (Parsons HBA 2001), Moyle et al (1995), Jennings and Hayes (1994), Leidy (1984), USFWS (1998), CNDDB records (2000), Fawcett (2001), and discussions with Bill Cox (CDFG) and Don Hankins (USFWS).

Petaluma River, Marsh and Tributaries

The Petaluma River is a shallow, 18-mile long tidal estuary draining a watershed of approximately 126 square miles. Because of an excessive sediment load from tributaries and surrounding land uses, the river is regularly dredged and intensively managed to maintain channel capacity, provide adequate clearance for commercial and recreational navigation, and limit flooding of urban and rural residential areas. Most of the tributaries are small, seasonal streams draining small, highly modified watersheds. Only two tributaries, Adobe Creek and San Antonio Creek, are presently known to irregularly support runs of anadromous salmonids (personal communication Bill Cox, CDFG and Pete Adams, NMFS; February 2002). However, as a tidal estuary and as part of the San Pablo Bay estuary, the Petaluma River and Marsh support a variety of aquatic species on a regular, seasonal, or occasional basis, including a number of special-status species. In the previous Draft EIR (Brown and Caldwell 1995), 25 fish species found in the Petaluma River are listed, about half of which are natives (Table 3F-1). In recent collections near downtown Petaluma, Fawcett (*Report in prep*.) found 17 fish species, including three species not listed in the 1995 report.

Ellis Creek, the tributary adjacent to the existing oxidation ponds, is a third-order (i.e., the main stem is connected to at least two smaller branches, each of which is joined by smaller branching tributaries) seasonal stream that has been highly degraded by agricultural activities (dams, diversions, dairy wastes, loss of riparian corridor, erosion) over a long period of time. Most of the main stem dries completely each summer. However, at least one small reach (above the confluence with Higgins Creek) has a mature riparian canopy and maintains water in pools throughout the dry season, and there may be similar remnants on private lands further upstream. Downstream from Lakeville Highway (adjacent to the oxidation ponds), the straightened channel has a well

developed, but thin, riparian corridor. The soft bottom and elevated summer water temperature in this area preclude its use for salmonid spawning or summer rearing, but it may serve as a migration corridor for steelhead spawning and rearing somewhere in the upper watershed (no salmonids were found in surveys conducted in 2000 and 2001 in the area near Higgins Creek described above).

Wheat Creek on Parcel C is a small, channelized, first-order drainage lacking riparian cover (based on examination of the 1999 aerial photo), described in the 1995 Draft EIR as unlikely to provide important habitat for any special-status aquatic species. Access to this stream corridor was not available.

Special-status Species

Special-status species include:

- plants and animals that are legally protected or proposed for protection under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA);
- plants and animals defined as endangered or rare under the California Environmental Quality Act (CEQA);
- animals designated as species of special concern by the USFWS or CDFG;
- animals listed as "fully protected" in the Fish and Game Code of California (Sections 3511, 4700, 5050 and 5515), and;
- plants listed in the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 1999).

A complete list of special-status plant and animal species was compiled from lists identified by the USFWS, California Natural Diversity Data Base (CNDDB [Rarefind] 2001; CDFG 2002), and the CNPS Inventory of Rare and Endangered Vascular Plants of California (CNPS 2001, CNPS 1999).

Special-status species with potential habitat in or adjacent to the Lakeville site include 24 species of plants (Tables 4.8-2). Of these 24 species, only 3 have suitable habitat within the project area. In addition, 48 species of animals may be present near the Lakeville vicinity (Table 4.8-3). Of these 48 species, only 31 have suitable habitat within the project area. The Hopper Street property is unlikely to support populations of special status species of plants and animals. Tables 4.8-2 and 4.8-3 represent a list of all species that were identified as potentially occurring in the project vicinity. Discussion of those animal species that are identified as having potential to occur in the project area is provided in the section following the tables.

For purposes of disclosure in this EIR, all possible special status species of plants and animals, with habitats on Parcel C as discerned from the 1999 color aerial photograph of the area, were listed as potentially occurring there.

Table 4.8-2

Special-Status Plant Species Potentially Occurring within the Project Vicinity

Species	Status			Habitat	Occurrences
	Federal	State	CNPS		
Allium peninsulare var. *franciscanum* Franciscan onion	--	--	1B	Dry hillsides	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period March-June; elev. 0-300 m
Alopecurus aequalis var. *sonomensis* Sonoma alopecurus	FE	--	1B	Freshwater marshes and swales, riparian scrub	Suitable habitat exists on Parcel A. Habitat may exist on Parcel C; floristically based surveys recommended. Bloom period May-July; elev. more than 100 m
Amorpha californica var. *napensis* Napa false indigo	--	--	1B	Openings in broadleaved upland forest, chaparral, and cismontane woodland	No suitable habitat present; no additional surveys recommended. Bloom period March-June; elev. 150-2,000 m
Astragalus tener var. *tener* Alkali milk-vetch	--	--	1B	Alkali playa, valley and foothill grassland, and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period March-June; elev. 1-170 m
Blennosperma bakeri Sonoma sunshine	FE	SE	1B	Valley and foothill grassland and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period March-April; elev. Less than 100 m
Chorizanthe valida Sonoma spineflower	FE	SE	1B	Coastal prairie in sandy soils, likely extinct in Sonoma County	No suitable habitat present; no additional surveys recommended. Bloom period June-August; elev. 10-50 m
Cordylanthus maritimus ssp. *palustris* Point Reyes bird's-beak	FSC	--	1B	Coastal salt marshes and swamps	Suitable habitat may exist on Parcels B and C; floristically based surveys recommended. Bloom period June-October; elev. 0-10 m
Cordylanthus mollis ssp. *mollis* Soft bird's-beak	FE	SR	1B	Coastal salt marshes and swamps	Suitable habitat may exist on Parcels B and C; floristically based surveys recommended. Bloom period July-September; elev.0-3 m

Table 4.8-2

Special-Status Plant Species Potentially Occurring within the Project Vicinity

Species	Status			Habitat	Occurrences
	Federal	State	CNPS		
Delphinium luteum Yellow larkspur	FE	SR	1B	North-facing rocky slopes in chaparral, coastal prairie, and coastal scrub	No suitable habitat present; no additional surveys recommended. Bloom period March-May; elev. 0-100 m
Downingia pusilla Dwarf downingia	--	--	2	Valley and foothill grassland, roadside ditches, and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period March-May; elev. Less than 150 m
Erigeron biolettii Streamside daisy	--	--	3	Broadleaved upland forest, cismontane woodland, and North Coast coniferous forest in rocky, mesic settings	No suitable habitat present; no additional surveys recommended. Bloom period June-September; elev. 30-1,100 m
Fritillaria liliacea Fragrant fritillary	FSC	--	1B	Cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grasslands, often serpentinite	No suitable habitat present; no additional surveys recommended. Bloom period February-April; elev. 3-410 m
Hesperolinon congestum Marin western flax	FT	ST	1B	Chaparral and valley and foothill grasslands in serpentine soils	No suitable habitat present; no additional surveys recommended. Bloom period May-July; elev. 30-365 m
Lasthenia burkei Burke's goldfields	FE	SE	1B	Mesic meadows and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period April-June; elev. Less than 500 m
Legenere limosa Legenere	--	--	1B	Wet areas and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period May-June; elev. Less than 150 m
Lessingia hololeuca Woolly-headed lessingia	--	--	3	Broadleaved upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland / clay, serpentinite	No suitable habitat present; no additional surveys recommended. Bloom period June-October; elev. 15-305 m

Table 4.8-2

Special-Status Plant Species Potentially Occurring within the Project Vicinity

Species	Status			Habitat	Occurrences
	Federal	State	CNPS		
Limnanthes vinculans Sebastopol meadowfoam	FE	SE	1B	Meadows and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period April-May; elev. Less than 300 m
Micropus amphibolus Mt. Diablo cottonweed	--	--	3	Broadleaved upland forest, chaparral, cismontane woodland, and valley and foothill grassland in rocky areas	No suitable habitat present; no additional surveys recommended. Bloom period April-May; elev. 45-825 m
Navarretia leucocephala ssp. *bakeri* Baker's navarretia	--	--	1B	Cismontane woodland, lower montane coniferous forest, meadows, valley and foothill grassland, and vernal pools, in mesic settings	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period May-July 15-1,740 m
Plagiobothrys mollis var. *vestitus* Petaluma popcorn-flower	--	--	1A	Wet sites in valley and foothill grassland, possibly coastal salt marsh margins	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period June-July 10-50 m
Pleuropogon hooverianus North Coast semaphore grass	--	SC	1B	Broadleaved upland forest, meadows, north coast coniferous forests (redwood groves) and vernal pools	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period May-August; elev. Less than 500 m
Polygonum marinense Marin knotweed	FSC	--	3	Coastal salt or brackish marshes and swamps	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period June-August; elev. 0-10 m
Sidalcea calycosa ssp. *rhizomata* Point Reyes checkerbloom	--	--	1B	Freshwater marshes and swamps	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period April-September; elev. 5-75 m

Table 4.8-2

Special-Status Plant Species Potentially Occurring within the Project Vicinity

Species	Status			Habitat	Occurrences
	Federal	State	CNPS		
Trifolium amoenum Showy Indian clover	FE	--	1B	Valley and foothill grasslands, often serpentinite	Suitable habitat may exist on Parcel C; floristically based surveys recommended. Bloom period April-June; elev. Less than 100 m

Source: Parsons, 2002

[1] State status data from Special Vascular Plants, Bryophytes, and Lichens List (CDFG 2002); CNPS electronic list (1999); CNPS (2001), and *The Jepson Manual* (Hickman 1993).
SE = State Listed Endangered; SR = State Listed Rare; SC = State Candidate; SSC = State Species of Special Concern;
FE = Endangered, FT = Threatened; FSC = federal Species of Concern.
[3] Habitat and Potential Occurrence Sources: California Natural Diversity Data Base (CDFG 2001); CNPS (2001); Hickman (1993).

Table 4.8-3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Invertebrates				
Carterocephalus palaemon magnus Sonoma arctic skipper	FSC	--	There are currently no CNDDB records. *C. palaemon* occurs along forest edges and clearings, and grassy meadows	No suitable habitat on site; no additional surveys required
*Hydrochara ricksecker*i Ricksecker's water scavenger beetle	FSC	--	Aquatic habitats in the San Francisco Bay	No suitable habitat on site; no additional surveys required
Syncaris pacifica California freshwater shrimp	FE	SE	Found in low elevation, low gradient streams where riparian cover is moderate to heavy. Associated with shallow pools away from main stream flow. Endemic to Marin, Napa and Sonoma counties	No suitable habitat on site. No additional surveys required.
Fish				
Lampetra ayresi River lamprey	FSC	CSC	Coastal streams and rivers of California. Spawning and rearing requirements similar to those for Pacific lamprey, but smaller-size gravel used, as adults are only 6-8 inches long (cf. three feet for Pacific lamprey).	Lower portion of Ellis Creek may serve as migration corridor to possible spawning areas higher in the watershed.
Hypomesus tranpacificus Delta smelt	FT	ST	This species inhabits the Sacramento-San Joaquin Delta and seasonally inhabits Suisun Bay, Carquinez Strait, and San Pablo Bay. This species is seldom found at salinities above 10 PPT, and is most often found at salinities below 2 PPT. Spawning appears to occur in side channels and sloughs in the middle reaches of the Delta.	During high outflow periods, some Delta smelt may be carried downstream into San Pablo Bay, and might then be found in estuarine areas of the Petaluma River, Ellis Creek, and Wheat Creek. As this would be an infrequent event, surveys targeting this species would not be useful.

Table 4.8-3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Spirinchus thaleichthys Longfin smelt	FSC	CSC	This species prefers moderately saline water and may be found in major bays and estuaries from San Francisco Bay northward. It lives in the bay waters throughout the summer, moving into the lower reaches of the rivers that flow into these bays in the fall to spawn	Suitable habitat occurs on Parcels A, B, and C (Brazil Property). Surveys are required.
Oncorhynchus kisutch Coho salmon-Central California ESU (Evolutionary Significant Unit)	FT	SPE	Requires beds of loose, silt-free, well-oxygenated coarse gravel for spawning. After hatching, juveniles must spend their first summer in the freshwater rearing areas, so the stream must have either perennial flow or cool intermittent pools with subsurface flow, shade, food, and shelter during the dry season. Federal listing is for populations between Punta Gorda and San Lorenzo River; current state listing (SE) is only for populations south of the San Francisco Bay; populations within and north of San Francisco Bay are now proposed for state listing as endangered.	No suitable habitat for spawning or juvenile rearing currently exists in lower Ellis Creek, owing to siltation and other damage to Ellis Creek from many years of agricultural forms of land use. However, it is possible that suitable habitat may still exist on private lands somewhere in the upper watershed, so the lower reach of Ellis Creek in the project area could still be a migration corridor. Pre-construction surveys are recommended at the proper time of year as determined by NMFS and CDFG, prior to construction of bridges across Ellis Creek

Table 4.8-3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Oncorhynchus mykiss irideus Steelhead-Central California Coast ESU	FT	--	Requires beds of loose, silt-free, well-oxygenated coarse gravel for spawning. After hatching, juveniles spend at least one summer in the freshwater rearing areas, so the stream must have either perennial flow or cool intermittent pools with subsurface flow, shade, food, and shelter during the dry season.	This ESU includes steelhead that spawn in tributaries of the Petaluma River. Spawning and juvenile rearing currently occurs in Adobe Creek, which enters the Petaluma River just west of Ellis Creek. Suitable habitat for spawning or rearing does not currently exist in lower Ellis Creek, but may still exist somewhere in the upper watershed. Pre-construction surveys are recommended at the proper time of year as determined by NMFS and CDFG, prior to construction of bridges across Ellis Creek
Oncorhynchus tshawytscha Central Valley spring-run Chinook salmon	FT	ST	Chinook spawning requirements are similar to those of coho and steelhead, but larger gravels may be used, as chinook may reach much larger size than coho or steelhead. Unlike steelhead or coho, chinook fry begin moving downstream immediately after emerging from the gravel, and do not spend their first summer near where they were spawned.	This ESU currently spawns only in the Sacramento River basin. However, either up-migrating adults or out-migrating juveniles may be seasonally present in San Pablo Bay, and possibly in the lower Petaluma River. Unlikely to occur in the estuarine portion of Ellis Creek except on rare occasions.

Table 4.8-3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Oncorhynchus tshawytscha Central Valley fall/late fall-run Chinook salmon	FC	CSC	Spawning requirements similar to those for coho or steelhead, but larger gravels may be used, as chinook may reach much larger size than coho or steelhead.	Spawning runs primarily occur in the Sacramento-San Joaquin system. However, small runs of fall-run chinook that occur annually or occasionally in some smaller streams draining directly to San Francisco or San Pablo Bays are probably of this same ESU. Adults or juveniles from other streams may be seasonally present in the lower Petaluma River. In unusually wet years, spawning might occur in Petaluma River tributaries.
Oncorhynchus tshawytscha Winter-run Chinook salmon	FE	SE	Spawning requirements similar to those for coho or steelhead, but larger gravels may be used, as chinook may reach much larger size than coho or steelhead.	This ESU spawns only in the upper Sacramento River. However, either up-migrating adults or out-migrating juveniles may be seasonally present in San Pablo Bay, and possibly in the lower Petaluma River. Unlikely to occur in the estuarine portion of Ellis Creek except on rare occasions.

Table 4.8-3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Pogonichthys macrolepidotus Sacramento splittail	FT	CSC	Inhabits slow moving rivers, dead end sloughs, and low-salinity (up to 18 ppt.) estuarine areas. Requires submerged aquatic plants or flooded terrestrial vegetation for spawning and foraging for young.	Endemic to the Central Valley, Sacramento-San Joaquin delta, Napa River and Napa Marsh, and the Petaluma River and Petaluma Marsh. Adults and/or juveniles may be present in lower Ellis Creek or the Petaluma River at any time of the year. Surveys may be required by USFWS.
Eucyclogobius newberryi Tidewater goby	FE	CSC	Brackish (salinity usually less than 10 ppt.) lagoons and lower reaches of streams. Believed to require clean, sandy bottoms for spawning.	No records of occurrence in the Petaluma River system, but there are historical records of this species in San Francisco Bay drainages including Novato Creek, Corte Madera Creek, and Aquatic Park in Berkeley. Tidewater goby could occur in the tidally influenced portion of Ellis Creek or in the Petaluma River and Petaluma Marsh. Surveys may be required.
Amphibians				
Ambystoma californiense California tiger salamander	FC	CSC	Annual grasslands and grassy understory of valley-foothill hardwood communities in central and northern California. Adults spend most of the year in underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources lacking predatory fish and bullfrogs are required for breeding.	Suitable habitat may be present in the ponds on the Brazil property (Parcel C) provided that predatory fish are absent. The nearest known breeding sites are about 8.5 miles northwest of the project site.

Table 4.8-3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Scaphiopus hammondii Western spadefoot toad	FSC	CSC	Most commonly associated with grassland communities of the Central Valley; however, valley-foothill hardwood woodlands may also be utilized. Breeding occurs in shallow temporary pools lacking predatory fish and bullfrogs.	Suitable habitat is present in the ponds on the Brazil property (Parcel C) provided that predatory fish are absent. However, there are no confirmed records of this species ever occurring in Sonoma County. The nearest known extant populations are in Sacramento County.
Rana aurora draytonii California red-legged frog	FT	CSC	Occurs in a variety of ponds, sloughs, low-gradient streams, and low-salinity lagoons. Adults may forage in, and migrate through, terrestrial grasslands, riparian woodlands, and forests, but require weedy, slow moving or standing water that persists through most of the dry season for successful reproduction. Introduced bullfrogs and predatory fish are implicated in the decline of red-legged frogs throughout their range.	Currently known to occur in the Ledson Marsh (Sonoma Creek), Sears Point area, Stage Gulch Creek, Ellis Creek, and lower Petaluma River area. This species was also observed during surveys conducted for the 1995 EIR in the densely vegetated and wooded reach of Ellis Creek between the Petaluma Marsh and South Ely Road.
Rana boylii Foothill yellow-legged frog	FSC	CSC	Partly shaded, shallow streams with riffles and rocky substrates in a variety of vegetation communities	Known from Adobe Creek, a tributary of the Petaluma River. Most of Ellis Creek, which largely lacks a rocky substrate, does not provide suitable habitat for this species. However, suitable habitat exists in a wooded reach just above the confluence with Higgins Creek.

Table 4-8.3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Reptiles				
Clemmys marmorata marmorata Northwestern pond turtle	FSC	CSC	Occurs in ponds, marshes, rivers, streams, and irrigation ditches that have abundant emergent or riparian vegetation. Sunny basking sites and suitable upland egg-laying sites (friable soil exposed to full sun) are also required.	Known to occur in Ellis Creek and the existing oxidation ponds.
Phrynosoma coronatum frontale California horned lizard	FSC	CSC	Found in a variety of habitats including scrubland, grassland, coniferous forest, and broadleaved forests. Common in lowlands along sandy washes where low shrubs provide cover.	Believed to be extinct in Sonoma County. Nearest extant populations are in Contra Costa County. No suitable habitat on site; no additional surveys required
Birds				
Ardea alba (rookery) Great egret	--	*	Feeds in shallow water and along shores of estuaries, lakes, ditches, and slow-moving streams, in salt ponds and mudflats, and in irrigated croplands and pastures. Nests colonially in large trees near water isolated from human activity.	Rookery present in eucalyptus tree near Pond 8. Riparian woodland along Ellis Creek may also provide suitable nesting habitat. Adjacent agricultural lands, wetlands, and ponds provide suitable foraging habitat.
Ardea herodias (rookery) Great blue heron	--	*	A colonial nesting species, rookeries are typically located close proximity to foraging areas: marshes, lake margins, tidal flats, rivers, streams, and wet meadows	Rookery present in eucalyptus tree near Pond 8.

Table 4-8.3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Elanus leucurus White-tailed kite	--	CFP	Forages in open grasslands, meadows, and marshes, near isolated dense-topped trees used for perching and nesting	This species has been documented nesting along Ellis Creek (JSA 1995). Riparian woodland along Ellis Creek and isolated trees may provide suitable nesting habitat. Adjacent agricultural lands, grasslands, and marshes provide suitable foraging habitat.
Circus cyaneus Northern harrier	--	CSC	Coastal salt marsh, fresh-water marsh, and grasslands. Nests on ground in shrubby vegetation, usually at marsh edge	Both foraging (grasslands, marshes) and nesting (marsh edge and wet meadow) are present on site.
Accipiter cooperi Cooper's hawk	--	CSC	Most commonly associated with dense stands of live oak, riparian deciduous or other forest communities near water	The riparian community associated with Ellis Creek provides potentially suitable nesting habitat for this species.
Haliaeetus leucocephalus Bald eagle	FT	SE	Inhabits ocean shorelines, lake margins, and river courses for both nesting and wintering. Nests are typically located within 1 mile of water	Potential foraging habitat is present along the margins of the Petaluma River. Nesting habitat is not present on site.
Buteo regalis (wintering) Ferruginous hawk	FSC	CSC	A winter migrant that commonly inhabits grasslands, prairies, and brushy open country	Grasslands may provide suitable foraging habitat.
Falco peregrinus anatum American peregrine falcon	FD	SE	Inhabits open country, breeding near rivers, wetlands, lakes, or other aquatic features, nests on cliffs, banks, dunes, mounds, and human-made structures	Potential foraging habitat is present along the Petaluma River; however, nesting habitat is not present on site.

Table 4-8.3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Laterallus jamaicensis coturniculus California black rail	--	ST	Mainly inhabits salt marshes bordering larger bays. Often associated with pickleweed-dominated marshes. May also occur in fresh water and brackish marshes	Salt marsh provides potentially suitable habitat for this species.
Rallus longirostris obsoletus California clapper rail	FE	SE	Salt water and brackish marshes traversed by tidal sloughs in the vicinity of the San Francisco Bay. Typically associated with abundant growths of pickleweed and cordgrass	Salt marsh provides potentially suitable habitat for this species.
Athene cunicularia hypugea Western burrowing owl	FSC	CSC	Open; dry annual or perennial grasslands, deserts, and scrublands with low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel	Grasslands may provide suitable habitat for this species.
Strix occidentalis caurina Northern spotted owl	FT	--	An inhabitant of old growth forests or mixed stands of old growth and mature trees. Associated with high, multistory canopies dominated by large trees, many trees with cavities or broken tops, woody debris and space under the canopy	Occurrence of this species on site is not likely; suitable habitat is not present.
Empidonax traillii brewsteri Little willow flycatcher	FSC	SE	A spring and fall migrant at lower elevations, primarily in riparian habitats from central/coastal California north. Breeding is now primarily limited to the Sierra Nevada and Cascade Ranges. This species typically breeds in willow-dominated riparian vegetation along perennial streams in moist meadows or spring-fed or boggy areas	May occur on site as a migrant; however, breeding at site is not likely due to the species' restricted breeding range.
Lanius ludovicianus Loggerhead shrike	FSC	CSC	Inhabits open environments, including grasslands, agricultural lands, open shrublands, and open woodlands	Riparian community along Ellis Creek and isolated trees may provide suitable nesting habitat. Adjacent grasslands provide suitable foraging habitat.

Table 4-8.3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Eremophila alpestris actia California horned lark	--	CSC	Inhabits short-grass prairie, "bald" hills, mountain meadows, open coastal plains, fallow grain fields, and alkali flats of California's coastal regions, chiefly from Sonoma County to San Diego County, and main part of San Joaquin Valley	Grasslands adjacent to the site may provide suitable foraging and nesting habitat.
Geothlypis trichas sinuosa Saltmarsh common yellowthroat	FSC	CSC	Resident of the San Francisco Bay region, inhabiting fresh and salt water marshes. Utilizes tall grasses, tule patches, and willow for nesting	Willows along Ellis Creek, salt marsh, and fresh water marshes may provide suitable breeding and foraging habitat.
Amphispiza belli belli Bell's sage sparrow	FSC	CSC	Inhabits coastal sagebrush, chaparral, and dry foothills	Occurrence on site is not likely; suitable habitat is not present on site.
Melospiza melodia samuelis San Pablo song sparrow	FSC	CSC	A resident of salt marshes along the north side of the San Francisco and San Pablo bays	Salt marsh may provide suitable nesting and foraging habitat.
Agelaius tricolor Tricolored blackbird	FSC	CSC	Inhabits cattail marshes, marshy meadows, and rangeland. A highly colonial species, it is most numerous in the Central Valley and vicinity of California	Foraging habitat is present on site; however, breeding habitat is not present.
Mammals				
Sorex ornatus sinuosus Suisun ornate shrew	FSC	CSC	Inhabits tidal marshes of the northern shores of San Pablo and Suisun bays. Requires dense low-lying cover and driftwood and other litter above the mean high tide line for nesting and foraging	Salt marsh may provide suitable habitat for this species.
Corynorhinus townsendii townsendii Townsend's western big-eared bat	FSC	CSC	Occupies the humid, coastal regions of northern and central California, in a wide variety of habitats. Roosts in caves, buildings, and mine tunnels. This species is highly sensitive to human disturbance at roosting, maternity, and hibernacula sites	Single CNDDB record for the Petaluma River quadrangle. Suitable roost sites are not present on site.

Table 4-8.3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Antrozous pallidus Pallid bat	--	CSC	Roosts in caves, mine tunnels, crevices in rocks, buildings, and trees in a variety of habitats	Large trees in the Ellis Creek riparian forest may provide suitable habitat for this species. Pre-construction surveys are recommended in those sites proposed for bridge construction
Myotis evotis Long-eared myotis bat	FSC	--	May be found in a variety of brush, woodland, and forest communities, from sea level to about 9,000 feet; shows a preference toward coniferous woodlands and forests. Nursery colonies located in buildings, crevices, spaces under bark, snags, night roosting in caves	Large trees in the Ellis Creek riparian forest may provide suitable habitat for this species. Pre-construction surveys are recommended in those sites proposed for bridge construction
Myotis thysanodes Fringed myotis bat	FSC	--	May be found in a variety of environments; valley and foothill hardwood, hardwood-conifer and pinyon-juniper woodland provide optimal habitat. Maternity colonies and roosts located in caves, mines, buildings, and crevices	No suitable habitat on site; no additional surveys required
Myotis volans Long-legged myotis bat	FSC	--	This species is most commonly associated with woodland and forest communities above 4,000 feet. However, may also forage in chaparral, coastal scrub, Great Basin shrub habitats, and in early successional stages of woodlands and forests. Occurrence records ranges from sea level to 11,400 feet. Roosts in rock crevices, buildings, under tree bark, in snags, mines, and caves	Large trees in the Ellis Creek riparian forest may provide suitable habitat for this species. Pre-construction surveys are recommended in those sites proposed for bridge construction
Myotis yumanensis Yuma myotis bat	FSC	--	Optimal environments include open forests and woodlands in proximity to bodies of water used for foraging; maternity colonies in caves, mines, crevices, and buildings	Large trees in the Ellis Creek riparian forest may provide suitable habitat for this species. Pre-construction surveys are recommended in those sites proposed for bridge construction

Table 4-8.3

Special-Status Wildlife Species Potentially Occurring Within the Project Area Vicinity

Species	Status		Habitat Association	Occurrences
	Federal	State		
Eumops perotis californicus Greater western mastiff bat	FSC	CSC	Many open, semi-arid to arid habitats, including coniferous and deciduous woodlands, coastal scrub, grasslands, chaparral; roosts in crevices of cliff faces, in high buildings, and in trees and tunnels	Large trees in the Ellis Creek riparian forest may provide suitable habitat for this species. Pre-construction surveys are recommended in those sites proposed for bridge construction
Aplodontia rufa phaea Point Reyes mountain beaver	FSC	CSC	Coastal area of Point Reyes in areas of springs or seeps. Associated with north facing slopes of hills and gullies in areas with significant vegetative cover	Occurrence on site not likely due to restricted range of this species and lack of suitable habitat on site.
Reithrodontomys raviventris Salt marsh harvest mouse	FE	SE	Only in the saline emergent wetlands of San Francisco Bay and its tributaries. Pickleweed is primary habitat. Requires higher areas in order to escape floods	Salt marsh and associated uplands may provide suitable habitat.
Zapus trinotatus orarius Point Reyes jumping mouse	FSC	CSC	Appears to be restricted to the Point Reyes Peninsula. Associated with bunch grass marshes in upland areas, that are safe from continuous inundation	Occurrence on site not likely due to the restricted range of this species and the lack of suitable habitat on site.

Source: Parsons, 2002

Notes:

Federal status:
- -- = No designation
- FE = Listed as endangered under the Federal Endangered Species Act
- FT = Listed as threatened under the Federal Endangered Species Act
- FC = Candidate species for listing under the Federal Endangered Species Act
- FSC = Species of concern as identified by the U.S. Fish and Wildlife Service
- FD = Species that has been federally delisted

State Status:
- -- = No designation
- SE = Listed as endangered under the California Endangered Species Act
- ST = Listed as threatened under the California Endangered Species Act

SPE =Proposed for listing as endangered under the California Endangered Species Act
CSC = Species of concern as identified by the California Department of Fish and Game
CFP = Listed as fully protected by the California Fish and Game Code
* = Although not formally designated a listed species, the species is monitored as a "special animal" by the CNDDB

Habitat and Potential Occurrence:
California Natural Diversity Data Base (CDFG 2001)
Petaluma Wastewater Facilities Project and Long-range Management Program, Revised Draft EIR (1995)
Petaluma Watershed Enhancement Plan (USDA, SSCRCD 1999)
USFWS Letter (August 10, 2001; information retrieved from USFWS Web Page)

Discussion of Species with Suitable Habitat in the Project Area

Sonoma Alopecurus

Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*), a member of the Poaceae family is known only from Sonoma and Marin counties. The species is a perennial herb, which is found in freshwater marshes, swales, and riparian scrub. Fewer than five native occurrences have been recorded, which need field verification. During previous surveys of Parcels A and B, this plant species was not observed, however, Parcel C may contain suitable habitat.

Point Reyes Bird's Beak

These are salt encrusted, hemiparasitic herbs of coastal salt marshes and their fringing brackish water grasslands and alkali flats. The Point Reyes's bird's beak (*Cordylanthus maritimus* ssp. *palustris*) is rare, being found in coastal and bay area salt marshes of Humboldt, Marin and Sonoma counties. According to the most recent monograph of the group, the ability of the hemiparasitic species like *C. maritimus* permits these plants to flower throughout the dry summer into the fall months. Plants derive much of their water and nutrition from the coexisting plants they parasitize (Chuang and Heckard 1986). The lateness of flowering coupled with their relatively showy, purplish-red bracts and petals, makes surveys for them relatively easy. The April 11, 2001 surveys were too early in the season to detect this species.

Soft Bird's Beak

Soft bird's beak wildflowers are relatives to the Point Reyes bird's beak discussed in a previous paragraph but differ from that species in having fewer male organs (stamens) and a relatively upright growth habitat (Chuang and Heckard 1986). Neither species is very tall, and very often may be hidden among competing species such as saltgrass (*Distichlis spicata)* or rabbitsfoot grass (*Polypogon monspeliensis*). Both species tend to grow in areas prone to periodic inundation by freshwater, not saltwater. Surveys of Parcel B have not revealed this species, however, Parcel C may contain suitable habitat.

California Freshwater Shrimp

The California freshwater shrimp (*Syncaris pacifica*) is listed as federally and state endangered and is the only extant member of the genus *Syncaris*. The shrimp is endemic to Marin, Sonoma, and Napa counties. The shrimp is found in low elevation (less than 115 meters, 380 feet), low gradient (generally less than 1 percent) perennial freshwater streams or intermittent streams with perennial pools where banks are structurally diverse with undercut banks, exposed roots, overhanging woody debris, or overhanging vegetation (USFWS 1998). Existing populations are threatened by introduced fish, deterioration or loss of habitat resulting from water diversion, impoundments, livestock and dairy activities, agricultural activities and developments, flood control activities, gravel mining, timber harvesting, migration barriers, and water pollution (USFWS 1998). Potentially suitable habitat may exist in Ellis Creek below South Ely Road. Suitable

habitat is not present in Ellis Creek near the Higgins Creek confluence. No shrimp were found during surveys conducted in 2000 and 2001.

River Lamprey

The biology of river lamprey (*Lampetra ayresi*) in California has not been studied. Moyle et al (1995) summarize probable life history features, based on studies conducted in British Columbia. River lampreys are anadromous; the adult lives for only one or two years in the ocean, then migrates upstream to spawn. Adults prey on other fishes by rasping at their flesh with their sucker-like oral disc. Spawning requirements are similar to those for salmonids: clean, aerated gravel beds in swiftly moving water. Adults construct nests by removing stones and gravel. After the eggs are laid and fertilized, the spawners loosen the gravel from upstream side of the nest, which washes down and buries the eggs. The adult lamprey dies soon after spawning. After hatching, the lamprey larvae (an eyeless form known as an *ammocete*) move to pool or glide areas containing unconsolidated sediments (gravel, sand, silt, with considerable organic debris), where they burrow into the substrate and spend 3 to 5 years before transforming to the eyed, adult form and migrating to sea.

River lampreys have been reported in the past to spawn in Sonoma Creek (Moyle, et al 1995), but there are no records of occurrence in the Petaluma River watershed. Adults and/or ammocetes have recently been found in Russian River tributaries (Mark West Creek, Green Valley Creek), and in Salmon Creek. River lamprey is a federal and state species of concern.

Delta Smelt

The Delta smelt (*Hypomesus transpacificus*), a member of the Family Osmeridae, is a small, short-lived native fish that is found only in the Bay-Delta Estuary (Goals Project 2000). This species was listed as threatened in 1993 under the Federal Endangered Species Act and as a State ‘threatened’ species by the CDFG. Spawning, which occurs in shallow freshwater (CDFG 1992b, USFWS 1994), has been known to occur at a variety of sites in the Delta, including the lower Sacramento and San Joaquin rivers and Georgiana Slough, and sloughs of the Suisun Marsh (USFWS 1994). Spawning occurs from late December to early July, after which the majority of the adults die. During high delta outflow events, some delta smelt are washed into San Pablo Bay (Moyle et al 1995), so some individuals might wander into the Petaluma River, although none have been reported there.

Although many factors are thought to contribute to the decline of the Delta smelt, the primary factor is attributed to the restricted habitat and increased losses through entrainment by Delta diversions (Goals Project 2000, Herbold et al. 1992, USFWS 1994). Reduced water flow may intensify entrainment at pumping facilities as well as reduce the quantity and quality of nursery habitat. Other factors contributing to the decline of the species include disease, toxic contaminants, drought, and competition with non-native species.

Longfin Smelt

The longfin smelt (*Spirinchus thaleichthys*) is adapted to a wide variety of salinity ranges. Although once petitioned for listing under the Federal Endangered Species Act, the species is considered a species of special concern both by the USFWS and the CDFG. The longfin smelt is a euryhaline (adapted to a wide salinity range) species with a 2-year life cycle. Spawning occurs in fresh water over sandy-gravel substrates, rocks, or aquatic plants (Goals Project 2000; Moyle et al 1995). After hatching, larvae are transported downstream into brackish water nursery areas (Goals Project 2000). During the winter months, yearling and older fish are found throughout San Pablo Bay (Moyle et al. 1995). Maturation begins late in the second summer of life, where the smelt begins migration upstream towards the Delta, eventually spawning in fresh water (Goals Project 2000).

Longfin smelt are widely distributed in estuaries on the Pacific Coast. Spawning adults are found seasonally as far upstream in the Delta as Hood, Medford Island, and the Central Valley Project and State Water Project fish collection facilities in the southern Delta (Goals Project 2000). Longfin smelt abundance has steadily declined since 1982. Factors contributing to the decline in longfin smelt include reduced Delta outflow, entrainment in diversions, introduction of exotic species, loss of habitat, and drought (Goals Project 2000).

Steelhead

Steelhead are anadromous; the adults return to their natal streams to spawn after 1-3 years at sea. Unlike other Pacific salmon, adults do not automatically die after spawning--some (mostly females) survive, return to the ocean, and may spawn again one or two years later. Most steelhead of the Central California Coast ESU begin their spawning runs in the winter months of January through March, but some begin in November or December, and some as late as the end of April (NMFS 1996; MSC 1995; Bill Cox, *pers. comm.*). Juveniles spend from one to three or more years rearing in their natal stream before migrating to sea as smolts. After entering the sea, steelhead grow rapidly to adult size, as do other salmon species.

Successful spawning and juvenile rearing requires certain types of habitat, including coarse, clean, well-oxygenated gravel for spawning and incubation. Excessive accumulations of fine sediment directly affect the viability of eggs, embryos, and juveniles (Reiser and Bjornn 1979; Barnhart 1986). After emerging from the gravel, juveniles require cool, clean water that persists through the dry season, a supply of invertebrate food, and shelter for resting and protection from predators.

Spawning and juvenile rearing usually take place in the upper reaches of smaller tributaries where suitable spawning gravel is present and cooler water persists throughout the summer months. While there is no suitable spawning and juvenile rearing habitat on the project site, any development along the Petaluma River could have effects on steelhead up-migrating to, or out-migrating from, spawning and rearing areas in Adobe Creek, San Antonio Creek, or upper Ellis Creek, or on juveniles rearing in the estuary (personal communication Bill Cox, CDFG, February 2002). Specific concerns raised in

the 1995 Draft EIR include the potential for acute toxicity, sedimentation, and turbidity to Wheat Creek.

The Central California Coast ESU spawns in river basins from the Russian River to Soquel Creek, Santa Cruz County (inclusive) and the drainages of San Francisco and San Pablo Bays; a separate ESU spawns in the Sacramento-San Joaquin River Basin of the Central Valley of California. Steelhead populations within the major streams occupied by this ESU appear to be greatly reduced from historical levels; for example, steelhead abundance in the Russian River has been reduced roughly sevenfold since the mid-1960s, but abundance in smaller streams appears to be stable at low levels. The primary risk factor for this ESU is deteriorated habitat due to excessive sedimentation, dams, diversions, and other problems related to land and water management practices.

Coho Salmon

Spawning and rearing requirements for coho are generally similar to those described above for steelhead. However, all else being equal, juvenile coho tend to have more of a preference for deep, shady pools with lots of woody debris and overhead cover than juvenile steelhead. After emerging from the gravel in the spring or late spring, nearly all juvenile coho in this region (Central California Coast ESU) spend their first summer, fall, and winter in their natal stream, then move to sea as smolts in the spring or late spring. The coho spawning run usually begins earlier (October-December) than that of steelhead (January-March). Coho are far less likely to occur in Ellis Creek, the Petaluma River, or San Pablo Bay than steelhead, as there are currently no known spawning runs to any streams that drain to San Francisco Bay or San Pablo Bay (NMFS 1995: Moyle, et al. 1995).

Chinook Salmon

Spawning and rearing requirements for chinook are generally similar to those described above for steelhead and coho, except that chinook usually require larger particle size in gravel beds used for spawning, and deeper water, as they are bigger fish. Chinook of the Central Valley fall-late fall run ESU sometimes spawn in wetter rainfall years in small streams that drain directly to San Pablo Bay (e.g., Novato Creek in 1994-95). However, there are presently no known runs to the Petaluma River or its tributaries. Adults and juveniles of this ESU, along with those of Central Valley spring-run or winter run, may occasionally wander into the Petaluma River estuary.

Sacramento Splittail

The Sacramento splittail is a member of the minnow family (Cyprinidae) and the only existing member of the genus *Pogonichthys* in California. The term splittail refers to its deeply forked caudal fin, the upper lobe of which is significantly longer than the lower lobe. Splittail are found in slow-moving reaches of larger rivers (including the Petaluma River) that drain into San Pablo Bay, and in low-salinity areas of estuaries, including San Pablo Bay. Splittail may live 5 to 7 years, reaching a length of 14 inches or more (Moyle 1976; Moyle et al. 1994). Spawning occurs in dead-end sloughs and lower reaches of rivers, among submerged macrophytes or flooded streambank vegetation. Foods include

benthic invertebrates, earthworms in flooded areas in spring, and eggs of other fish species.

Splittail representing several different year classes were found in the Petaluma River near downtown Petaluma in July-August, 1999 (Fawcett, *report in prep*.). Any project related impact to the river and its fringing coastal brackish- and salt marsh may affect the species. Specific concerns raised in the 1995 Draft EIR include the potential for acute toxicity, sedimentation, and turbidity to Wheat Creek (Parcel C) and the Petaluma Marsh.

Tidewater goby

The tidewater goby is a small, benthic fish that lives in brackish (usually less than 10 ppt. salinity) lagoons lower stream reaches in California. It is a federal endangered species, although it is currently proposed for de-listing in the northern part of its range, including the Bay Area. It is a state species of special concern. Although there are no records of its occurrence in the Petaluma River or its tributaries, it occurred historically in Novato Creek, Corte Madera Creek, and in Aquatic Park in Berkeley (Leidy 1984). It could occur in the tidally influenced portion of Ellis Creek or in the Petaluma River and Marsh.

California Red-legged Frog

The California red-legged frog (*Rana aurora draytonii*) is a large brown to reddish brown frog that historically occurred in coastal habitats from the vicinity of Point Reyes National Seashore and inland from the vicinity of Redding southward to northwestern Baja California, Mexico (Jennings and Hayes 1994, USFWS 2000a). The species has been extirpated from seventy percent of its historic range (USFWS 2000a). Though still common in the San Francisco Bay area (including Marin County) and along the central coast, the remainder of the California red-legged frog's distribution has been reduced to isolated localities in the Sierra Nevada, northern Coast Range, and northern Transverse Range (USFWS 2000a).

California red-legged frog is listed as Threatened by the USFWS and is designated as a Species of Special Concern by the CDFG. Beginning with commercial hunting for the restaurant industry prior to the turn of the century, this species has been subjected to a variety of pressures that have resulted in its decline and disappearance over the majority of its historic range (Jennings and Hayes 1994). Other factors that have contributed to the decline of California red-legged frog include destruction of riparian habitat due to development, agriculture, or flood control practices, and the introduction of exotic predators such as bullfrogs, crayfish, and a variety of non-native fishes (Jennings and Hayes 1994).

The California red-legged frog inhabits a variety of aquatic, upland, and riparian environments, including ephemeral and permanent ponds, seasonal wetlands, perennial creeks, intermittent streams, manmade aquatic features, riparian corridors, blackberry (*Rubus discolor*) thickets, non-native annual grasslands, and oak savannahs (USFWS 2000b). This species appears to be capable of utilizing almost any aquatic system provided a permanent source of water, ideally lacking non-native predators, is nearby

(Stebbins 1985, Jennings and Hayes 1994, USFWS 2000b). "The importance of riparian vegetation for this species is not well understood" (USFWS 2000b). The ability of this species to disperse relatively great distances (over 2 miles [about 3 kilometers]), serves as an important key to its long-term survival, by enabling it to recolonize areas subjected to localized extinctions and colonize new or previously uncolonized areas (USFWS 2000b).

Breeding occurs during winter and early spring (late November through April). After mating, the female attaches egg masses containing 2,000 to 6,000 eggs to emergent vegetation at or near the water's surface. The embryos hatch within 6 to 14 days after fertilization and the larvae typically complete metamorphosis between July and September, 3.5 to 7 months after the eggs were laid. Sexual maturity is attained in 2 years by males and 3 years by females. Juveniles may be active both diurnally and nocturnally, while adults are highly nocturnal (Jennings and Hayes 1994, USFWS 1997a and 2000a, Storer 1925).

California red-legged frogs have been found in the wooded area of Ellis Creek adjacent to the existing oxidation ponds (Jones & Stokes Associates 1998). Due to the known occurrence of California red-legged frog along portions of Ellis Creek, protocol level surveys in accordance with the U.S. Fish and Wildlife Service *Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (1997), should be conducted prior to any project related activities impacting Ellis Creek. If red-legged frogs are found to occur within the project area, Section 7 consultation with the USFWS will be initiated.

Foothill Yellow-legged Frog

The foothill yellow-legged frog is a medium-sized (2 in. body length) ranid frog found in shallow, rocky or cobbly streams containing riffles and pools, and a partially open riparian canopy (i.e., at least dappled sunlight). This species is more likely to occur in small streams than in large streams or rivers. Eggs are attached in masses to rocks or cobbles in flowing water along the stream edge in spring, after most of the high winter flows are over (Jennings and Hayes 1994). The larvae are nearly black when first hatched, but soon change to cryptic coloration that closely matches the streambed. This species is a federal and state species of concern. Although this species has disappeared from many parts of its former range, particularly in the southern half of the range, it is still common in streams with suitable habitat in Sonoma County. It is currently known to exist in Adobe Creek. Ellis Creek at the project site has no habitat suitable for this species, but suitable habitat does exist further upstream in the vicinity of the confluence with Higgins Creek. Neither Wheat Creek nor the Petaluma River or Marsh near the project site have habitat suitable for this species.

Northwestern Pond Turtle

The western pond turtle is currently divided into two subspecies: the northwestern pond turtle (*Clemmys marmorata marmorata*) and the southwestern pond turtle (*Clemmys marmorata pallida*). Within California, the northwestern subspecies occurs throughout northern California extending northward from the vicinity of the American River, while

the southwestern subspecies occurs in coastal drainages from the vicinity of Monterey County south. Individuals of both subspecies may occupy the zone between these two ranges. The northwestern and southwestern pond turtles are both designated as a federal and State species of special concern. The northwestern subspecies is most likely to be present at the project site. Pond turtles are associated with permanent water or nearly permanent water including ponds, lakes, streams and irrigation ditches or permanent pools along intermittent streams in a variety of environments. Pond turtles are often observed basking on exposed sites, such as logs and mud banks (Stebbins 1985). An omnivorous species, pond turtles feed on a variety of items including aquatic plant material, small insects, aquatic invertebrates, fish, and frogs.

Western pond turtles were observed in Ellis and Higgins creeks as well as the wastewater treatment ponds during focused surveys in 1994 (Brown & Caldwell and Jones & Stokes Associates, Inc. 1995). Due to availability of suitable habitat and documented occurrence within the project vicinity, pre-construction surveys in accordance with CDFG guidance are recommended prior to any project related activities that may impact potentially suitable habitat for this species.

Great Egret

The great egret (*Ardea alba*) although not formally designated a listed species at either the federal or state level, is monitored as a “special animal” by the California Natural Diversity Database (CNDDB).

Great egrets feed in shallow water and along shores of estuaries, lakes, ditches, and slow-moving streams, in salt ponds and mudflats, and in irrigated croplands and pastures. A colonial nesting species, although occasionally nests in isolated pairs, nests are typically located in large trees near water isolated from human activity. Egrets often breed in mixed colonies with a variety of other wading birds, such as great blue herons, and cormorants (Kaufman 1996).

A mixed species rookery, containing this species, great blue heron (*Ardea herodias*), snowy egret (*Egretta thula*), and double-crested cormorants (*Phalacrocorax auritus*) is present in a eucalyptus tree near Pond 8 of the water treatment facility. Riparian woodland along Ellis Creek may also provide suitable nesting habitat. Adjacent agricultural lands, wetlands, and ponds provide suitable foraging habitat.

Great Blue Heron

The great blue heron (*Ardea herodias*) breeds throughout North and Central America, the Caribbean and Greater Antilles, and the Galapagos. Some populations migrate to the S. America during the winter months. The great blue heron is the largest heron in North America at approximately 4 feet in height. The species fishes in both night and day, with most of its activity around dawn and dusk. The heron uses its long legs to wade in shallow water and its sharp spear-like bill to catch its food. The species diet consists of fish, frogs, salamanders, lizards, snakes, shrimps, crabs, crayfish, dragonflies, grasshoppers, and many aquatic insects. The great blue heron's habitats include rivers,

lake edges, marshes, saltwater shores, and swamps. The bird usually nests in trees near water. A rookery containing great blue herons is found adjacent to pond 8 at the Lakeville site.

Although the species is not formally designated as a listed species, it is monitored as a "special animal" by the CNDDB. Possible causes for declining population numbers include habitat destruction or loss, and utility wire fatalities (Hancock 1984).

White-tailed Kite

White-tailed kite (formerly known as black-shouldered kite) (*Elanus leucurus*) is fully protected under the California Fish and Game Code. Take of this species, including removal of an active nest or disturbance that results in abandonment of a nest, is prohibited. The white-tailed kite occurs year-round in coastal and valley lowlands of California (Zeiner et al. 1990a). The species can be found in association with the herbaceous and open stages of a variety of environments, including open grasslands, meadows, emergent wetlands, and farm country (Kaufman 1996, Zeiner et al. 1990a). White-tailed kites feed primarily on small diurnal mammals, such as voles and house mice, with birds, insects, reptiles, and amphibians utilized to a lesser extent (Kaufman 1996, Zeiner et al. 1990a). Nests are constructed near the top of dense oaks, willows, or other tree stands that are located adjacent to foraging areas (Zeiner et al. 1990a). The breeding season extends from February to October, with peak activity occurring from May to August (Zeiner et al. 1990a).

Northern Harrier

The northern harrier occurs as a year-round resident in the San Francisco Bay area. Foraging habitat includes annual grasslands; freshwater, brackish, and salt marshes; and certain row crops such as alfalfa. Tall emergent vegetation around wetland edges typically provides nesting and roosting habitat, although the species may nest in grasslands and grain fields several miles from water (Polite 1982). Breeding occurs between April and September with peak activity in June and July. Only one clutch of 3 to 12 eggs is produced each year. Fledging occurs in about 53 days. The fledged juveniles and breeding pair may roost communally in late autumn and winter.

The California population of northern harriers has declined in recent decades due primarily to habitat loss and fragmentation (Remsen 1978, Zeiner et al. 1990a).

Coopers Hawk

Cooper's hawk (*Accipiter cooperi*) is currently designated as a State species of special concern. The species inhabitsdense stands of live oak, riparian deciduous, or other forested environments near water (Zeiner et al. 1990a). This species is also being increasingly found in urban areas where tall trees exist for nest sites (Kaufman 1996). Cooper's hawks typically forage in broken woodlands and habitat edges, feeding mostly on birds and small mammals (Kaufman 1996, Zeiner et al. 1990a). The breeding season extends from March through August, with peak activity from May through July (Zeiner et al. 1990a).

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*), which is proposed for delisting, was listed as federally threatened on August 11, 1995, and state listed as endangered on June 27, 1971. Breeding habitat generally consists of large remote lakes, reservoirs, and marshes with tall, sturdy trees located within a mile of open water. Winter over-night roosting sites consist of large, tall trees, with open crowns that are sheltered from winds.

Ferruginous Hawk

The USFWS and the CDFG designate the ferruginous hawk (*Buteo regalis*) as a species of special concern. Ferruginous hawks are uncommon to fairly common winter residents of the Modoc Plateau, Central Valley, and Coast Ranges. Ferruginous hawks typically inhabit arid to semi-arid, open terrain, such as valley and foothill grasslands, desert scrub, and sagebrush flats. Ferruginous hawks winter in fair numbers in the Hollister, Santa Ana, and Panoche Valley areas.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrina*) is federally and state listed as endangered. Peregrine falcons traditionally nest on open ledges of vertical cliffs overlooking rivers, lakes, or the ocean where waterfowl, shorebirds, and other bird prey are readily available. City buildings and bridges also provide nesting sites (BioSystems 1994). Inland marshes, riparian corridors, and coastal wetlands are important foraging areas for breeding, migrating, and wintering peregrines (Zeiner et al. 1990a).

Although the peregrine falcon is a recovering nesting species in California (especially along the central coast), the state population increases significantly during September to early May when northern migrants arrive to winter. These latter individuals typically winter in areas containing large numbers of shorebirds or waterfowl (including San Francisco Bay).

The American peregrine falcon was once common throughout most of California. Eggshell thinning associated with high DDT concentrations in prey species led to a drastic decline in population numbers beginning in the 1940's. By the mid 1970's, the California American peregrine population was reduced to approximately 10 breeding pairs (CDFG 1992). Restricted use of contaminant pesticides and active recovery efforts have resulted in the reoccupation of breeding sites in some areas of the state (BioSystems Analysis, Inc. 1994).

California Black Rail

The California black rail (*Laterallus jamaicensis coturniculus*) is a year long resident of saline, brackish, and fresh emergent wetlands in the San Francisco Bay area (Zeiner et al. 1990a). Habitat used by black rail ranges from almost pure pickleweed to sedges, saltgrass, bulrushes and cattails. The species nests in dense vegetation near the upper limits of tidal flooding. The foraging habitat of the species in the San Francisco Bay area consists of tidal emergent wetlands, tidal sloughs, and freshwater supporting bulrush.

During high tides, these areas provide protection from predation. Escape cover is critical to the survival of these birds. Predation by large waders (e.g., egrets and herons) in habitats without sufficient escape cover is particularly high during high seasonal tides (typically during December and January). Black rails are considered non-migratory, although juveniles may disperse long distances (32 km) away from their natal nesting areas (BioSystems Analysis, Inc. 1994).

The California black rail population is currently declining and the species is listed as threatened in the state. It is also a federal species of concern. Threats to black rail populations include habitat loss, predation, habitat contamination and nest disturbance. Nest desertion is common when individuals are disturbed during nesting. Maintenance of existing, occupied habitat is also important since black rail recolonization of restored marshes has not been particularly successful (BioSystems Analysis, Inc. 1994).

Historically, the California black rail is believed to have occurred from Bodega Bay south along the coast to northern Baja California and in inland freshwater marshes of the Sacramento-San Joaquin River Delta, San Bernardino-Riverside area, Salton Sea, and lower Colorado River north of Yuma. Today more than 80 percent of California black rails live in the northern reaches of the San Francisco Bay estuary, where they occur almost exclusively in marshes with unrestricted tidal influence (BioSystems Analysis, Inc. 1994). Within the San Francisco Bay area the subspecies is currently confined to mostly pristine remnants of historical tidal marshlands along the large tributaries and shoreline of northern San Pablo Bay, along the Carquinez Strait, and throughout parts of Suisun Bay (Evens et al. 1991).

California Clapper Rail

The California clapper rail (*Rallus longirostris obsoletus*) is a small, secretive water bird that inhabits the coastal salt and brackish marshes and tidal sloughs of northern California. California clapper rails are year-round residents of the upper to lower zones of coastal salt marshes characterized by dense pickleweed and cordgrass (*Spartina foliosa*). The rails forage in the soft mud exposed at low tide along the tidal sloughs and channels in the salt marsh. Foods consumed by the rails include crabs, mussels, clams, snails, insects, spiders, amphipods, polychaete worms, small rodents, and fish. Nests are constructed with local plant materials near the tidal sloughs under the protective cover of the pickleweed and cordgrass. Five to ten eggs are laid, on average; during the nesting period and incubation duties are shared by both parents. The young hatch in 23 to 29 days (Applegarth 1938, Zucca 1954) and soon leave the nest. Parental care continues until the chicks are approximately eight weeks old (Zembal 1991). Young fledge at ten weeks and are usually displaced from the parental territory shortly thereafter. Juvenile dispersal may occur up to 10 km (6.2 mi) away from the natal area. Clapper rails will readily re-nest if they loose a clutch or brood (Applegarth 1938). Some pairs may successfully nest twice in the same season.

The California clapper rail was listed as endangered by the federal government in 1970 and by the State of California in 1971. This subspecies is in danger of extinction due to significant loss, degradation, and fragmentation of suitable habitat. Tidal wetlands within

the San Francisco Bay area have been reduced 85 to 95 percent since the mid 1800's, from an original estimated 181,000 acres. One decade after federal listing, the population of California clapper rails was estimated at 1,500 birds, 80 percent of which occurred in the South San Francisco Bay area. However, by the mid-1980s the population was declining dramatically. By the winter of 1991-1992, only an estimated 300 birds remained in South San Francisco Bay. Much of the remaining suitable habitat for clapper rails is highly fragmented and degraded. Rail eggs have also been found to contain high levels of mercury and selenium and other contaminants, probably due to the birds' food supply being contaminated by sewage effluent, industrial discharge, and urban runoff. Invasive, non-native predators including red foxes, Norway rats, and feral cats and dogs also prey on clapper rails and their eggs.

The long-term viability and recovery of the California clapper rail depends largely on the preservation and restoration of sufficiently large tracts of suitable salt marsh habitat. The establishment of the San Francisco Bay National Wildlife Refuge in 1972 and its expansion to 43,000 acres in 1988 provided the largest reserve for clapper rail in the San Francisco Bay area. Ongoing cooperative acquisition and restoration programs between the USFWS, CDFG, East Bay Regional Park District, Regional Water Quality Control Board, other state and federal agencies, and numerous conservation organizations continue to provide opportunities to increase the amount of land dedicated to clapper rail conservation. In addition, ongoing predator control programs within the national wildlife refuge have effectively reduced predation pressure on this subspecies. A relatively recent population estimate for the California clapper rail places the population at approximately 1,200 birds, based on 600 clapper rails in south San Francisco Bay (Takekawa 1993) and 617 rails in north San Francisco Bay (Evens and Collins 1992).

Historically, the distribution of California clapper rail extended from Humboldt Bay in Humboldt County south to Morro Bay in San Luis Obispo County. This subspecies is now known to occur only in San Francisco and Suisun Bays, with the largest numbers of California clapper rail occurring in the salt marshes of South San Francisco Bay.

Burrowing Owl

The Western burrowing owl (*Athene cunicularia hypugea*) is designated as a species of special concern by the CDFG, and is also protected under the Migratory Bird Treaty Act. The owl is small in size, with sandy coloring on the head, back, and upper parts of the wings and white-to-cream with barring on the breast and belly. Burrowing owls are found in open, dry grasslands, agricultural and range lands, and desert communities, often in association with burrowing animals. Burrowing owls may also be found at the margins of airports, irrigation ditches, golf courses, and vacant urban lots. Burrowing owls are primarily crepuscular (active at dusk and dawn), but will hunt throughout a 24-hour period. Burrows created by ground squirrel or other small mammal are typically used for shelter and nesting.

Burrowing owl populations have declined throughout California as a result of habitat loss from agricultural conversion and urbanization, and from the secondary effects of ground squirrel poisoning programs.

Willow Flycatcher

Three subspecies of the willow flycatcher are recognized in California. The little willow flycatcher (*Empidonax traillii brewsteri*), which occurs along the west slope of the Sierra Nevada and in northern California; the southwestern willow flycatcher (E. t. extimus), which occurs in southern California, with Kern and Inyo counties currently representing the northern extent of its range; and E. t. adastus, which occurs east of the Sierra/Cascade crest (Craig et al. 1992).

The willow flycatcher (*Empidonax traillii*) was state listed as endangered on January 2, 1991. The state listing includes all subspecies of the willow flycatcher. The southwestern subspecies (*E. t. extimus*) was federally listed as endangered on March 29, 1995. The little willow flycatcher is currently designated as a species of concern by the U.S. Fish and Wildlife Service.

A spring and fall migrant throughout much of the state at lower elevations, occurring primarily in riparian communities with dense willows. Willow flycatchers previously bred throughout much of lowland and montane California. However, the majority of the remaining breeding populations now occur in the Sierra Nevada, Cascades, Klamath/Siskiyou regions, and Warner Mountains, along the Kern River in Kern County, and along the Santa Margarita and San Luis Rey rivers in San Diego County (Craig et al. 1992, Unitt 1987, Finch and Stoleson 2000).

Within the project vicinity, the little willow flycatcher is most likely to occur as a spring and fall migrant. During this time the riparian community along Ellis Creek may provide suitable foraging habitat. The little willow flycatcher's breeding range is now primarily limited to the west slope of the Sierra Nevada and Cascade Ranges. In the Sierra Nevada this subspecies typically breeds in willow-dominated riparian vegetation along perennial streams in moist meadows or spring-fed or boggy areas. Breeding on site is not expected due to the subspecies restricted breeding range.

Loggerhead Shrike

Loggerhead shrike (*Lanius ludovicianus*) is designated as a species of special concern by the CDFG. The loggerhead shrike occurs in lowlands and foothills throughout California. The species inhabits open areas with scattered trees and scrub, and other available hunting perches, such as fences and wires. Open croplands and grasslands serve as important foraging areas. Common prey items include insects, small birds, mammals, amphibians, reptiles, and other invertebrates.

Although the direct cause is not known, population declines have been recently noted for the species. Pesticides and habitat encroachment have been proposed as potential causes of this species decline.

California Horned Lark

The California horned lark (*Eremophila alpestris actia*) is a state species of special concern. This subspecies is distributed along coastal California from Sonoma County

south to San Diego County, and inland throughout the San Joaquin Valley. Horned larks show a preference for low, sparse ground vegetation or open ground. Nests are built on the ground in natural depressions. Annual grasslands and ruderal vegetation communities in the project area can provide suitable nesting and foraging habitat where vegetation cover is low and sparse.

Saltmarsh Common Yellowthroat

The saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*) nests in a variety of habitats ranging from brackish marsh and emergent wetland to riparian woodland. Nests are placed near or on the ground, or may be over water in emergent aquatic vegetation, dense shrubs, or other dense growth (Zeiner et al. 1990a). Common yellowthroat generally have home ranges between 0.3 to 1.4 ha (0.8 to 3.4 ac). Breeding occurs from early April to mid-July with peak activity in May and June. Clutch size ranges between 3 and 6 eggs (average 4). Male common yellowthroat are usually monogamous, but they may also be polygynous, depending on the availability and quality of suitable habitat. The diet of common yellowthroat is almost exclusively insectivorous, but occasionally includes seeds. Predators include snakes, accipiters and small mammals. Yellowthroat nests are also commonly parasitized by brown-headed cowbirds (*Molothrus ater*).

The saltmarsh common yellowthroat is restricted to the marshes and wetland habitats of San Francisco and San Pablo Bays, and along the central coast of California. The historic breeding range of this species extended from Tomales Bay in Marin County south to San Jose and east to the Carquinez Strait (Grinnell and Miller 1944). Surveys have located saltmarsh common yellowthroat in Marin, Sonoma, Napa, Solano, Alameda, San Francisco, San Mateo, and Santa Clara counties (Foster 1977, Hobson et al. 1986).

San Pablo Song Sparrow

As a breeding species, the song sparrow (*Melospiza melodia*) is found across North America from southern Alaska and central and eastern Canada to northern Florida and Mexico (Goals Project 2000). In 1858, the San Pablo Bay song sparrow (*Melospiza melodia samuelis*) was recognized as one of three distinct subspecies inhabiting San Francisco Bay area year-round. Nests of the species are found to an average of 9.5 inches above ground, within four main marsh plant species of *Salicornia, Spartina, Grindelia*, and *Distichlis* (Goal Project 2000).

The San Pablo song sparrow is federal and state species of special concern. Possible factors for the decline of the species include habitat loss, habitat fragmentation, and habitat degradation.

Tri-colored Blackbird

Tri-colored blackbird (*Agelaius tricolor*) occurs in suitable habitat throughout much of the Central Valley and foothills of California, and along the coast from approximately Mendocino County to northern Baja California, Mexico. This colonial species is a year round resident in marshes, wet meadows, rice fields, and rangelands. Tri-colored blackbirds require large tracts of tules, cattails, or blackberries for their nesting colonies.

The tricolored blackbird is designated as a Species of Special Concern by the CDFG and as a Species of Concern by the USFWS. Much of the historic habitat for this species has been diminished due to the conversion of marshes to agriculture and urban development.

Suisun Ornate Shrew

One of nine subspecies of ornate shrew that occur in California, the Suisun ornate shrew (*Sorex ornatus sinuosis*) is an inhabitant of the salt marsh ecosystem of the San Pablo and Suisun Bays. The species typically inhabit saline and brackish tidal marshes characterized by pacific cordgrass, pickleweed, gumplant (*Grindelia humulis*), California bulrush (*Scirpus californicus*), and cattail.

The Suisun ornate shrew is designated as a federal and state species of special concern. Habitat loss and diking have been the primary factors in the decline of the species. Experts have identified the lack of adequate elevational gradient of marsh vegetation and adjacent upland habitats as the principal to the recovery of the species populations in San Pablo and Suisun bays (Goals Project 2000).

Pallid Bat

The pallid bat (*Antrozous pallidus*) is designated as a species of special concern by the CDFG. The pallid bat inhabits a variety of habitats including grasslands, shrublands, woodlands, and forests from sea level up through mixed conifer forests. Pallid bats may make local movements on a seasonal basis; however, they are not considered to be migratory. This species hibernates during the winter months. During the day, pallid bats roost in buildings, rock crevices, caves, mines, and hollow trees. Suburban development of oak woodlands has lead to the decline of this species.

Long-eared Myotis Bat

The relatively long black ears of the long-eared myotis (*Myotis evotis*) are distinctive and dramatic in contrast with its paler body fur. These bats are endemic to the west, ranging from southwestern Canada, south through California into Baja, eastward through northern Arizona and New Mexico and north into the Dakotas. They are found predominantly in coniferous forests, typically only at higher elevations in southern areas (between 7,000 and 8,500 feet), but also occur down to sea level. From British Columbia to northern Arizona, they roost in tree cavities and beneath exfoliating bark in both living trees and dead snags. Pregnant western long-eared myotis often roost at ground level in rock crevices, fallen logs, and even in the crevices of sawed-off stumps, but they cannot rear young in such vulnerable locations. Long-eared myotis capture prey in flight, but also glean stationary insects from foliage or the ground. Their main diet appears to consist of moths, and their relatively quiet echolocation calls are well suited for sneaking up on prey undetected as well as for maneuvering through cluttered habitats.

Long-eared myotis bat has been designated by the USFWS as a species of special concern. Habitat loss is the primary factor in the decline of the historical population.

Long-legged Myotis Bat

The long-legged myotis (*Myotis volans*) is one of western America's most widely distributed bat species. It is found from the Tongass National Forest in Alaska, south, through all of the western U.S. and into the Baja peninsula, and also along the Sierra Madre Occidental in Mexico. Long-legged myotis are especially dependent on wooded habitats from piñon- juniper to coniferous forests, usually at elevations of 4,000 to 9,000 feet, although they may occur down to sea level. Radio-tracking studies have identified maternity roosts beneath bark and in other cavities. Most nursery colonies live in at least 100 year-old trees that provide crevices or exfoliating bark. These typically are located in openings or along forest edges where they receive a large amount of daily sun. Though maternity colonies are most often formed in tree cavities or under loose bark, they also are found in rock crevices, cliffs, and buildings. Long-legged myotis forage over ponds, streams, water tanks, and in forest clearings, often on moths. Few winter records exist in the West.

Long-legged myotis bat has been designated by the USFWS as a species of special concern. Loss of riparian habitats and the decline in permanent water sources in the southwest are the primary contributors to the species decline.

Yuma Myotis Bat

The Yuma myotis (*Myotis yumanensis*) is found throughout western North America, from British Columbia through Washington, Idaho, and western Montana, southern Wyoming, Colorado, New Mexico, West Texas and into Mexico. Occasionally roosting in mines or caves, these bats are most often found in buildings or bridges. Bachelors also sometimes roost in abandoned cliff swallow nests, but tree cavities were probably the original sites for most nursery roosts. These bats typically forage over water in forested areas Although Yuma myotis feed predominantly over water, they eat a variety of insects that includes moths, froghoppers, leafhoppers, June beetles, ground beetles, midges, mosquitoes, muscid flies, caddisflies, and crane flies.

Yuma myotis bat has been designated by the USFWS as a species of special concern. Yuma myotis are threatened by loss of riparian habitats and the decline in permanent water sources in the southwest.

Greater Western Mastiff Bat

The USFWS and the CDFG designate the Greater Western mastiff bat (*Eumops perotis californicus*) as a species of special concern. The distribution of the mastiff bat extends from southern California north to near the Oregon border. Mastiff bats occur in a variety of habitats from desert scrub to montane meadows. The status of the mastiff bat at the project site is uncertain. Structures on the site may provide roost sites for this species.

Salt Marsh Harvest Mouse

Very little is known about the biology of the salt marsh harvest mouse (*Reithrodontomys raviventris*). It lives primarily in pickleweed habitat characteristic of the salt and

brackish marshes bordering the San Francisco Bay. Adjacent uplands with dense vegetation cover provide protection from predation during times when high tides flood the marshes. This species is nocturnal and appears to be solitary outside the breeding season. Reproduction includes only 1 to 2 litters per year, with an average litter size of 3 to 4 young. Foods used by this mouse consist mainly of salt marsh plant stems and leaves, seeds and insects. Like other endemic salt marsh wildlife, salt marsh harvest mouse appears to have a physiological tolerance of high salinity levels in its food and water.

The salt marsh harvest mouse was listed as an endangered species by the federal government in 1970 and by the State of California in 1971. The primary reason for this listing was loss, fragmentation, and degradation of habitat. Development along the shores of San Francisco Bay has eliminated up to 95 percent of existing marsh habitat. Filling of the bay lands, freshwater discharge from sewage treatment plants, and subsidence resulting from excessive draw down of groundwater has made much of the former marsh habitat in San Francisco Bay unsuitable for this species. However, salt marsh harvest mouse habitat is now protected within the San Francisco Bay and San Pablo Bay National Wildlife Refuges, on California wildlife management areas and on an increasing number of tracts of land being acquired by the state, Bay Area cities, and a variety of conservation organizations.

The salt marsh harvest mouse is a small (9-gram) mouse endemic to the salt and brackish water marshes in the San Francisco Bay area (Zeiner et al. 1990b). The principal populations of this species are in the Petaluma and Napa marshes of San Pablo Bay, along the coast of Suisun Bay in Contra Costa County, and in the marshes at the southern end of San Francisco Bay. Scattered populations are located elsewhere around San Pablo and Suisun Bays, but few are found in the central part of San Francisco Bay between Richmond and the San Mateo Bridge. There are two subspecies of salt marsh harvest mouse: *Reithrodontomys raviventris halicoetes*, the northern salt marsh harvest mouse, which occurs in the marshes of the San Pablo and Suisun Bays; and *R. r. raviventris*, the southern salt marsh harvest mouse, which occurs in the marshes of Corte Madera, Richmond, and south San Francisco Bay.

Toxicity and Bioaccumulation

This section describes the potential impacts of toxicity and bioaccumulation of toxic compounds in aquatic life due to the project wastewater discharge to created wetlands. Bioaccumulation impacts due to wastewater discharge to the Petaluma River were discussed in Section 4.5, Surface Water Quality.

Effluent Quality

Wastewater discharged to the created wetlands and to the river will be secondary treated wastewater and will be essentially the same as current effluent quality or better. Table 4.8-4 describes current effluent quality for constituents that may be toxic or bioaccumulate (organic compounds and metals). The effluent concentrations in Table 4.8-4 differ from those in Table 4.5-2 in Section 4.5 because Table 4.8-4 reflects all

discharge data for 1997 through 2001 whereas Table 4.5-2 reflects only October through May concentrations during river discharge.

Table 4.8-4

Existing Effluent Quality[a] (1997-2001)
(all values in µg/L unless noted)

Constituent	Min or Detection Limit	Median	Instantaneous Max
Hardness (mg/L)	154	174	250
Cyanide	<3	3	17
Acute Toxicity - minnow (% survival)	95	100	100
Acute Toxicity - stickleback (% survival)	40	100	100
Chronic Toxicity (100/NOEL)	NA	1	1
Detectable Organic Compounds			
2,3,7,8-TCDD (pg/L)	0.54	<0.77[7]	<2.3
1,2,3,4,6,7,8-HeptaCDD (pg/L)	2.38	2.72	4.6
OctaCDD (pg/L)	6.27	16.9	41
1,2,3,4,7,8-HexaCDF (pg/L)	2.04	ND	0.991
1,2,3,4,6,7,8-HeptaCDF (pg/L)	1.55	1.5	2.1
OctaCDF (pg/L)	3.95	3.77	5
Total Dioxin Compounds (pg/L)	7.8	8.8	9.9
Bis(2-ethylhexyl)phthalate	<5	<5	12
Chloroform	<0.5	2.0	8
Bromodichloromethane	<0.5	<0.5	3.8
Bromomethane	<0.5	<0.5	85
Dibromochloromethane	<0.5	<0.5	2.4
Lindane (gamma-BHC)	<0.01	<0.01	0.01
Beta-BHC	<0.01	<0.01	0.02
2-Chloroethylvinyl ether	<1	<1	6
4-Methylphenol	<2	<2	4.3
Phenol	<5	<5	31
Toluene	<0.5	<0.5	5.1
Metals (Total Recoverable)			
Antimony	<5	<5	<5
Arsenic	<2.0	2.0	9.0
Cadmium	<0.1	<0.20	0.3
Chromium	0.2	1.0	200
Copper	<2.0	4.0	13.0
Lead	0.2	<2.0	3.0
Mercury[b]	0.003	0.006	0.010

Table 4.8-4

Existing Effluent Quality[a] (1997-2001)
(all values in µg/L unless noted)

Constituent	Min or Detection Limit	Median	Instantaneous Max
Nickel	<3.0	5.0	170
Selenium	0.6	<1	1
Silver	<0.1	<0.5	0.8
Thallium	<5	<5	<5
Zinc	10	20	40

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

[a] The data presented in this table is existing effluent and, for purposes of impacts analysis, project effluent quality.
[b] Effluent concentrations of mercury shown are values since the implementation of ultra-clean sampling and analytical techniques in June 1999.

Evaluation Methodology

This section describes the methods used to determine significance of bioaccumulation and toxicity. The evaluation criteria are presented in Table 4.8-5.

Toxicity to wetland organisms was evaluated using the whole effluent toxicity tests conducted by the City on 100 percent wastewater. These tests are specified by the San Francisco Regional Quality Control Board in the City's NPDES permit as an appropriate method to ascertain the presence of toxicity in wastewater.

Bioaccumulation is an accumulation or build up of potentially toxic compounds in organisms. This necessitates repeated exposure to the constituent in question. Constituents with median concentrations that are below detection make evaluation of bioaccumulation risk highly speculative. Therefore wastewater constituents that were usually below detection (median concentration below detection) were eliminated from further evaluation.

Potential bioaccumulation of metals and organic compounds discharge to the created wetlands and Petaluma River was evaluated using California Toxics Rule (CTR) chronic criteria for the protection of aquatic life for metals and pesticides, and bioconcentration factors and log octanol/water partition coefficients (a measure of a compounds tendency to accumulate in animal tissues) for non-pesticide organic priority pollutants.

CTR chronic criteria are developed using toxicity tests and also bioaccumulation information. It was concluded that if the median concentration in effluent does not exceed the CTR chronic criterion, bioaccumulation is unlikely and the impact on bioaccumulation in wetland organisms is less than significant. If the median concentration in effluent exceeds the chronic criterion, bioaccumulation is likely and the impact on bioaccumulation in wetland organisms is significant.

CTR chronic criteria have not been promulgated for some organic compounds. For these constituents, the potential to bioaccumulate was based on the compound's bioconcentration factors and log octanol/water partition coefficients. Bioconcentration factors less than 30 and log octanol/water partition coefficients of less than 3 indicate a low bioaccumulation potential (Franke et al. 1994). For organic compounds in effluent with a detectable median, values greater than these were considered significant. Bioconcentration factors and log octanol/water partition coefficients were obtained from the National Library of Medicine database SRC Chemfate.

Regulatory Framework

Federal Endangered Species Act

The Federal Endangered Species Act of 1973 (Act) recognized that many species of fish, wildlife, and plants are in danger of or threatened with extinction and established a national policy that all federal agencies should work toward conservation of these species. The Secretary of the Interior and the Secretary of Commerce are designated in the Act as responsible for identifying endangered and threatened species and their critical habitats, carrying out programs for the conservation of these species, and rendering opinions regarding the impact of proposed federal actions on endangered species. The Act also outlines what constitutes unlawful taking, importation, sale, and possession of endangered species and specifies civil and criminal penalties for unlawful activities.

Biological assessments are required under Section 7(c) of the Act if listed species or critical habitat may be present in the area affected by any major construction activity conducted by, or subject to issuance of a permit from, a federal agency as defined in Part 404.02. Under Section 7(a)(3) of the Act every federal agency is required to consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service on a proposed action if the agency determines that its proposed action may affect an endangered or threatened species.

Section 9 of the Federal Endangered Species Act prohibits the "take" of any fish or wildlife species listed under the FESA as endangered or threatened. Take, as defined by the FESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such action." However, Section 10 allows for the "incidental take" of endangered and threatened species of wildlife by non-Federal entities. Incidental take is defined by the FESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Section 10(a)(2)(A) requires an applicant for an incidental take permit to submit a "conservation plan" that specifies, among other things, the impacts that are likely to result from the taking and the measures the permit applicant will undertake to minimize and mitigate such impacts. Section 10(a)(2)(B) provides statutory criteria that must be satisfied before an incidental take permit can be issued.

Wetlands and Other Jurisdictional Waters of the U.S.

The CEQA Guidelines (1994) state that effects on the environment that conflict with adopted environmental plans or goals are normally regarded as significant. A "no net loss of wetland acreage or value" policy is established within both the state and federal executive branches (California Wetlands Conservation Policy 1993). Ditching, draining, or other activities which could alter the characteristic physical, chemical, biological or public interest values (as defined by 40 CFR 230 Subparts C-F) associated with wetlands and other waters of the U.S. are considered impacts under ACOE authority. For the purposes of this document, any destruction of wetlands or other waters of the U.S. (either in fill or other disturbance) is considered significant.

Placement of fill material in waters of the U.S. is regulated through Section 404 of the Clean Water Act (CWA), under jurisdiction of the ACOE. Waters defined under Section 404 include, but are not limited to, areas subject to the ebb and flow of the tide, streams, and wetlands (33 CFR §328.23[3]). The extent of the waters in streams is defined by elevations along the stream bank above which water normally does not rise (ordinary high water). Wetlands are defined as areas that are saturated or inundated by surface or ground water for a frequency and duration sufficient to support the prevalence of plants adapted for life in saturated soil conditions (33 CFR §328 [(b)b]).

The goal of the CWA is to maintain, restore, and enhance the physical, chemical, and biological integrity of the Nation's waters. In reviewing proposed projects involving impacts to wetlands, the ACOE requires no net loss of wetland functions and values. Compensatory mitigation for unavoidable impacts to wetlands permitted by the ACOE requires replacement acreage, preferably in-kind and in the same watershed, sufficient to achieve the goal of no net loss. Replacement acreage is determined by the ACOE based on the functions and values of the area being filled, the functions and values of the proposed mitigation site, and the likelihood of success of the proposed mitigation. Wetland mitigation may include restoration, creation, and/or preservation. The mitigation must be based on the functions and values of wetlands that are affected and the local opportunities to utilize these three approaches. Compensation should be completed before or concurrent with the impact, as near to the site of impact as practicable, and the mitigation site must be protected from subsequent loss or degradation.

Since 1984, with the implementation of its settlement agreement final regulations, the ACOE began to regulate the discharge of fill into isolated waters. The 1984 draft regulations also included the now expired Nationwide permit (NWP) 26 for discharges into isolated waters and other waters above the headwaters. NWP 26 has been replaced, in large part, by NWP 39, and other NWP's, effective June 1, 2000. Lacking information about migratory bird use, the ACOE assumed jurisdiction over seasonal wetlands, including seasonal pools and ponds, that are isolated or above the headwaters hinging its regulatory authority on the Migratory Bird Species Act. The ACOE operated under the assumption until the January 2001 United States Supreme Court decision *Solid Waste Agency of Northwestern Cook County versus United States Army Corps of Engineers et al*. commonly known as the SWANCC decision. The Court apparently removed the jurisdictional status of isolated intrastate waters including vernal pools, abandoned,

water-filled quarry pits, some ponds and lakes without outlets, isolated wetlands, seeps and seasonally wet depressions.

Current policy statements issued by ACOE General Counsel assert that, "the Corps' ecological judgment about the relationship between waters and their adjacent wetlands provides an adequate basis for legal judgment that adjacent wetlands may be defined as waters under the Act. In sum, the holding, the facts, and the reasoning of *United States versus Riverside Bayview Homes* continued to provide authority for the USEPA and the Corps to assert CWA jurisdiction over, *inter alia*, all of the traditional navigable waters, all interstate waters, and all tributaries to navigable or interstate waters, upstream to the highest reaches of the tributary systems, and over all wetlands adjacent to any and all of these waters."

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21).

California Environmental Quality Act

CEQA Guidelines - Section 15380

Rare or endangered species are defined in the CEQA Guidelines (Section 15380) as follows:

(a) "Species" as used in this section means a species or subspecies of animal or plant or variety of plant.

(b) A species of animal or plant is:

(1) "Endangered" when its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors; or

(2) "Rare" when either:

(A) Although not presently threatened with extinction, the species is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or

(B) The species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the Federal Endangered Species Act.

(c) A species of animal or plant shall be presumed to be rare or endangered if it is listed in:

(1) Sections 670.2 or 670.5, Title 14, California Administrative Code; or

(2) Title 50, Code of Federal Regulations Sections 17.11 or 17.12 pursuant to the Federal Endangered Species Act as rare, threatened, or endangered.

(d) A species not included in any listing identified in subsection (c) shall nevertheless be considered to be rare or endangered if the species can be shown to meet the criteria in subsection (b).

CDFG 1601 Series Streambed Alteration Agreement

The CDFG also regulates activities that may affect streambeds. Division 2, Chapter 6, Section 1601 of the California Fish and Game Code states that "...general plans sufficient to indicate the nature of a project for construction by, or on the behalf of, any government agency, state or local, and any public utility, of any project which will divert, obstruct or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the Department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit, or will use material from the streambeds designated by the Department, shall be submitted to the Department."

California Endangered Species Act

The California Endangered Species Act (Fish and Game Code Sections 2050-2098) established a State policy to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat. The Fish and Game Commission is charged with establishing a list of endangered and threatened species. State agencies must consult with the Department of Fish and Game to determine if a proposed Project is likely to jeopardize the continued existence of any endangered or threatened species.

Section 2081 of the Fish and Game Code allows the "take" of a species listed as threatened or endangered by the California Endangered Species Act. Take is defined as any act that involves direct mortality or other actions that may result in adverse impacts when attempting to take individuals of a listed species. Under Section 2081, the State Department of Fish and Game may issue a permit to authorize take for scientific, educational or management purposes, or take that is incidental to otherwise lawful activities.

California Fish and Game Code Native Plant Protection Policy

The goals of the California Native Plant Protection Policy are as follows:

> The intent of the Legislature and the purpose of this chapter (Chapter 10) is to preserve, protect, and enhance endangered or rare plants of this state (Section 1900). For purposes of this Chapter, a 'native plant' means a plant that grows in a wild uncultivated state which is normally found native to the plant life of this state (Section 1901).
>
> The commission may adopt regulations governing the taking, possession, propagation, transportation, exportation, importation, or sale of any endangered or rare native plants. Such regulations may include, but shall not

be limited to, requirements for persons who perform any of the foregoing activities to maintain written records and to obtain permits that may be issued by the department (Section 1907).

No person shall import into this state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the commission determines to be an endangered native plant or a rare native plant, except as otherwise provided in this chapter (Section 1908).

All state departments and agencies shall, in consultation with the department, utilize their authority in furtherance of the purposes of this chapter by carrying out programs for the conservation of endangered or rare native plants. Such programs include, but are not limited to, the identification, delineation, and protection of habitat critical to the continued survival of endangered or rare native plants (Section 1911).

Sonoma County General Plan

The goals of the Sonoma County General Plan (Sonoma County 1989) apply to the unincorporated lands at the Lakeville Highway site, specifically Parcels A, B and C. General Plan elements with relevant goals and policies include the Resource Conservation Element (RC) and Open Space Element (OS).

One of the pertinent goals is RC-5 in which two objectives are applicable at the Lakeville Highway site: RC-5.1 and RC-5.3. Objective RC-5.1 is written to, "Promote and maintain the County's diverse plant and animal communities and protect biotic resources from development activities, including areas with important wildlife habitats and woodland resources". Objective RC-5.3 has been drafted to, "Recognize and preserve the Laguna de Santa Rosa and the San Pablo Bay area as biotic resource areas of particular significance to Sonoma County's environment."

Other Resource Conservation Element goals that apply to the project include RC-6 (dealing with Special Status Species), RC-7 (addressing quality of the Petaluma River estuary and other aquatic resources), and RC-8 (fisheries and riparian resources).

In addition, the Open Space (OS) Element, goals 4 and 5 of the General Plan, apply to Lakeville Highway lands. Specific objectives include Objective OS-4.1 and OS-4.2 (critical habitat protection), Policy OS-4e (setbacks from wetlands), Objective OS-5.1 (riparian corridor protection), and Policy OS-5c and 5e (establishment of streamside conservation areas).

City of Petaluma General Plan

The Petaluma General Plan (Petaluma 1987) has several goals and policies applicable to the project, and these are restated in this section from the General Plan (1995).

The River. Goal 2 of this Chapter of the General Plan is to preserve and protect the Petaluma River and streams in their natural state as open spaces, natural resources, and habitats.

Open Space, Conservation, and Energy. Chapter 6 of the General Plan states that, "The City, with the cooperation of the County, can make a significant commitment to the future of the area by actively working to control pollution, prevent erosion, protect watersheds, and reclaim land and water." Goal 5 is to retain waterways and adjacent land in their natural state in the Petaluma Planning Referral Area. Likewise, Goal 6 is to protect and preserve natural resources in the same referral area. Specifically, the following Policies and Programs apply to the project.

> Policy 21: Watershed lands shall be protected, and any development of watershed areas shall retain as much natural vegetation as feasible.
>
> Policy 23: Streams and streamsides shall be used to protect natural open space, recreation, or activity areas for adjacent development.
>
> Policy 24: Development shall be restricted in areas that contain rare or endangered species of plants or animals.
>
> Program 21: Plant native vegetation on each side of all designated waterways consistent with floodway regulations in order to stabilize the banks of the waterways and to serve as a natural filter of sediment to prevent sediment from entering the waterway. Fence vegetation where necessary to insure its survival.
>
> Program 25: Refer all applications for development in Petaluma, where grading is necessary or where the potential for soil erosion exists, to Southern Sonoma County Soil Conservation Service for comment.
>
> Program 26: Where feasible, purchase conservation easements along streams, or require dedication of an easement at the time of development.
>
> Program 31: Seek funding from both the Resource Conservation District and the Agricultural Stabilization and Conservation Service for flood protection, fencing of waterway buffer areas, and watershed management programs.

Petaluma Watershed Enhancement Plan

The Southern Sonoma County Resource Conservation District (USDA, SSCRCD 1999) has a current watershed enhancement plan that includes the Lakeville Highway proposed project site and other areas within the Petaluma River watershed. The Petaluma Watershed Enhancement Plan was developed in 1999 by the USDA, SSCRCD's watershed council and numerous stakeholders in concert with the RWQCB's efforts to improve watershed conditions and water quality. Of the four goals set forth in the plan, Goal D, to conserve and enhance existing wildlife habitat applies to the analysis of impacts to biological resources.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

The preceding sections outline the relationships between CEQA and the federal and State endangered species acts. It is this framework built from federal, State, and local laws that are the basis for determining the points of significance during the evaluation of impacts under CEQA.

Table 4-8.5

Evaluation Criteria with Point of Significance – Biological Resources

Evaluation Criteria	As Measured By	Point of Significance	Justification
1. Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?	a. Number of individuals of a plant or wildlife species that would be lost b. Acres of occupied or designated critical habitat	a. Greater than 0 individuals b. Greater than 0 acres	FESA, CESA (Sections 2062 and 2067), CEQA (Article 5, Section 15065), and California Native Plant Protection Act (CDFG Code Sections 1900-1913); Petaluma General Plan; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
2. Will the project cause loss of active raptor nests, migratory bird nests, or wildlife nursery sites?	Number of active nesting or nursery sites	Greater than 0 active nest sites	CEQA, CDFG Wildlife Habitat Relationships model, Fish and Game Code
3. Will the project cause permanent loss of sensitive wildlife habitat?	Acres of sensitive wildlife habitat	Greater than 10 percent of each habitat type in the project area The 10 percent significance threshold is used here to define a "substantial" impact for species that are not rare, threatened, or endangered, pursuant to CEQA Appendix G, Item IV. (a).	CEQA, CDFG Wildlife Habitat Relationships model; Petaluma General Plan; Sonoma County General Plan OS-4 and RC-5
4. Will the project cause permanent loss of sensitive native plant communities?	Acres of sensitive native plant community (as defined by the California Natural Diversity Data Base) lost	Greater than 0 acres	CEQA, California Native Plant Protection Act, CDFG Interim Wildlife/Hardwood Management Guidelines, CNDDB, Sonoma County General Plan OS-4 and RC-5, Petaluma General Plan; Petaluma Watershed Plan

Table 4-8.5

Evaluation Criteria with Point of Significance – Biological Resources

Evaluation Criteria	As Measured By	Point of Significance	Justification
5. Will the project substantially block or disrupt major fish or wildlife migration or travel corridors[4]?	Number of corridors substantially blocked or disrupted	Greater than 0 corridors	CEQA; Petaluma General Plan Goals 6.3-5, 6.3-6 and Objectives 6.4-n, -o, -r, and -s; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
6. Will the project cause permanent loss of aquatic habitat (i.e., streams)?	Linear feet of stream habitat	Greater than 0 linear feet of stream habitat	CEQA, with concurrence from Bill Cox CDFG fisheries biologist, Region 3 Yountville; Petaluma General Plan Goal 5.1-2; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
7. Will the project destroy wetlands or waters of the U.S.?	Acreage of permanent discharge to or placement of fill in potential jurisdictional wetlands or waters of the U.S.	Greater than 0 acre	Clean Water Act, 40 CFR 230 Section 404(b)(1) Guidelines, Corps, EPA, and State of California no net loss policies; Petaluma General Plan; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
8. Will the project expose organisms to hazardous levels of a) toxic or b) bioaccumulatory substances	a. Chronic and acute effluent toxicity tests b. Concentrations of constituents in secondary treat water	a. 100/NOEL = 1 (chronic) and median percent survival >90% or >70% 10% of the time (acute) b. Exceeds the CTR standard for protection of aquatic life or bioconcentration factor <30 or log octanol/water partition coefficient <3	a. SFRWQCB Basin Plan toxicity objective b. California Toxics Rule (CTR) and Franke et al. (1994)

Source: Parsons, 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: BIO-1: Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?

Analysis: *Water Recycling Facility - Significant*

The Water Recycling Facility could cause the possible loss of individuals of an indeterminate number of rare species of fish, plants and wildlife.

There is potential habitat for several special-status species within Ellis Creek and the Ellis Creek riparian area, which would be affected by construction of a new bridge crossing the creek and placement of pipelines underground beneath Ellis Creek. Salmonid populations have not been identified in Ellis Creek, but do exist in neighboring streams, so there is a potential that the upper reaches of Ellis Creek could become populated with steelhead at some future time and the lower reaches of Ellis Creek within the project are could become a migratory pathway. Other species that could occur in Ellis Creek include California red-legged frog and northwestern pond turtle. Because riparian vegetation shades the stream, removal of vegetation could cause the temperature of the water to increase, thereby affecting the suitability of habitat for temperature-sensitive species, such as steelhead. Project impacts are 0.07 acres of temporary and 0.02 acres of permanent fill in the Ellis Creek streambed and 0.22 acres of temporary and 0.13 acres of permanent disturbance to riparian vegetation.

Tidewater goby and Sacramento splittail may be present in the tidally influenced portion of the creek and in the Petaluma River; impacts to this habitat may occur from underground pipelines across the tidal portion of Ellis Creek and the outfall replacement in the Petaluma River. Project impacts are 0.83 acres of temporary impact to the tidal portions of Ellis Creek or the Petaluma River.

The increased discharge rate from 5.2 to 6.7 average dry weather flow will likely have a net benefit to individuals and habitat of endangered, threatened, or rare fish. Water quality modeling results (Larry Walker Associates 2001) indicate that the increased future rate of discharge will likely cause a reduction of salinity in the Petaluma River of approximately 1 ppt, on average, between the outfall location and 3 km upstream of the outfall location. The increase is also expected to move the 10 ppt salinity boundary about 600 m downstream, on average. These changes would be a net benefit to several of the special-status aquatic species described above including tidewater goby, Delta smelt, Sacramento splittail, California red-legged frog, and western pond turtle, and would probably have no impact on the other special status aquatic species. This is because, first, historically, more brackish or freshwater habitat was available in the Petaluma River system to species that require it than is now available, due to dams, diversions, and loss of floodplain/wetlands to development and flood control (and corresponding increase in "flashiness" of runoff). Second, shifting the salinity distribution or 10 ppt line further downstream would mean that more of the

broader floodplain of the Petaluma Marsh area would become available to species that require low-salinity water. Three of the federally listed fish species described above would have more of their preferred habitat available to them:

- Both Delta smelt and tidewater goby are usually found in salinity less than 10 ppt. (Table 4.8-3, above);
- Sacramento splittail are usually found in waters less than 18 ppt; and
- Splittail and Delta smelt both spawn in fresh water.

California red-legged frogs that occur in Ellis Creek and the Petaluma Marsh also would have some incremental increase in Petaluma River and marsh habitat available to them, as would northwestern pond turtles.

Analyses done in conjunction with the water quality model (Larry Walker Associates 2001) indicate that the storage ponds are isothermal with the Petaluma River. Thus, the increased discharge is not expected to result in temperature changes in the Petaluma River.

Although no rare plants were identified on the property, rigorous surveys were not completed, and the potential exists for the loss of rare plants due to construction.

Analysis: *River Access Improvements – Significant*

The River Access Improvements could cause the possible loss of individuals of an indeterminate number of rare species of fish, plants and wildlife, as described above. There is potential habitat for several special-status species within Ellis Creek and the Ellis Creek riparian area, which would be affected by restoration activities and the dock in Ellis Creek. Project impacts are up to 1.0 acre of temporary and 0.01 acres of permanent fill in Ellis Creek and 0.03 acres of temporary disturbance to riparian vegetation along Ellis Creek.

Regarding potential habitat for the tidewater goby and Sacramento splittail in the tidally influenced portion of the creek or the Petaluma River marsh, impacts may occur from restoration of the lower portion of Ellis Creek, levee stabilization and from the two docks in Ellis Creek and the Petaluma River. Project impacts are up to 1.0 acres of temporary and 0.21 acres of permanent fill in either the tidal portion of Ellis Creek or in the Petaluma River.

Although no rare plants were identified on the property, rigorous surveys were not completed, and the potential exists for the loss of rare plants due to construction.

Mitigation: **BIO-1a. Aquatic Species Protection Program**

The City shall implement an Aquatic Species Protection Plan, as follows:

- A Worker Environmental Awareness Training Program for construction personnel shall be provided.

- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.

- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.

- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.

- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of 2:1 (2 acres of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.

- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. Detailed specifications shall be incorporated onto bid documents and construction drawings.

- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

Mitigation: **BIO-1b. Rare, Threatened and Endangered Plant Protection Program**

A qualified biologist shall be retained to conduct floristically-based surveys for special-status plants in accordance with the CDFG's "Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities" prior to initiation of construction activities. The purpose of these surveys will be to locate and identify any special-status plants that may occur in the proposed construction zone.

If special-status plants are located during the surveys, exclusionary buffer zones (recommend a minimum 30-foot buffer, where feasible) shall be established around each population site. Mesh fencing shall be installed at the boundary of the exclusionary buffer zone prior to initiation of construction activities.

If complete avoidance cannot be achieved, the City shall submit a site-specific mitigation and compensation program for the affected plants in consultation with the CDFG. The mitigation program shall include the results of the surveys, delineation of suitable habitats for restoration or planting of rare species, procedures for obtaining seed before construction, and performance standards for success of the mitigation program. Sufficient areas exist along Ellis Creek and elsewhere on the site to create or restore plant communities if needed.

BIO-1c. Wildlife Protection Program

The City shall implement rules at the public areas on Parcels A and B to require dogs to be leashed at all times. In addition, rules shall be established requiring the public to remain on established trails.

After Mitigation: *Less than Significant*

The measures described above will either avoid impacts to rare and endangered plant and wildlife species or compensate for any impacts by replacing or restoring them in kind and on site. Land is available within the project area for compensatory creation of riparian or wetlands habitats.

IMPACT: BIO-2: Will the project cause a loss of active raptor nests, migratory bird nests, or wildlife nursery sites?

Analysis: *Water Recycling Facility and River Access Improvements - Significant*

A mixed species rookery, containing great egret, great blue heron, snowy egret (*Egretta thula*), and double-crested cormorants (*Phalacrocorax auritus*) is present in a eucalyptus tree near Pond 8 of the water treatment facility. Riparian woodland along Ellis Creek may provide suitable nesting habitat for these species as well as a variety of raptors and migratory birds. Initiation of construction activities during the nesting season could result in the loss of active nests. In addition to direct loss, noise and visual disturbance associated with construction activities occurring during the nesting season can disrupt nesting birds, potentially leading to nest abandonment and nest failure. These impacts are considered potentially significant.

Mitigation: **BIO-2a. Active Raptor and Migratory Bird Nest Protection Program**

A qualified biologist shall conduct pre-construction surveys to determine if any active raptor or migratory bird nests occur within 500 feet of the project area at least two weeks prior to initiation of construction activities.

If active nests are located in the study area, construction exclusion zones shall be established around each active nest. Appropriate construction exclusion zones shall be established through consultation with CDFG. Construction activities shall be prohibited within exclusion zone until the end of the nesting season.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors. The monitor shall also monitor the nest to

determine when the young have fledged and submit weekly reports to the CDFG and the City of Petaluma throughout the nesting season.

BIO-2b. Rookery Protection Program

A construction exclusion zone shall be established around the rookery located near pond 8 of the water treatment facility. Furthermore, a qualified biologist will conduct pre-construction surveys to determine if any other nests occur within 500 feet of the project area. A construction exclusion zone shall be maintained around each rookery between January 15 and June 15 to ensure that no construction activities occur within 500 feet of an active rookery (personal communication, Wilcox 2001).

A qualified biologist shall monitor the rookery to evaluate potential disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the rookery.

After Mitigation: *Less than Significant*

Active raptor and migratory bird nests will be identified during pre-construction surveys, and appropriate construction exclusion zones will be established around active nests to avoid disturbance during the nesting season.

The historic rookery located near Pond 8 of the water treatment facility, and any other rookeries that may exist, will be protected during both the nesting and non-nesting seasons through the use of a construction exclusion zone. These mitigation measures would reduce project related impacts to active raptor and migratory bird nests and rookeries to a less-than-significant level.

IMPACT: BIO-3: Will the project cause permanent loss of sensitive wildlife habitat?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Sensitive wildlife habitats are defined as habitats that provide high suitability for foraging and breeding for state or federal species of special concern and California fully protected species; and important resting; foraging; and breeding habitat for migratory birds and other native wildlife. Sensitive wildlife habitats identified within the proposed project area are valley foothill riparian, saline emergent wetland, Eucalyptus, and cropland. Sensitive wildlife species associated with riparian, wetland, and cropland are identified in Table 4.8-3.

For purposes of the impact analysis, the sensitive wildlife habitats listed above are presented in Table 4.8-6 by their equivalent plant community names from Table 4.8-1. There are no impacts to the Eucalyptus habitat.

Table 4.8-6

Project Impacts to Sensitive Habitats (Acres)

Structure or Activity	Riparian Forest		Marsh and Aquatic (Wetlands and Waters of the U.S.)[1]		Cropland	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Water Recycling Facility						
Ellis Creek Bridge	0.19	0.13	0.03	0.02	0	0
Fill at headworks	0	0	0	0.1	0	0
North road, including culvert	0	0	0.2	0.2	0	0
East road	0	0	0.3	0	0	0
Wastewater pipelines	0.03	0	1.6	0	2	0
Polishing wetlands, access roads and parking lot	0	0	0	0	25	45
Roads and trails to the Petaluma River	0	0	0	0	0	0
Construction staging areas	0	0	0	0	15	0
Outfall	0	0	0.8	0	0	0
Subtotal	0.22	0.13	2.93	0.32	42	45
River Access Improvements						
Restoration of Ellis Creek and creation of habitat	0.03	0	1.0	0	0	1.0
2 docks	0	0	0	<0.01	0	0
Levee stabilization	0	0	0	.15	0	0
Retrofit radar antenna structures	0	0	0	.04	0	0
Boardwalk trail to Ellis Creek	0	0	0	<0.01	0	0
Subtotal	0.03	0	1.00	0.21	0	1.0
Total	**0.25**	**0.13**	**3.93**	**0..53**	**42**	**46**

Source: Parsons 2002

[1] Please note that the Marsh and Aquatic Habitat columns include waters of the U.S. which are not vegetated and in some cases are not included in impact calculations or mitigation requirements.

Permanent loss of wildlife habitat is very small and does not meet the threshold of significance set at 10 percent of the habitat in the region. Therefore, impacts are found to be less than significant. In addition, the wildlife habitat currently provided by agriculture will be replaced with wildlife habitat provided by wetlands. These wetlands will continue to support nesting and foraging activities of wildlife populations.

Mitigation: No mitigation is necessary.

IMPACT: BIO-4: Will the project cause a permanent loss of sensitive native plant communities?

Analysis: *Water Recycling Facility and River Access Improvements - Significant*

Sensitive riparian habitat (including intermittent aquatic habitat) occurs at the site of the proposed Ellis Creek Bridge; project impacts are 0.25 acres of temporary and 0.13 acres of permanent disturbance. The site also includes several different kinds of marsh, wetlands, and aquatic habitats; project impacts are 3.93 acres of temporary and 0.53 acres of permanent fill or disturbance. See Impact BIO-7 for a discussion of wetland impacts.

Mitigation: **BIO-4: Prepare a Riparian Census and Conceptual Riparian Mitigation Plan**

A qualified biologist shall conduct a census of all riparian woody vegetation from the top-of-bank and/or drip-line of the tree or shrub canopy within the project area of the proposed Ellis Creek bridge and approaches. The census will take place within the staked and flagged areas of the site where ground disturbance will take place. The census will include identification of riparian tree and shrub species, counts of stems, and diameter at breast height for those stems greater than 24-inches in diameter within the construction footprint. The City will prepare a Riparian Mitigation and Monitoring Plan to include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. The plan will be written in sufficient detail for a CDFG 1603 Streambed Alteration Agreement. Mitigation will be on site, if possible, at a ratio of 2:1, namely 2 acres of riparian forest for every acre impacted by the construction of the proposed Ellis Creek Bridge. Mitigation sites will be preserved in perpetuity.

After Mitigation: *Less than Significant*

Replacement of lost riparian vegetation on site will reduce the impacts of the project on sensitive riparian wildlife habitat to less than significant. Land is available within the project area for compensatory creation of riparian habitats.

IMPACT: BIO-5: Will the project substantially block or disrupt major fish or wildlife migration or travel corridors?

Analysis: *Water Recycling Facility and River Access Improvements - Significant*

There are no known major terrestrial wildlife migration or travel corridors known on the properties in question.

The Petaluma River is a migration corridor for steelhead going to and from Adobe Creek, San Antonio Creek, and possibly the upper watershed of Ellis Creek. Construction-related activities could cause steelhead, which may use lower Ellis Creek as a migration corridor, to avoid passing through the area on their way to or from spawning and rearing areas higher in the watershed, which would be a significant impact. Increased sediment, turbidity, or accidental discharges of pollutants from construction equipment could also affect steelhead or other special-status fish species moving through the Petaluma River or Marsh downstream from the project site, which would also be a significant impact. An increase in discharge from 5.2 to 6.7 average dry weather flow is not expected to disrupt migration corridors since changes in water quantity and quality are small and the change in salinity will not affect migratory fish accustomed to encountering a wide range of salinities during migration.

Measure PD-8, Construction Erosion and Spill Control Measures, adopted as part of this project, requires the City develop and implement measures designed to prevent significant construction impacts to water quality.

Mitigation: **BIO-1a. Aquatic Species Program.**

BIO-4. Prepare a riparian census and top-of-bank survey and prepare conceptual riparian mitigation and monitoring plan.

After Mitigation: *Less than Significant*

Implementation of mitigation measures BIO-1a and BIO-4 will ensure that steelhead could migrate up Ellis Creek during migration periods without impediment or peril caused by the bridge construction over Ellis Creek, or by the underground installation of the wastewater pipelines.

IMPACT: BIO-6: Will the project cause permanent loss of aquatic habitat (i.e., streams)?

Analysis: *Water Recycling Facility - Significant*

Permanent loss of aquatic habitat will occur from placement of the bridge over Ellis Creek. The piers and abutment for the bridge will impact approximately 50 linear feet of streambed

A net shift in the salinity regime in the Petaluma River (see Impact BIO-1) will effectively mean an increase in low-salinity habitat will become available to special-status species that require such habitat.

Analysis: *River Access Improvements – Significant*

Docks proposed in the Petaluma River and Ellis Creek will permanently effect approximately 75 feet and 10 feet of streambed respectively. A permanent loss of aquatic habitat will occur in the Petaluma River from levee stabilization over approximately 1,300 linear feet.

Mitigation: **BIO-1a**. **Aquatic Species Protection Program**

After Mitigation: *Less than Significant*

Mitigation Measure BIO-1a will require avoidance of impacts to aquatic habitat where feasible, and compensation for any loss if necessary. Compensation will consist of restoration or creation of habitat on site in kind at a ratio of 2:1 or at the ratio prescribed by the Corps of Engineers. This will reduce impacts to aquatic habitats to less than significant. Land is available within the project area or at Shollenberger Park for compensatory creation of riparian, wetlands or river habitats.

IMPACT: BIO-7: Will the Project destroy wetlands or other waters of the U.S.?

Analysis: *Water Recycling Facility - Significant*

The Water Recycling Facility will cause up to 2.93 acres of temporary and 0.32 acres of permanent fill or disturbance to jurisdictional wetlands or waters of the U.S. . Even though the project will create polishing wetlands that will be used as habitat, the wetlands will be managed for wastewater treatment as well as habitat, and therefore will not qualify as mitigation for lost wetlands.

Analysis: *River Access Improvements – Significant*

The River Access Improvements will cause up to 1.0 acre of temporary and 0.21 acres of permanent fill or disturbance to wetlands or waters or the U.S.

Mitigation: **BIO-7. Create or Restore Wetlands and Waters of the U.S.**

The City shall prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. The Plan shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. Mitigation will be on site and in kind, if possible.

Compensatory mitigation for permanent impacts shall be provided at a ratio of 2:1, that is, 2 acres of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers.

After Mitigation: *Less than Significant*

The Conceptual Wetland Mitigation and Monitoring Plan will provide for revegetation of temporary impacts and compensatory mitigation of permanent impacts, thereby reducing impacts to a less-than-significant level. Land is

available within the project area for compensatory creation of riparian or wetlands habitats.

IMPACT: BIO-8: Will the project expose organisms to hazardous levels of toxic or bioaccumulatory substances?

Analysis: *Water Recycling Facility - Significant*

Since 1997, the median acute toxicity in effluent toxicity tests was 100 percent survival for both minnows and sticklebacks. The minimum survival for minnows was 95 percent. The minimum survival for sticklebacks was 40 percent, but that occurred in only one case (8 percent of the time). The next lowest survival for sticklebacks was 80 percent (personal communication, McCord 2002). Therefore greater than 70 percent survival occurred more than 10 percent of the time. Chronic toxicity was conducted four times. In all tests, 100 percent wastewater produced no observed effect for both larval survival and larval growth tests. Therefore, the impact of the project on acute and chronic toxicity in the receiving water is expected to be less than significant.

Table 4.8-7 shows the median concentrations of metals and organic compounds with detectable median concentrations in Petaluma's effluent. Also shown in Table 4.8-7 are the available CTR (California Toxics Rule) chronic criteria applicable to wetlands, which are freshwater. Table 4.8-7 also shows available bioconcentration factors and log octanol/water partition coefficients for organic compounds with detectable medians and without a CTR chronic criterion.

The median concentrations of all metals and cyanide in Petaluma's effluent were lower than the respective freshwater chronic criteria applicable to wetlands discharge. Therefore, the impact of the project on bioaccumulation of metals and cyanide is less than significant.

Chloroform has bioconcentration factors ranging from 3.0 – 8.3 and a log octanol/water partition coefficient of 1.97. Therefore, the potential of chloroform to bioaccumulate is low and the impact of the project on bioaccumulation of chloroform is less than significant.

Dioxins and furans have been measured on three occasions in Petaluma's effluent. On all occasions 2,3,7,8-TCDD was below detection but the medians of several dioxin/furan congeners were detectable and the medians of the TEF-normalized concentration of two congeners, 1,2,3,4,6,7,8-HeptaCDD and 1,2,3,4,6,7,8-HeptaCDF, exceed the evaluation criterion for 2,3,7,8-TCDD . Although 2,3,7,8-TCDD has the potential to bioaccumulate, information on the bioaccumulation potential of the detected congeners, including their bioconcentration factors and log octanol/water partition coefficients, is unavailable. Therefore, the potential for the project to cause bioaccumulation of these constituents is unknown so the impact is considered to be significant.

Table 4.8-7

Effluent Quality, CTR Criteria, Bioconcentration Factors and Log Octanol/Water Partition Coefficients

Constituent	Median Effluent Concentration	CTR Chronic Criterion for Wetlands[a]	Basin Plan Objective	Bioconcentration Factor	Log Octanol/Water Partition Coefficient
Mercury[b]	0.006	0.012[c]			
Arsenic	2.00	150			
Chromium	1.00	11			
Copper	4.00	14.4			
Nickel	5.00	83			
Zinc	20.00	189			
Cyanide	3	5.2			
Chloroform	1.9	NA		3.0 – 8.3	1.97
Dioxins/Furans	Various	NA		NA	NA
Acute Toxicity (% survival)	100	NA	Median >90% or >70% 10% of the time		
Chronic Toxicity (100/NOEL)	1	NA	1		

Source: Larry Walker & Associates, 2001 and Merritt-Smith Consulting, 2002

[a] The CTR is the California Toxics Rule. Freshwater criteria were used since the created wetlands will be non-tidal freshwater). The freshwater criteria for some metals are hardness dependent. The median hardness of Petaluma's effluent is 174 mg/l.
[b] Effluent concentrations of mercury shown values since the implementation of ultra-clean sampling and analytical techniques in June 1999.
[c] No CTR CCC exists. The value shown is the National Toxics Rule CCC (CFR 40.136, July 1, 1999). NTR CCC are derived as described for CTR criteria.

Mitigation: **WQ-1e: Dioxin/Furan Congener Monitoring and Source Reduction Program**

After Mitigation: *Less than Significant*

Source reduction measures for dioxins and furan congeners will serve to reduce bioaccumulatory impacts to less than significant in the wetland in the same manner that source reduction will reduce impacts from discharge.

Analysis: *River Access Improvements – No Impact*

These improvements will not cause bioaccumulatory impacts.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: BIO-C1: Will the project cumulatively impact biological resources?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The impacts of the project on biological resources will be fully mitigated and therefore will not contribute to a trend of resource disturbance or damage that may be occurring due to other projects. In fact, the project likely have a net benefit after mitigation to individuals and habitat of endangered, threatened, or rare fish since the increased future rate of discharge will likely cause a reduction of salinity in the Petaluma River and move the 10 ppt salinity boundary about 600 m downstream, on average. These changes would be a net benefit to several of the special-status aquatic species described above. Mitigation proposed for impacts to riparian habitat will enhance Ellis Creek as a future fishery to complement regional efforts to restore streams entering San Pablo Bay.

Mitigation: No mitigation is necessary.

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4.9 TRANSPORTATION AND CIRCULATION

This section identifies potential project impacts to transportation and circulation during project and cumulative conditions. Analysis includes evaluation of intersections adjacent to the project site and project entrances, safety issues, and potential impacts during construction.

SETTING

The Lakeville site is located on Lakeville Highway, State Route 116, in Petaluma, California. Lakeville Highway is an 11-mile highway connecting State Route 37 to Highway 101 in Sonoma County. Lakeville Highway is a 2-lane highway with a speed limit of 55 mph that widens to a 4-lane highway west of Pine View Way reducing the speed limit to 45 mph. Lakeville Highway is a designated truck route where trucks constitute 8.9% of traffic volumes.

The Lakeville site has two existing entrances along Lakeville Highway, the West Gate and the East Gate as illustrated in Figure 4.9-1. At the West Gate, the entrance is 12 feet wide at the gate and 110 feet wide where the entrance meets Lakeville Highway. The sight distance along Lakeville Highway to the west is 565 feet and to the east is unlimited. The East Gate entrance is 13.5 feet wide at the gate and 80 feet wide where the entrance meets Lakeville Highway.

Along Lakeville Highway, a total of 20 accidents were reported near the project site within a three-year period according to Caltrans' records, as cited in Traffic Master Plan Draft Report for the Water Recycling Facility Project (see Appendix D). Many of these accidents were caused from the drivers' failure to yield at unsignalized intersections.

The three unsignalized study intersections analyzed for this project are as follows:

- Lakeville Highway and McDowell Boulevard
- Lakeville Highway and Pine View Way
- Lakeville Highway and Browns Lane

The level of service for these intersections was analyzed using the Highway Capacity Manual (HCM) 2000 Methodology. Level of service (LOS) is both a quantitative and qualitative description of an intersection's operation, ranging from LOS A, or free-flow conditions, to LOS F, or highly congested conditions. LOS B and C signify stable conditions with acceptable delays. LOS D is typically considered acceptable for peak hour in urban areas. LOS E is approaching capacity. The correlation between average stopped vehicular delay and level of service for signalized and unsignalized intersections are shown in Table 4.9-1. For unsignalized intersections, the HCM methodology rates the level of service on the movement with the highest delay at the intersection. The lane geometry for each of these intersections is on Figure 4.9-2.

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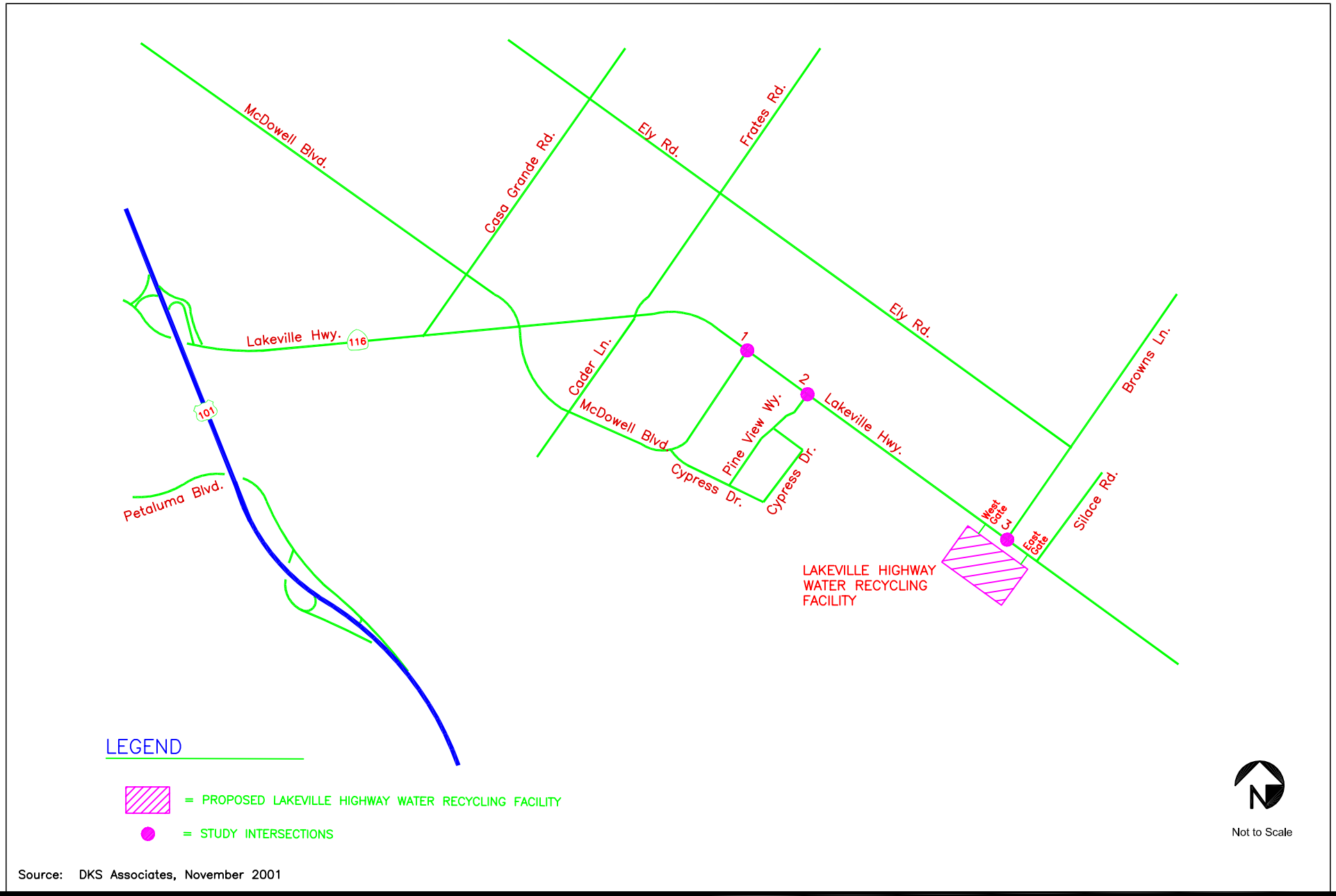

Source: DKS Associates, November 2001

City of Petaluma
Water Recycling Facility EIR

SITE LOCATION

PARSONS

Figure 4.9-1

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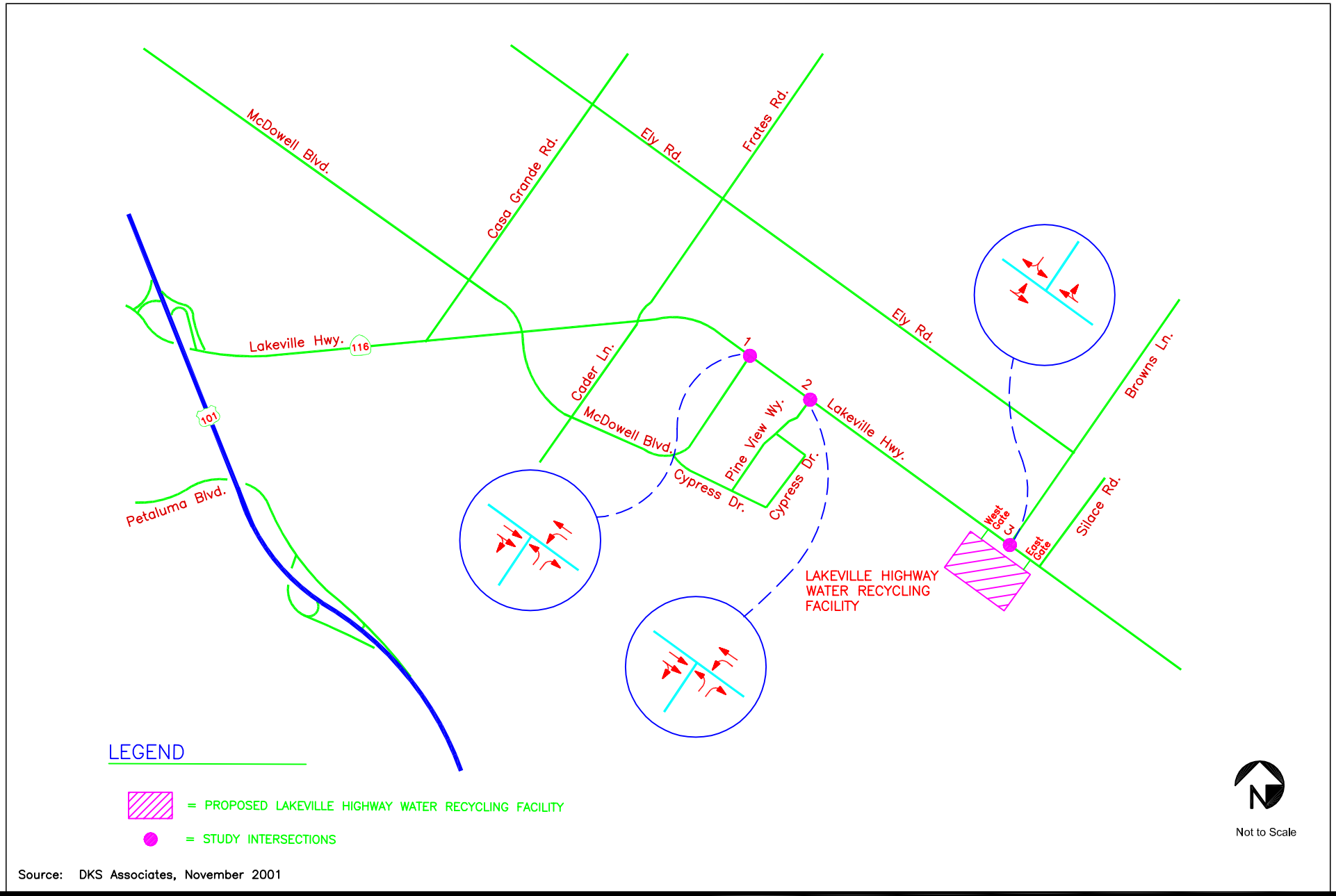

Source: DKS Associates, November 2001

City of Petaluma
Water Recycling Facility EIR

EXISTING LANE GEOMETRY

PARSONS

Figure 4.9-2

Table 4.9-1

Intersection Level of Service Definitions

Level of Service	Description	Average Stopped Delay Per Vehicle (seconds)
A	Free flow; minimal to no delay	≤ 5.0
B	Stable flow, but speeds are beginning to be restricted by traffic condition; slight delays.	$5.0 < \text{delay} \leq 15.0$
C	Stable flow, but most drivers cannot select their own speeds and feel somewhat restricted; acceptable delays.	$15.0 < \text{delay} \leq 25.0$
D	Approaching unstable flow, and drivers have difficulty maneuvering; tolerable delays.	$25.0 < \text{delay} \leq 40.0$
E	Unstable flow with stop and go; delays.	$40.0 < \text{delay} \leq 60.0$
F	Total breakdown; congested conditions with excessive delay.	$\text{delay} > 60.0$

Source: Highway Capacity Manual 2000

Existing Traffic Conditions

Traffic counts were conducted at the three study intersections on September 19, 2001 during the AM and PM peak periods. Operating conditions at the intersections were analyzed for the peak hour which is defined as the one-hour time period between 7:00 and 9:00 AM and the one-hour time period between 4:00 and 6:00 PM during which the highest volumes of traffic are experienced. Figure 4.9-3 shows the existing volumes.

The results of the existing intersection levels of service are presented in Table 4.9-2. The results indicate that under existing conditions, all of the intersections during the AM peak period operate at acceptable levels of service. However, during the PM peak period delays increase at the Lakeville Highway/Pine View Way intersection to an unacceptable level of service F, representative of congested conditions. The intersection at Lakeville Highway/Mc Dowell Boulevard has tolerable delays during the PM peak period.

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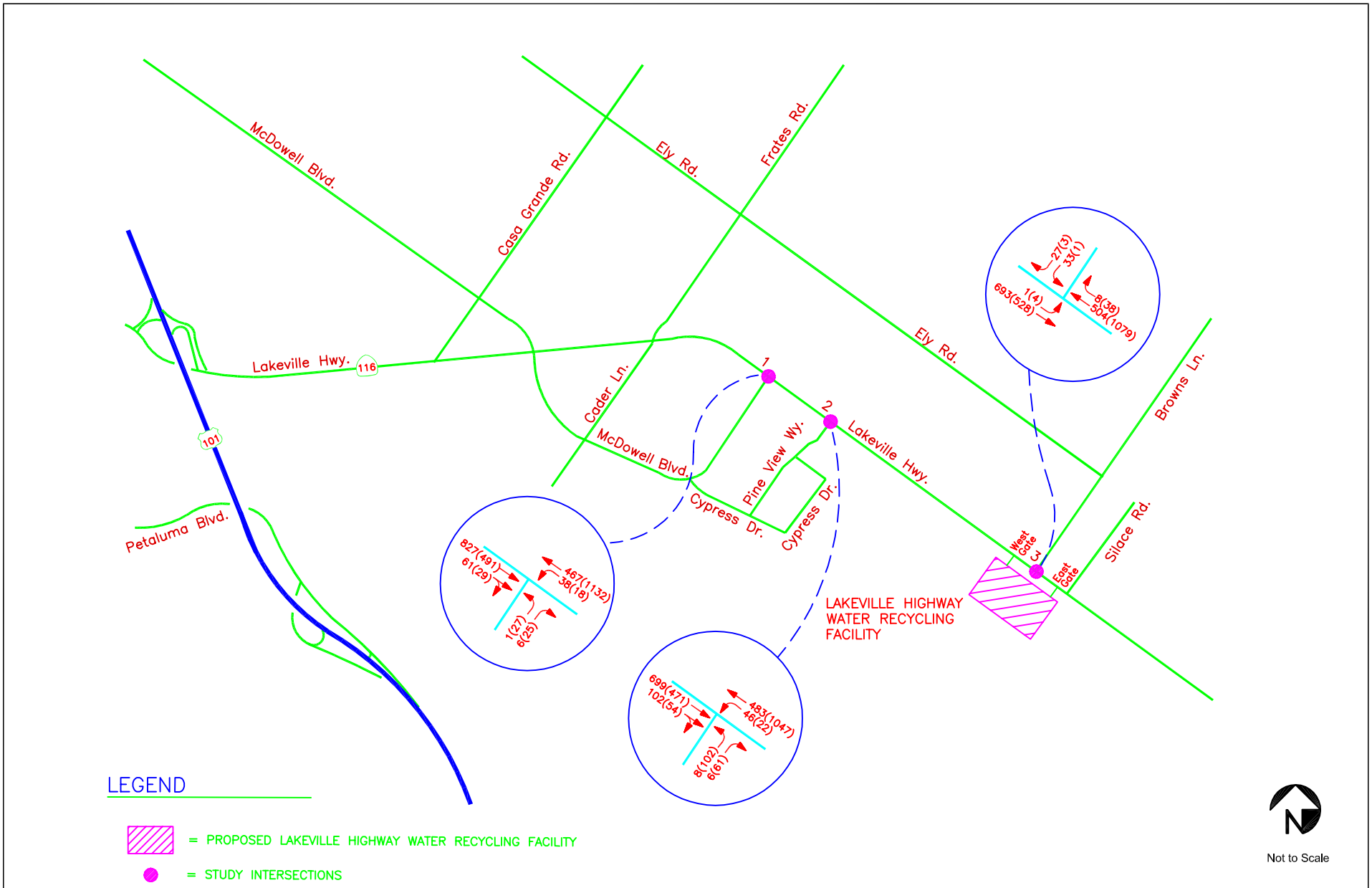

Source: DKS Associates, November 2001

City of Petaluma
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EXISTING CONDITIONS

PARSONS

Figure 4.9-3

Table 4.9-2

Existing Intersection Levels of Service

			Existing Conditions	
	Intersections	**Peak**	**LOS**	**Average Delay (seconds)**
1	Lakeville Highway/Mc Dowell Blvd	AM	B	14.7
		PM	D	30.3
2	Lakeville Highway/Pine View Way	AM	D	27.1
		PM	F	>100
3	Lakeville Highway/Browns Lane	AM	D	34.6
		PM	E	36.5

Source: DKS 2002

Existing Parking Conditions

The existing Lakeville facility has less than five parking spaces on site because most of the administrative staff personnel work at the Hopper Street treatment plant.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.9-3

Evaluation Criteria with Point of Significance – Transportation and Circulation

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will project traffic cause congestion along study area roadways?	Deterioration in intersection level of service along study area roadways.	For city streets where existing LOS is C or better, LOS of D or worse is significant. For city streets where existing LOS is D or E, deterioration to the next lower level is significant.	Petaluma General Plan, Transportation Element, Section 10.3, Policy 1.
2. Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?	a. Miles of lane closures not in compliance with Standard Transportation Procedures.	Greater than 0 miles.	Sonoma County Public Works Department; California Department of Transportation, and Professional Judgment

Table 4.9-3

Evaluation Criteria with Point of Significance – Transportation and Circulation

Evaluation Criteria	As Measured by	Point of Significance	Justification
3. Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Number of locations where there is ingress/egress of construction equipment onto a major roadway not in accordance with regulations[1].	Greater than 0 locations.	Sonoma County Public Works Department; California Department of Transportation
4. Will project construction traffic damage public or private roadbeds?	Number of miles of roadway which project does not restore to existing conditions or better.	Greater than 0 miles.	Sonoma County Public Works Department; California Department of Transportation
5. Will there be inadequate parking for project activities?	Any on-street parking.	Greater than 0 vehicles.	Code requirements for Sonoma County and City of Petaluma
6. Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Number of roadways traveled by project heavy vehicles on non-designated truck routes without a Transportation Permit.	Greater than 0 roadways.	Sonoma County Public Works Department, California Department of Transportation

Source: Parsons 2002

IMPACTS AND MITIGATION MEASURES

Construction Conditions

The main construction for the future expansion of the Lakeville site is estimated to begin in November 2003 and continue through February 2007. The main phase of construction, which requires construction equipment, materials and equipment to be hauled to the site, is scheduled to start in November 2003. Site preparation, including electrical power relocation, flow diversion piping installation and sludge removal, will begin in April 2003. During the 40-month construction period, a variety of construction activities will affect the surrounding roadways.

The number of construction workers varies according to the construction activity and will range from 50 to 150 workers on-site at the same time. The most critical activity that will affect roadway traffic is hauling fill to the site. An estimated maximum 150 trucks per day plus 100 vehicles trips per day for workers for up to 8 months may be required. Two different types of trucks will be used to transport materials and fill. A truck with a trailer attached totaling approximately 60 feet in length will be used to transport fill, and a single unit truck

approximately 30 feet long will be used for various construction activities. The truck with the attached trailer will have a turning radius of approximately 55 feet and the single unit truck will have a turning radius less than 50 feet. No improvements are proposed at the West Gate. However, the existing East Gate entrance into the site will be improved to handle truck access. Trucks traveling inbound to the construction site will travel on US 101 and junction eastbound onto Lakeville Highway and turn right into the East Gate. The hours of construction are anticipated to be from 7 AM to 6 PM with most activities from 8 AM to 5 PM.

A construction staging area is proposed on Parcel A. Typical equipment such as graders, compactors, excavators, cranes, forklifts, trucks, concrete mix trucks, and other specialty vehicles will be stored at the construction staging area or on-site. Parking for construction workers will also be at the staging area or on-site. No parking will be allowed on Lakeville highway.

Project Conditions

Due to the amount of traffic on Lakeville Highway during the commute periods, the expansion of the Lakeville site requires a new site access road from the adjacent Oakmead/Northbay Business Park. The new access road runs across Parcels A and B and will be the primary access for staff and the public. It includes a bridge across Ellis Creek. Chemical deliveries and sludge hauling trucks would continue to enter through the existing East Gate.

In addition, the following improvements are proposed:

- Lakeville Highway will be widened to accommodate a new acceleration and deceleration lane
- The East Gate will allow right and left turn in and out
- The West Gate will allow right turn in and out
- A frontage road inside the facility will connect the two gates

Project traffic volumes are identified in Table 4.9-4. A total of 28 trucks per month from May – October and 35 trucks per month from November – April will be used for the new expansion. Visitor traffic is estimated to be up to 100 vehicles or 200 trips per day.

Table 4.9-4

Project Traffic Volumes

	Process	Media	May-Oct vehicles/month	Nov-Apr vehicles/month
Trucks	Primary (1)	Grit Screening	4	4
	Secondary (2)	Sludge	21	21
	Tertiary (3)	Alum, Polymer, Hypochlorite, Bisulfite	3	10
		Subtotal	**28**	**35**
Cars	Administrative Workers (4)	Passengers	450	450
	Operations Workers(5)	Passengers	300	300
	Visitors(6)	Passengers	3,000	3,000
		Subtotal	**3,750**	**3,750**

Source: DKS 2002

(1) Headworks trucks assume flow of 8 mgd.
(2) Secondary Process assumes full 7-day operation during maximum month.
(3) Hypochlorite/Bisulfite assume 8 mgd while Alum/Polymer assumes 8 mgd after secondary effluent.
(4) Assumes 15 workers (one car each) 20 days per month for a total of 300 trips. In addition 150 misc. trips to/from site.
(5) Assumes 15 workers (one car each) 20 days each month.
(6) Assumes 100 vehicles per day 30 days each month.

IMPACT: TR-1: Will the project traffic cause congestion along study area roadways?

Analysis: *Water Recycling Facility and River Access Improvements – Significant for Construction Conditions*

The construction traffic conditions consist of existing traffic volumes plus construction traffic volumes. The construction traffic has been projected using the construction activity schedule. The number of workers and trucks used for construction will affect the roadway and study intersections during the AM and PM peak periods. The construction traffic conditions were evaluated using the HCM 2000 methodology for existing plus construction traffic volume.

The level of service results for the construction conditions are summarized in Table 4.9-5. The results indicate that under construction traffic conditions, all of the study intersections during the AM peak period operate at acceptable levels of service. However, during the PM peak period Lakeville Highway/Pine View Way operates at an unacceptable level of service F.

Table 4.9-5

Construction Intersection Levels of Service

	Intersections	Peak	Construction Conditions LOS	Construction Conditions Average Delay (seconds)
1	Lakeville Highway/Mc Dowell Blvd	AM	C	15.3
		PM	D	31.9
2	Lakeville Highway/Pine View Way	AM	D	29.6
		PM	F	>100
3	Lakeville Highway/Browns Lane	AM	D	34.6
		PM	E	36.5

Source: Parsons 2002

Mitigation: **TR-1a. Reroute Construction Worker Trips**

Before 9:00 AM and after 4:00 PM, and after the new access road is constructed, construction workers shall be required to enter and exit Lakeville Highway at McDowell Boulevard.

After Mitigation: *Less than Significant*

Rerouting the construction worker trips will improve all the study intersections except Lakeville Highway and McDowell Boulevard. The construction worker trips will exit U.S. 101 to Lakeville Highway (east) and turn right on Lakeville Highway and McDowell Boulevard. This intersection will operate at LOS C during the AM and LOS D during the PM peak period.

Analysis: *Water Recycling Facility and River Access Improvements – Significant for Project Conditions*

The project traffic conditions consist of existing traffic volumes plus project traffic volumes plus visitor traffic volumes. The project traffic conditions were evaluated during the AM and PM peak hours using the Highway Capacity Manual (HCM) 2000 methodology for existing plus project plus visitor traffic volume.

The level of service results for the project conditions are summarized in Table 4.9-6. The results indicate that under the project condition, all of the study intersections during the AM peak period operate at acceptable levels of service. However, during the PM peak period Lakeville Highway/Pine View Way operates at an unacceptable level of service F. The level of service for the East Gate and West Gate is acceptable.

Table 4.9-6

Project Intersection Levels of Service

			Project Conditions	
	Intersections	**Peak**	**LOS**	**Average Delay (seconds)**
1	Lakeville Highway/Mc Dowell Blvd	AM	C	15.1
		PM	D	33.6
2	Lakeville Highway/Pine View Way	AM	D	34.6
		PM	F	>100
3	Lakeville Highway/Browns Lane	AM	D	34.6
		PM	E	36.5
	Lakeville Highway/East Gate	AM	B	12.8
		PM	B	12.8
	Lakeville Highway/West Gate	AM	--	--
		PM	B	12.9

Source: DKS 2002

Mitigation: **TR-1b. Install Signage to Reroute Employee and Visitor Trips**

The City shall install an informational sign on Lakeville Highway just west of the intersection with McDowell Blvd., indicating that the new wetlands park can be accessed by turning right on McDowell Blvd. In addition, the City shall install a sign as visitors leave the wetlands park to prohibit a right turn into Pine View between 4:00 and 6:00 PM on weekdays.

After Mitigation: *Less than Significant*

Signage at Lakeville and McDowell Blvd. will divert some trips from the Lakeville Highway intersections east of McDowell Blvd., thereby improving the operation of each of those intersections. The signage preventing wetlands park traffic from leaving via Pine View during the PM peak period will reduce the project's impact on that intersection to a level below significance, as the left turning movement out of Pine View is the critical movement causing the LOS F during the PM peak period.

IMPACT: TR-2: Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Lane closures will not be necessary for construction. Flagmen or temporary traffic signals will be implemented if necessary to ensure safe working conditions.

Mitigation: No mitigation is necessary.

IMPACT: TR-3: Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

If necessary, flagmen or temporary traffic signals will be implemented for large trucks entering the project site in order to ensure safe roadway conditions for motor vehicles.

Mitigation: No mitigation is necessary.

IMPACT: TR-4: Will project construction traffic damage public or private roadbeds?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

There are no restrictions for truck traffic on U.S. 101 and Lakeville Highway (S.R. 116) since it is a designated truck route. The roadbeds have been designed to handle the heavy loads associated with construction traffic. The existing East Gate entrance into the site will be improved to handle truck access.

Mitigation: No mitigation is necessary.

IMPACT: TR-5: Will there be inadequate parking for project activities?

Analysis: *Water Recycling Facility and River Access Improvements – Less than significant*

During construction, parking will be designated at the staging area on Parcel A and in Ponds No. 1 and 4. No on-street parking along Lakeville Highway is allowed.

During operation, the project will provide parking in Pond 1 for employees and visitors to the facility. A total of 36 parking spaces are provided for employees and 14 parking spaces are provided for visitors. The project will have approximately 30 administrative staff employees per day. In addition, 80 parking spaces will be provided near the polishing wetlands for visitors to the wetlands and trails. Therefore, parking should be adequate for daily operations.

Mitigation: No mitigation is necessary.

IMPACT: TR-6: Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?

Analysis: *Water Recycling Facility and River Access Improvements – Less than significant*

U.S. 101 and Lakeville Highway (S.R. 116) are both designated truck routes suitable for heavy vehicles for construction activities. There are no restrictions for trucks or heavy vehicles on these routes.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: TR-C1: Will there be traffic congestion along study area roadways during the cumulative conditions?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The cumulative condition evaluates projected traffic in 2021 on the same study intersections. The future base traffic volumes were projected based on a 4 percent annual growth rate. The growth rate was determined using Caltrans highway traffic volumes comparing the date of 1992 to 2000.

The cumulative traffic conditions consist of the projected base traffic in 2021 plus project traffic as depicted in Figure 4.9-4. The cumulative traffic conditions were evaluated during the AM and PM peak hours using the HCM 2000 methodology. The level of service results for the future base case are summarized in Table 4.9-7; the future base case plus project conditions are summarized in Table 4.9-8. The results indicate that under cumulative conditions all of the study intersections during the AM and PM peak period operate at LOS F. However, both the East and West Gates operate at acceptable levels of service.

Table 4.9-7

Projected 2021 Future Base Intersection Levels of Service

			2021 Future Base Conditions	
	Intersections	Peak	LOS	Average Delay (seconds)
1	Lakeville Highway/Mc Dowell Blvd	AM	F	98.5
		PM	F	>100
2	Lakeville Highway/Pine View Way	AM	F	>100
		PM	F	>100
3	Lakeville Highway/Browns Lane	AM	F	70.4
		PM	F	>100

Source: DKS 2002

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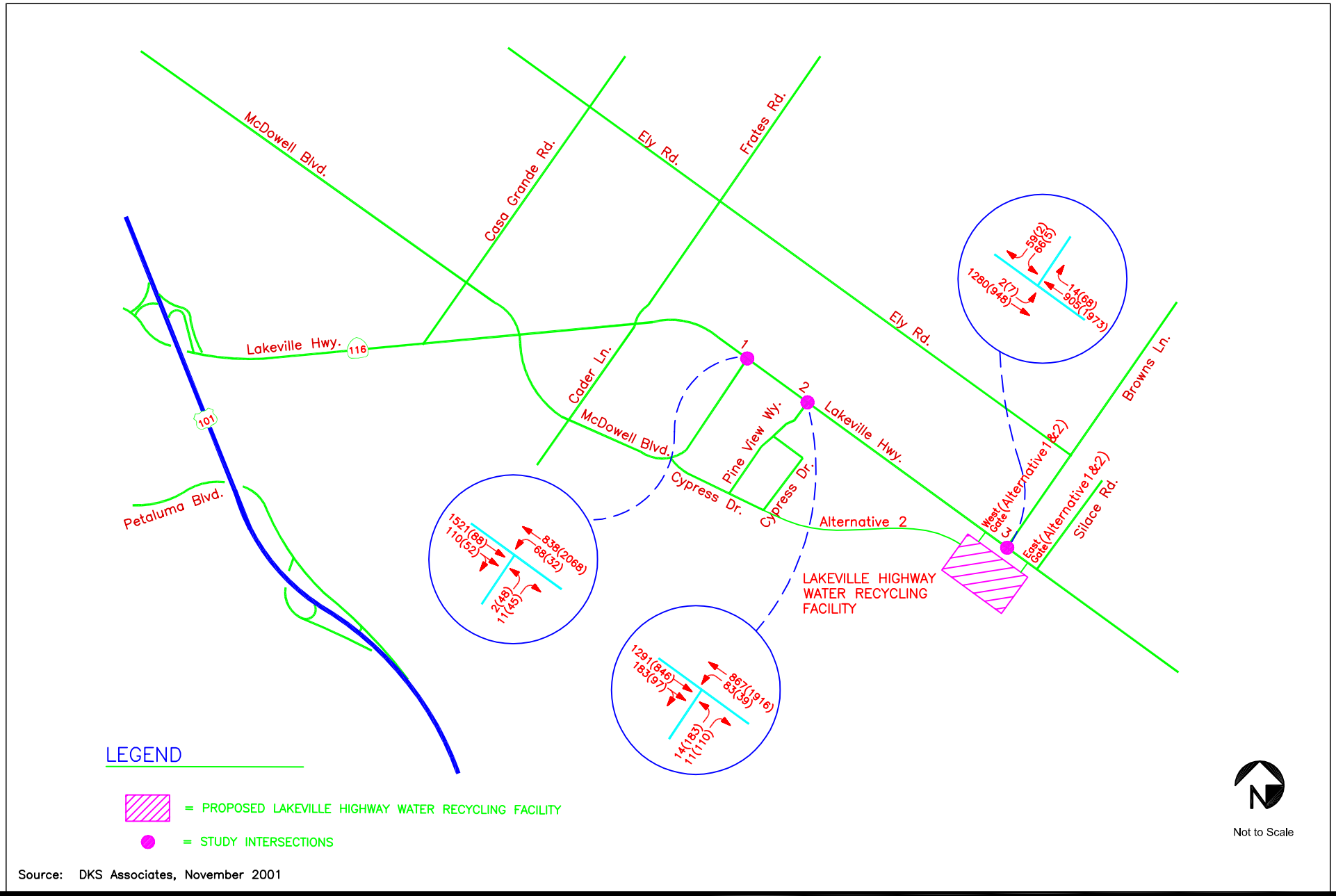

Source: DKS Associates, November 2001

City of Petaluma
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2021 FUTURE CONDITIONS

PARSONS

Figure 4.9-4

Table 4.9-8

Cumulative Intersection Levels of Service

			Cumulative Conditions	
	Intersections	**Peak**	**LOS**	**Average Delay (seconds)**
1	Lakeville Highway/Mc Dowell Blvd	AM	F	>100
		PM	F	>100
2	Lakeville Highway/Pine View Way	AM	F	>100
		PM	F	>100
3	Lakeville Highway/Browns Lane	AM	F	70.4
		PM	F	>100
	Lakeville Highway/East Gate	AM	--	--
		PM	C	21.3
	Lakeville Highway/West Gate	AM	--	--
		PM	C	21.4

Source: DKS 2002

During the cumulative conditions, all of the study intersections will operate at unacceptable levels of service according to the evaluation criteria for intersection analysis. However, the delay at all intersections does not increase since there are so few project trips added to the through movement.

Cumulative projects do not have a nexus with construction-related impacts such as lane closure, construction parking, or damage to roadbeds since project impacts are fully mitigated. Cumulative traffic impacts regarding hazards and parking are less than significant because project design and mitigation reduce impacts to minimal levels or no impact.

Mitigation: No mitigation required is necessary.

REFERENCES

DKS Associates, 2002. Traffic Master Plan, City of Petaluma, California, Lakeville Highway Water Recycling Facility Project. Prepared for Carollo Engineers. February.

Highway Capacity Manual, 2000.

4.10 AIR QUALITY

This section describes air quality impacts from construction and operation of the project.

SETTING

Climate Factors

Petaluma is located in the climatological subregion referred to as the Petaluma Valley. The Petaluma Valley is bordered by coastal mountains to the southwest, Sonoma Mountain to the east and a series of low hills to the west called the Estero Lowlands, which open to the Pacific Ocean. The region from the Estero Lowlands to the San Pablo Bay is known as the Petaluma Gap. This low-terrain area, including the Petaluma Valley, allows marine air to flow into the Bay Area. The project site is located near the Petaluma River and topography in the area is flat.

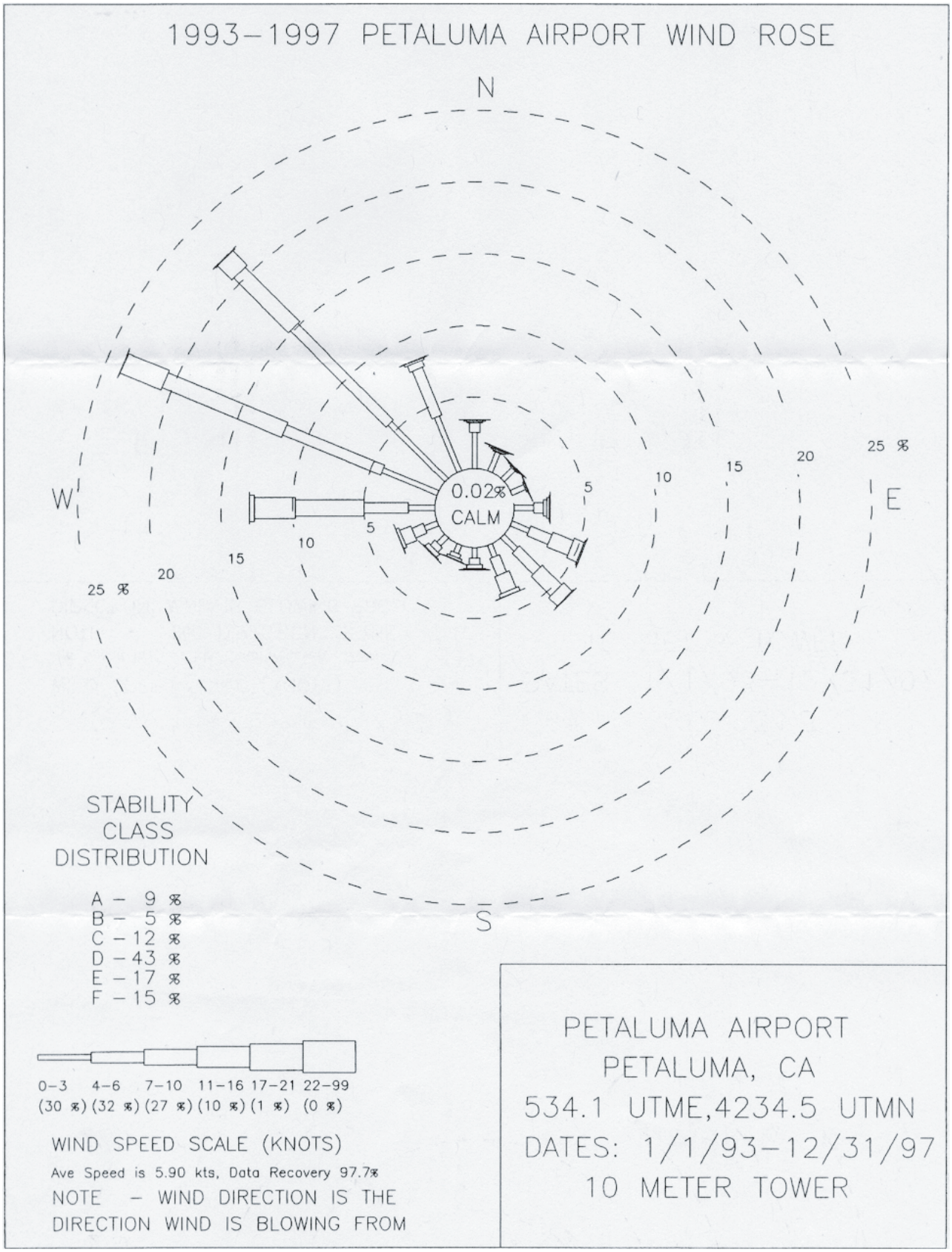
Temperatures in Petaluma are moderated by the influence of marine air. Summer maximum temperatures are typically in the upper 70's to low 80's, while maximum winter temperatures are in the 50's. Summer minimum temperatures are in the low to mid 50's, while winter minimum temperatures are in the 30's with frost not uncommon.

Clear calm nights during late fall through early spring, result in the formation of surface-based inversions. An inversion is a layer of warmer air over a layer of cooler air. Surface-based inversions limit the vertical mixing of air, trapping localized pollutant emissions near the surface. Another type of inversion, an elevated inversion, caused by subsiding air from a high pressure zone over cooler marine air, results in a buildup of regional air pollutants.

Wind patterns are strongly influenced by the Petaluma Gap, which is generally oriented from northwest to southeast. As a result, marine air penetrating into the region blows strongly from the northwest. A wind rose developed from five years of continuous collection of wind data at Petaluma Airport (from 1993-97) is presented in Figure 4.10-1. This wind rose indicates that the average wind speed was about 7 miles per hour (mph) or 6 knots. About 70% of the time, winds were 5 mph or higher. About 75% of the time, winds blew from the northwest and about 15% of the time winds blew from the southeast. Rarely does the wind blow from the southwest or northeast directions. Calm conditions occurred less than 1% of the time.

Regulatory Setting

Clean air goals have been set through the establishment of ambient air quality standards. Individuals vary as to their sensitivity to air pollutants, so standards have been set at levels that protect individuals that are more sensitive (e.g., asthmatics). National ambient air quality standards (NAAQS) were established by the federal Clean Air Act of 1970 (amended in 1977 and 1990) for six criteria pollutants. These criteria pollutants include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb) and particulate matter. Standards for particulate matter were recently divided into two standards: PM_{10} and $PM_{2.5}$, which measure the amount of inhalable particulate matter in one cubic meter of air. PM_{10} includes



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1993-1997 PETALUMA AIRPORT WIND ROSE

PARSONS

Figure 4.10-1

particulates less than 10 micrometers in diameter, while $PM_{2.5}$ includes those less than 2.5 micrometers. These criteria pollutants are considered the most prevalent air pollutants that are known to be hazardous to human health.

California established ambient air quality standards as early as 1969 through the Mulford-Carrol Act. The California Clean Air Act of 1988 (amended in 1992) requires attainment of the California ambient air quality standards (CAAQS). In many cases, the State standards are more stringent than the national ambient air quality standards.

Federal and state air quality standards are summarized in Table 4.10-1. A brief description of the six criteria air pollutants is as follows:

- Ozone. Ground-level ozone is the principal component of smog. It is not directly emitted into the atmosphere, but is formed by the photochemical reaction of reactive organic gases and nitrogen oxides (known as ozone precursors) in the presence of sunlight. Ozone levels are highest during late spring through early summer when precursor emissions are high and meteorological conditions are favorable for the complex photochemical reactions to occur. Approximately half of the reactive organic gas and nitrogen oxide emissions in the Bay Area are from motor vehicles. Adverse health effects of ground-level ozone include respiratory impairment and eye irritation. High ozone concentrations are also a potential problem to sensitive crops such as wine grapes.

- Carbon Monoxide. Carbon monoxide is a non-reactive pollutant that is highly toxic, invisible, and odorless. It is formed by the incomplete combustion of fuels. The largest source of carbon monoxide emissions is motor vehicles. Wood stoves and fireplaces also contribute to high levels of carbon monoxide. Unlike ozone, carbon monoxide is directly emitted to the atmosphere. The highest carbon monoxide concentrations occur during the nighttime and early mornings in late fall and winter. Carbon monoxide levels are strongly influenced by meteorological factors such as wind speed and atmospheric stability. Adverse health effects of carbon monoxide include the impairment of oxygen transport in the bloodstream, increase of carboxyhemoglobin, aggravation of cardiovascular disease, impairment of central nervous system function, and fatigue, headache, confusion, and dizziness.

- Nitrogen Dioxide. Nitrogen dioxide is a reddish-brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the primary sources of nitrogen dioxides. Nitrogen dioxide contributes to ozone formation. Adverse health effects associated with exposure to high levels of nitrogen dioxide include the risk of acute and chronic respiratory illness.

Table 4.10-1

Relevant California and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards	
			Primary	Secondary
Ozone	8-hour	—	0.08 ppm (176µg/m^3)	--
	1-hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as primary
	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	--
Carbon monoxide	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
	Annual	—	0.053 ppm (100 µg/m^3)	Same as primary
Nitrogen dioxide	1-hour	0.25 ppm (470 µg/m^3)	—	—
	Annual	—	0.03 ppm (80 µg/m^3)	—
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	—
Sulfur dioxide	3-hour	—	—	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	—	—
	Annual	30 µg/m^3 (geometric mean)		
PM_{10}			50 µg/m^3 (arithmetic mean)	Same as primary
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
	Annual	—	15 µg/m^3	
$PM_{2.5}$	24-hour	—	65 µg/m^3	
	Calendar quarter	—	1.5 µg/m^3	Same as primary
Lead				
	30-day average	1.5 µg/m^3	—	—

Source: Illingworth & Rodkin 2002

Notes: (a) Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
(b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
(c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that states implementation plan is approved by the EPA. to protect the public welfare from any known or anticipated adverse effects of a pollutant.
(d) Secondary Standards: The levels of air quality necessary

- Sulfur Dioxide. Sulfur dioxide is a colorless gas with a strong odor and potential to damage materials. It is produced by the combustion of sulfur containing fuels such as oil and coal. Refineries and chemical plants are the primary sources of sulfur dioxide emissions in the Bay Area. Adverse health effects associated with exposure to high levels of sulfur dioxide include aggravation of chronic obstruction lung disease and increased risk of acute and chronic respiratory illness.

- Inhalable Particulates. Inhalable particulate or PM_{10} and $PM_{2.5}$ refers to a wide variety of solid or liquid particles in the atmosphere. These include smoke, dust, aerosols, and metallic oxides. Some of these particulates are considered toxic. Although particulates are found naturally in the air, most particulate matter found in the Bay Area is emitted either directly or indirectly by motor vehicles, industry, construction, agricultural activities, and wind erosion of disturbed areas. Most $PM_{2.5}$ is comprised of combustion products (i.e., soot). Small particulate matter may be inhaled, and possibly lodge in and/or irritate the lungs. Exposure to small particulate matter can also increase the risk of chronic respiratory illness with long-term exposure and altered lung function in children.

- Toxic Air Contaminants. Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Toxic Air Contaminants. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods of time. They are regulated at the local, state, and federal level.

Air Pollution Sources

For the most part, air quality is very good in Petaluma. Ground-level ozone is the primary air pollutant of concern in Petaluma. Transport of ozone, or ozone precursor pollutants, from the urban areas located to the south combined with emissions of ozone precursors from automobiles in the area is the major cause of the elevated ozone levels. Automobile uses are the primary source of air pollutant emissions in Petaluma. Wood burning and other outdoor burning are sources of air pollutants (primarily particulates and carbon monoxide) during late fall and winter.

Existing Air Quality Conditions

Air quality in the region is controlled by the rate of pollutant emissions and meteorological conditions. Meteorological conditions such as wind speed, atmospheric stability, and mixing height all effect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while frequent, short-term variations result from changes in atmospheric conditions. The San Francisco Bay Area is considered one of the cleanest major metropolitan areas in the country with respect to air quality.

There are no air pollutant monitoring stations in Petaluma. Air pollutant concentrations measured at the BAAQMD monitoring station closest to Petaluma (Santa Rosa) are shown in Table 4.10-2. Concentrations measured at San Rafael are also shown in Table 4.10-2. The pollutants of most concern to the Petaluma area are ozone and PM_{10}. Ozone levels measured at both the Santa Rosa or San Rafael stations have exceeded the state ozone standard at least once

annually in all years except 1997. The federal ambient air quality standards have not been exceeded at any of those stations. Between 1995 and 1999, the occurrences of air pollutant concentrations exceeding ambient air quality standards in Santa Rosa (closest to Petaluma) were:

- Ozone, California 1-hour standard: one day in 1995 and one day in 1999.
- Small Particulate Matter (PM_{10}), California 24-hour standard: an estimated 12 days in 1997 and 6 days in both 1998 and 1999.

There were no other recorded exceedances of air quality standards in Santa Rosa.

Air Quality Attainment Status

The federal Clean Air Act required states exceeding the national ambient air quality standards, such as California, to prepare air quality plans showing how the standards were to be met by the end of 1987. The Act was amended in 1977, and again in 1990, to extend the deadline for compliance and requires that revised State Implementation Plans be prepared. The 1990 amendments established categories of severity, from marginal to extreme, for nonattainment areas (areas not meeting the federal ambient air quality standards). The Bay Area was classified as moderate nonattainment for carbon monoxide, moderate nonattainment for ozone, unclassified for inhalable particulate matter (i.e., PM_{10}), and attainment for all other pollutants. In 1995, the Bay Area was upgraded to a maintenance area for ozone, since federal standards had been attained for five consecutive years. Later, in 1995 and 1996, violations of the federal ozone standard occurred. As a result, the U.S. Environmental Protection Agency (EPA) redesignated the region as an unclassified non-attainment area. Violations of the federal ozone standard have continued to occur during the summer of 1990 and 2000.

In 1998, the Bay Area was designated as a carbon monoxide maintenance area from a "moderate" nonattainment area. The region has not reported any exceedances of the federal standards for carbon monoxide since 1991. Since 1986, the violations of the federal standards for carbon monoxide have been confined to downtown San Jose and Vallejo.

The Bay Area is not in compliance with the California ambient air quality standards for ozone and inhalable particulate matter (PM_{10}). At the state level, the Bay Area is classified as a serious nonattainment area for ozone, since attainment of the California ambient air quality standards could not be achieved. The state standards for inhalable particulate matter are exceeded throughout the Bay Area, and the area is therefore classified as nonattainment. The San Jose urban area, which was not previously in compliance for carbon monoxide, was reclassified as attainment in 1994. The remainder of the Bay Area is in attainment for the California carbon monoxide standards and standards for other pollutants.

Table 4.10-2

Measured Air Pollutant Concentrations Near Petaluma

Pollutant	Average Time	Measured Air Pollutant Levels (in ppm)				
		1995	1996	1997	1998	1999
Santa Rosa						
Ozone (O_3)	1-Hour	0.10	0.08	0.09	0.07	0.10
	8-Hour	0.08	0.06	0.08	0.05	0.08
Carbon Monoxide (CO)	8-Hour	2.8	3.0	3.3	3.2	3.4
Nitrogen Dioxide (NO_2)	1-Hour	0.07	0.06	0.06	0.06	0.07
	Annual	0.015	0.014	0.013	0.015	0.014
Fine Particulate Matter ($PM_{2.5}$)	1-Hour	NA	NA	NA	NA	NA
	Annual	NA	NA	NA	NA	NA
Respirable Particulate Matter (PM_{10})	24-Hour	46 ug/m^3	38 ug/m^3	85 ug/m^3	53 ug/m^3	54 ug/m^3
	Annual	21 ug/m^3	21 ug/m^3	24 ug/m^3	25 ug/m^3	25 ug/m^3
San Rafael						
Ozone (O_3)	1-Hour	0.09	0.11	0.11	0.07	0.10
	8-Hour	0.07	0.08	0.07	0.6	0.08
Carbon Monoxide (CO)	8-Hour	3.2	4.0	2.8	3.3	5.6
Nitrogen Dioxide (NO_2)	1-Hour	0.06	0.07	0.06	0.06	0.09
	Annual	0.018	0.018	0.016	0.017	0.018
Fine Particulate Matter ($PM_{2.5}$)	1-Hour	NA	NA	NA	NA	NA
	Annual	NA	NA	NA	NA	NA
Respirable Particulate Matter (PM_{10})	24-Hour	74 ug/m^3	50 ug/m^3	72 ug/m^3	52 ug/m^3	76 ug/m^3
	Annual	19 ug/m^3	20 ug/m^3	20 ug/m^3	19 ug/m^3	20 ug/m^3

Source: Illingworth & Rodkin 2002

Notes: ppm = parts per million
Values reported in bold exceed ambient air quality standard
NA = data not available

In 1997, the EPA established $PM_{2.5}$, a new ambient air quality standards for ozone and particulate matter smaller than 2.5 micrometers (2.5 μm) in diameter. The new ozone standard is 0.08 ppm for an 8-hour average period, compared to 0.12 ppm for a 1-hour averaging period. The new $PM_{2.5}$ standard is 65 $\mu g/m^3$ for a 24-hour averaging period and 15 $\mu g/m^3$ for an annual averaging period. These standards would take effect over the next several years. Although these criteria are stricter than existing national standards, the current California ambient air quality standards are even stricter[1]. Currently, sufficient data to classify the attainment status for these standards are not available.

Air Quality Planning

Air quality planning in the region is governed at the federal, State, regional and local level.

Federal

At the federal level, the Environmental Protection Agency (EPA) issues regulations through the authority granted by the Clean Air Act. The EPA's regulations and programs are designed to require states to attain and maintain compliance with federal standards. The EPA also has programs that identify and regulate toxic air pollutants.

The EPA requires states not in compliance with the federal standards to prepare and submit air quality plans (state implementation plans or SIP) showing how the standards would be met. If they cannot show how the standards would be met, then the states must show progress toward meeting the standards. The ozone attainment plan submitted to the EPA in 1999 was rejected due to continuing violations of the standard. The Bay Area has prepared a revised plan, which is currently under review. The current EPA approved air quality plan was submitted in 1994.

Under section 176(c) of the 1990 Clean Air Act Amendments, “conformity” provisions for federal projects are outlined. Federal actions are required to conform to the requirements of a state implementation plan and must not jeopardize efforts for a region to achieve the national ambient air quality standards. Primary oversight responsibility for conformity assurance is assigned to the federal agency undertaking the project, not the EPA, state, or local agency. This project is subject to conformity requirements because the City may apply for a State Revolving Fund loan, which is partially funded by the EPA. Under the conformity requirements, federally supported or funded activities must not (1) cause or contribute to any new air quality standard violation, (2) increase the frequency or severity of any existing standard violation, or (3) delay the timely attainment of any standard, interim emission reduction, or other SIP milestone aimed at bringing the region into attainment. There are two types of conformity requirements: (1) Transportation Conformity (applies to U.S. Department of Transportation projects) and (2) General Conformity (applies to all non-transportation projects with federal involvement). The General Conformity regulations apply to a wide range of federal actions or approvals that would cause emissions of criteria air pollutants above specified

[1] The California ambient air quality standard for PM_{10} is 50 μg/m3, which includes all particulate matter 10 micrometers and smaller, including those 2.5 micrometers and smaller.

levels to occur in locations designated as nonattainment or maintenance areas. Specifically since the Bay Area is nonattainment for ozone and is a carbon monoxide maintenance area, federal projects are subject to the General Conformity regulations. If these projects emit more than 100 tons per year of ozone precursor pollutants (i.e., reactive organic compounds and nitrogen oxides) or carbon monoxide or the emissions are more than 10 percent of the nonattainment or maintenance area's emission inventory for the pollutant(s) of concern a conformity determination is required. Projects with lower emissions are exempt from making a conformity determination.

California

In California, the Air Resources Board coordinates and oversees both state and federal air quality control programs. The Board's primary functions include establishing the California ambient air quality standards, monitoring existing air quality, limiting emissions from mobile sources, and developing the State Implementation Plan. The State Implementation Plan is the State's overall air quality control strategy for both mobile and stationary sources. Control programs for these sources are carried out at the regional or county level.

Bay Area Air Quality Management District

The Bay Area Air Quality Management District regulates stationary sources (with respect to federal, state, and local regulations), monitors local air quality, and develops local air quality control strategies. In coordination with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG), the District has prepared the Bay Area Clean Air Plan (CAP). This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. Its objective is to indicate how the region would attain the stricter state air quality standards, as mandated by the California Clean Air Act. The plan is designed to achieve a region-wide reduction of ozone precursor pollutants through the expeditious implementation of all feasible measures. Air quality plans are developed on a triennial basis, with the latest plan, 2000 Clean Air Plan, being an update to the 1997 CAP.

Applicable County and City Policies/Ordinances

The Sonoma County General Plan Resource Conservation Element establishes goals, objectives and policies to preserve and maintain air quality within the region. The policies are not directly applicable to the project. Petaluma General Plan air quality objectives and policies are contained in Chapter 11 - *Community Health and Safety*. However, none of these policies are applicable to this project.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

The following evaluation criteria have been developed according to Environmental Checklist Form contained in Appendix G of the CEQA Guidelines and the Bay Area Air Quality Management District CEQA Guidelines.

Table 4.10-3

Evaluation Criteria with Point of Significance – Air Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will construction of the project generate emissions that expose people to high levels of dust and equipment exhaust?	Size of construction area, duration or construction, and proximity of receptors.	Application of appropriate mitigation measures recommended by BAAQMD.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pgs. 13-15).
2. Will project emissions cumulatively exceed allowable limits?	Emissions of Reactive Organic Compounds, Nitrogen Oxides, Sulfur Dioxide, and particulate.	Greater than 80 pounds/day for each pollutant.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16).
3. Will project expose sensitive receptors to substantial levels of toxic air contaminants?	Emissions of toxic air contaminants.	Probability of contracting cancer for ME1 exceeds 10 in one million or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the ME1.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 18).
4. Will project violate or contribute to violation of ambient air quality standard?	Carbon monoxide emissions and traffic impacts.	1) Daily carbon monoxide emissions greater than 550 pounds, 2) Substantial traffic impacts at intersections operating at Level of Service D, E, or F now and in the future, and 3) 10% increase in traffic on nearby arterial roadways.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16-18).
5. Will project cause potential odors?	Complaints	Greater than ten odor complaints in a 90-day period or 1 confirmed or 3 unconfirmed complaints on an annual basis, averaged over 3 years.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 18).

Source: Parsons, Illingworth & Rodkin 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: AQ-1: Will construction of the project generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Demolition of decommissioned facilities and construction of the new facilities would result in the generation of dust. A portion of this dust would contain particulate matter less than 10 micrometers in diameter (PM_{10}), which is a criteria air pollutant regulated at both the federal and state levels. The Hopper Street facility is old and building materials may contain hazardous substances that could be emitted during demolition. Nitrogen oxides are also emitted by equipment operation during construction.

During demolition, grading, construction of wetlands/ponds, and other construction activities, dust would be generated. Most of the dust would result during demolition and disturbance of soils. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed, amount of activity, soil conditions and meteorological conditions. Typical winds during late spring through summer are from the west-northwest. Nearby residences could be adversely affected by dust generated during construction activities. The closest sensitive receptors (i.e., residences) are located about 800 to 1,000 feet northwest from both sites.

Removal of materials during demolition or contaminated soils could lead to emissions of toxic air contaminants. A Phase I site assessment conducted for the Hopper Street site (Baseline Environmental Consulting 1994) found asbestos and lead paint in the existing structures to be removed. Demolition, renovations or removal of these materials is subject to BAAQMD regulations.

Although demolition, grading and construction activities would be temporary, they would have the potential to cause both nuisance and health air quality impacts. PM_{10} is the pollutant of greatest concern associated with dust. If uncontrolled, PM_{10} levels downwind of actively disturbed areas could possibly exceed State standards. If uncontrolled, dust generated by demolition, grading and construction activities represents a potentially significant impact. Measure PD-14, Construction Air Quality Controls, adopted as part of this project, requires the City to incorporate applicable control measures recommended by the BAAQMD in their CEQA guidelines. The BAAQMD considers air quality impacts associated with construction activities to be less than significant, if all these measures are implemented.

Mitigation: No mitigation is necessary.

IMPACT: AQ-2: Will project emissions cumulatively exceed allowable limits?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

The BAAQMD has established quantitative thresholds of significance for evaluating impacts from project operations. Operation of the new facility would generate fugitive emissions of volatile organic compounds (VOCs) through the treatment of wastewater. VOC emissions are expected due to the presence of these compounds in the influent water being treated. VOCs entering the treatment plant may be either volatized from the treatment processes, decomposed by biological processes, or passed through the treatment facility. VOCs will volatilize from open surfaces and are stripped from the wastewater during the aeration processes. The degree of volatilization is enhanced with increased agitation in the process. Most VOCs contained in wastewater are emitted during the wastewater treatment process.

The treatment facility is expected to emit minor emissions of VOCs. These emissions would be slightly greater than emissions emitted from the existing Hopper Street facility. No specific data quantifying emissions at both the existing and proposed facility are available. However, emissions can be generally estimated based on data from other similar wastewater treatment plants in California.

Overall, fugitive emissions of air pollutants were estimated using emissions data developed from data collected at facilities in the San Francisco Bay Area. These facilities estimated their emissions using Bay Area Air Toxics (BAAT) emission factors (CH2MHill 1991). These factors were developed for treatment facilities as part of a study by a consortium of publicly owned treatment works in the Bay Area, in conjunction with the BAAQMD. The BAAT factors developed from this study are used to estimate emissions based on total influent flow rate to the existing and proposed treatment facility. Based on an average BAAT emission rate of 116 pounds VOCs per year per million gallons of influent per day and a projected dry weather domestic flow of 6.1 million gallons per day, emissions of VOCs are predicted at 1.9 pounds per day (or 0.35 tons per year). This is well below the BAAQMD significance threshold for VOCs of 80 pounds per day or 15 tons per year.

In addition to VOCs, there is the potential for fugitive particulate matter emissions from various activities at the process units associated with solids handling. These include screenings, grit and sludge handling; however, these emissions are expected to be minor since the moisture content of the material would preclude generation of fugitive emissions. These emissions were not quantified. No stationary or point sources that would have substantial emissions of any criteria air pollutants have been identified. The proposed facility would be electric powered; therefore, emissions from combustion sources are not anticipated. However, there are standby diesel engine generators that may result in minor emissions of criteria air pollutants.

Emissions of criteria air pollutants (including ozone precursor pollutants) associated with the proposed treatment facility are expected to be below BAAQMD significance thresholds. The City will consult with BAAQMD to ensure that all necessary permits are obtained prior to construction and operation.

Mitigation: No mitigation is necessary.

IMPACT: AQ-3: Will the project expose sensitive receptors to substantial levels of toxic air contaminants?

Analysis: *Water Recycling Facility - Less than Significant*

Wastewater treatment facilities are a source of air toxic emissions. One source of these emissions is from toxic contaminants in the wastewater entering the facility becoming volatilized during treatment. Another source is associated with the treatment disinfection process where chlorine or chlorine-based products are added to the treated wastewater and then extracted. A sodium hypochlorite and sodium bisulfite system would be used for disinfection for discharge and would be used to prevent algae growth in the recycled water distribution system. Through complex reactions between chlorine based compounds and organic compounds, some toxic contaminants (e.g., chloroform) would be emitted into the atmosphere. Emissions of these compounds would be localized. Exposure to significant levels of these compounds is unlikely since the closest sensitive receptors to this portion of the proposed treatment plant would be about 1/2 mile or further away. The proposed project would rely on ultraviolet (UV) light disinfection for approximately 4 mgd (this does not require the use of chlorine), so use of chlorine-based chemicals would actually be reduced from current levels. Measure PD-15, Permitting and Control of Toxic Air Contaminants, adopted as part of this project, requires the City to obtain all necessary permits from the BAAQMD. As part of this process, the City or BAAQMD shall prepare an air toxics analysis in accordance with the BAAQMD's Risk Management Policy. If necessary, the project shall incorporate control equipment to reduce exposure of the public to insignificant levels. Control measures that may be necessary to reduce air toxic emissions could include carbon absorption systems in addition to the UV disinfection system that is currently planned.

Analysis: *River Access Improvements – No Impact*

These improvements would have no emissions after construction.

Mitigation: No mitigation is necessary.

IMPACT: AQ-4: Will the project violate or contribute to violation of ambient air quality standard?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Carbon monoxide is an air pollutant that is directly emitted from combustion sources (e.g., automobiles) for which concentrations can be modeled and

compared with ambient air quality standards. Operation of the current facility and the future facility would generate less than 200 new vehicle trips per day and stationary or point sources of air pollution are not expected to result in carbon monoxide emissions. The BAAQMD provides guidance for evaluating the significance of projects with respect to air quality impacts. This project would be considered to have a less-than-significant impact for localized carbon monoxide impacts, since traffic conditions associated with the project would be less than the screening criteria established by the BAAQMD. That is, the project would 1) result in daily carbon monoxide emissions less than 550 pounds, 2) traffic impacts would not be substantial at intersections operating at Level of Service D, E, or F now and in the future, and 3) traffic on nearby arterial roadways would increase by less than 10%. As a result, elevated carbon monoxide concentrations are not expected from this project

Mitigation: No mitigation is necessary.

IMPACT: AQ-5: Will the project cause potential odors?

Analysis: *Water Recycling Facility - Less than Significant*

Most odor impacts from wastewater treatment facilities are associated with the headworks and sludge handling systems. The primary source of odors at wastewater treatment facilities is hydrogen sulfide, which is produced by anaerobic activity or treatment processes. Odors can be controlled to some degree, primarily by adding oxygen to the treatment process. A primary cause of odors is typically from upset conditions or equipment failure.

The existing treatment plant at Hopper Street is an occasional source of odors. The plant is surrounded by industrial land uses on three sides and a railroad on the other side. The closest residential areas are about 800 feet northwest of the facility and about 1,200 feet north across U.S. Highway 101. A public records request from the BAAQMD indicates that there has been only one confirmed odor complaint associated with the existing facility since 1997. This indicates that odors were not a significant issue with the plant over the last three years.

Demolition of the existing Hopper Street wastewater treatment facility would result in reduced emissions of odorous compounds. Most process equipment would be removed and sludge lagoons would be evacuated and filled with clean material. Substantial odors associated with decommissioning of this facility are not expected to be an issue with the proposed project.

The new treatment facilities would be at the existing oxidation ponds on Lakeville Highway. Relocation of the headworks to the Lakeville Highway site could result in the potential for odor complaints at nearby residences.

Existing land uses surrounding the area are primarily agricultural. About seven residences are included in these surrounding land uses: one located about 900 feet northwest, one other 1,600 feet northwest, three located 1,000 to 1,600 feet north

and two about 1,400 feet northeast of the ponds. These distances are measured from the Lakeville Highway frontage of the site.

The potential for odors from a wastewater treatment plant primarily depends on the proximity of sensitive receptors to the source, wind conditions, and strength of the source. Odors typically occur downwind from a source under relatively stable atmospheric conditions, which include light winds. When winds are moderate to strong, odors are rapidly dispersed downwind of the source. Table 4.10-4 summarizes locations of the closest sensitive receptors and the occurrence of wind conditions favorable for transport of odors (i.e., when winds are 10 mph or less). Any one sensitive receptor located near the proposed project would be downwind about 6% to 14% of the time. During about 27% of the time, at least one of the nearby sensitive receptors could be downwind from the treatment facility.

Table 4.10-4

Occurrences of Wind Conditions Favorable to Transport Odors to Sensitive Receptors

Quadrant	Distance (from Lakeville Highway frontage) to Closest Residence	Percentage of Time that Sensitive Receptor Downwind[1]
North	3 Residences (~1000 to ~1600ft)	6%
Northeast	2 Residences (both ~1400ft)	6%
East	>2500ft	33%
Southeast	>2500ft	47%
South	>2500ft	12%
Southwest	>2500ft	5%
West	>2000ft	9%
Northwest	2 Residences (~900 ft, ~1600 ft)	13%
All	7 Residences, Business Park	25%

Source: Illingworth & Rodkin 2002

1 Percentage of time that wind of 10 mph or less blowing from the proposed treatment facility and ponds to sensitive receptor.

- Headworks. Potential odors from the proposed facility would be primarily associated with the new headworks facility. Odor at this facility would be controlled by enclosing the facility and providing biofilters for odor control. The headworks odor control should be sufficient to prevent substantial odors from impacting off-site locations.

- Sludge Handling Systems. The sludge handling systems are also a potential source of odors. However, current designs would put these systems at almost one

mile in a direction that is typically downwind from the nearest sensitive receptor. According to the BAAQMD Guidelines, odors are not usually an issue when the source is located one mile away. The solids treatment will include thickening, aerobic digestion, and dewatering. Digestion provides a reduction in volatile solids content of the sludge and therefore a reduction in the odors from solids storage. Odor control facilities consisting of biofilters will be provided for the thickening and dewatering facilities. In addition, the sludge dewatering facilities will also be housed in a building with odor control systems.

- Oxidation Ponds. The existing oxidation ponds are currently used to treat a combination of secondary, primary, and raw effluent. The oxidation ponds for the proposed treatment facility would primarily treat secondary effluent, reducing the potential for substantial odors. The ponds will receive raw wastewater only when flows are greater than 24 mgd during pear hour flows. Treatment of raw effluent poses the greatest potential for odors. According to the plant operators, odors complaints are received on an infrequent basis. These complaints typically occur in wintertime when extended periods of reduced sunlight occur (i.e., a period of several cloudy days). A public records request made to the BAAQMD revealed that no complaints regarding odors associated with the existing oxidation ponds have been received by the BAAQMD since 1997. The previous EIR reported that one odor complaint was received in 1993, but was found to be from unrelated agricultural activities. There are other sources of odors near the Lakeville Highway, which include agricultural activities. The existing oxidation ponds at Lakeville highway do not currently cause a significant impact with respect to odors. The potential for odor complaints associated with the proposed oxidation ponds is likely to be less, since the oxidation ponds would primarily treat secondary effluent. It should be noted that it is common to have brief odor episodes associated with oxidation ponds at most treatment plants due to seasonal changes. These occur about twice per year (spring to summer and fall to winter). When these episodes occur, measures can be taken to control the odors; however, the onset can be difficult to predict.

- Algae Removal. Algae removal would be provided by a wetlands treatment system in Ponds No. 9 and 10. Wetland areas could be a source of localized odors when water levels are low or the area rapidly dries up. Normal operation of the wetland system would include keeping wetlands filled with water, thus reducing the potential for odors.

Operation of the proposed treatment facility would be subject to the BAAQMD Regulation 7 – Odorous Substances. Limitations of this regulation become effective when the BAAQMD receives 10 or more citizen complaints and deems these complaints objectionable in the normal daily activities of the complainants. The BAAQMD has a toll-free phone number for receiving complaints. If a BAAQMD inspector confirms an odor complaint, a notice of violation would be issued to the source facility. After issuance of three or more notices of violation, the BAAQMD begins to take action to require the operators to abate the situation.

Substantial odors are not anticipated with this project since (1) the treatment headworks would be equipped with odor controls, (2) the sludge handling systems would be located approximately one mile from the nearest sensitive receptors and would include the use of biofilters, and (3) oxidation ponds would primarily treat secondary effluent (as opposed to raw, primary, and secondary effluent currently being treated). Based on odor complaint records, the current oxidation ponds do not result in significant odors. However, the expansion of the existing facility including the wetlands could increase the potential for noticeable odors to affect nearby residences.

Odors may be noticeable from time to time to persons in the area of the proposed facility. The measure of significance is whether the proposed project would frequently expose members of the public to objectionable odors. Odors from wastewater treatment facilities are difficult to predict. Although prevailing wind conditions and the lack of substantial past odor complaints indicate odors will not be a problem, expansion of the facility may cause unforeseeable odor complaints. The potential for increased odor complaints represents a significant impact. Measure PD-16, Odor Control, adopted as part of this project, requires proper design and operation of the facilities to reduce the potential for odor complaints. This includes conformance with BAAQMD Regulation 7.

Analysis: *River Access Improvements - No Impact*

These improvements are not expected to create odors.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: AQ-C1: Will the project have the potential to have a cumulative impact to air quality?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Under the BAAQMD CEQA Guidelines, projects that individually have a significant air quality impact would be considered to have a cumulative impact to air quality. For projects that do not individually have a significant impact to air quality, the determination of a significant cumulative impact is based on the consistency of the project with the local General Plan and the Bay Area Clean Air Plan (i.e., 2000 Bay Area Clean Air Plan). With mitigation measures, the project is not anticipated to have a significant air quality impact. The treatment facility would serve growth that is projected in the City's General Plan and thus assumed to be included in growth forecasts used to develop the 2000 Bay Area Clean Air Plan. Construction of the treatment facilities would be subject to current air quality rules and regulations. As a result, the project is not expected to conflict or obstruct the timely implementation of the 2000 Clean Air Plan or subsequent updates to the plan.

Although the project includes federal involvement, it is exempt from the General Conformity requirements since it would result in emissions that are below the de minimus levels (100 tons per year for carbon monoxide or any ozone precursor pollutant) and emissions would be well below 10% of the Bay Area emission inventory for those air pollutants. As a result, a conformity determination is not required for the project.

Mitigation: No mitigation is necessary.

REFERENCES

Baseline Environmental Consulting 1994. *Phase I Site Assessment Wastewater Treatment Plant. Petaluma, CA.* Prepared for City of Petaluma

Bay Area Air Quality Management District 1996, revised 1999. *BAAQMD CEQA Guidelines Assessing the Air Quality Impacts of Projects and Plans*.

CH2M Hill 1991. *Bay Area Air Toxics (BAAT) Group AB2588 Emission Inventory Guidelines for POTWS*. May.

4.11 NOISE

This section identifies potential impacts related to noise including impacts due to demolition, construction, and operation of the new facilities. Persons not familiar with environmental noise analysis are referred to Appendix E for additional discussion.

SETTING

Existing Noise Environment

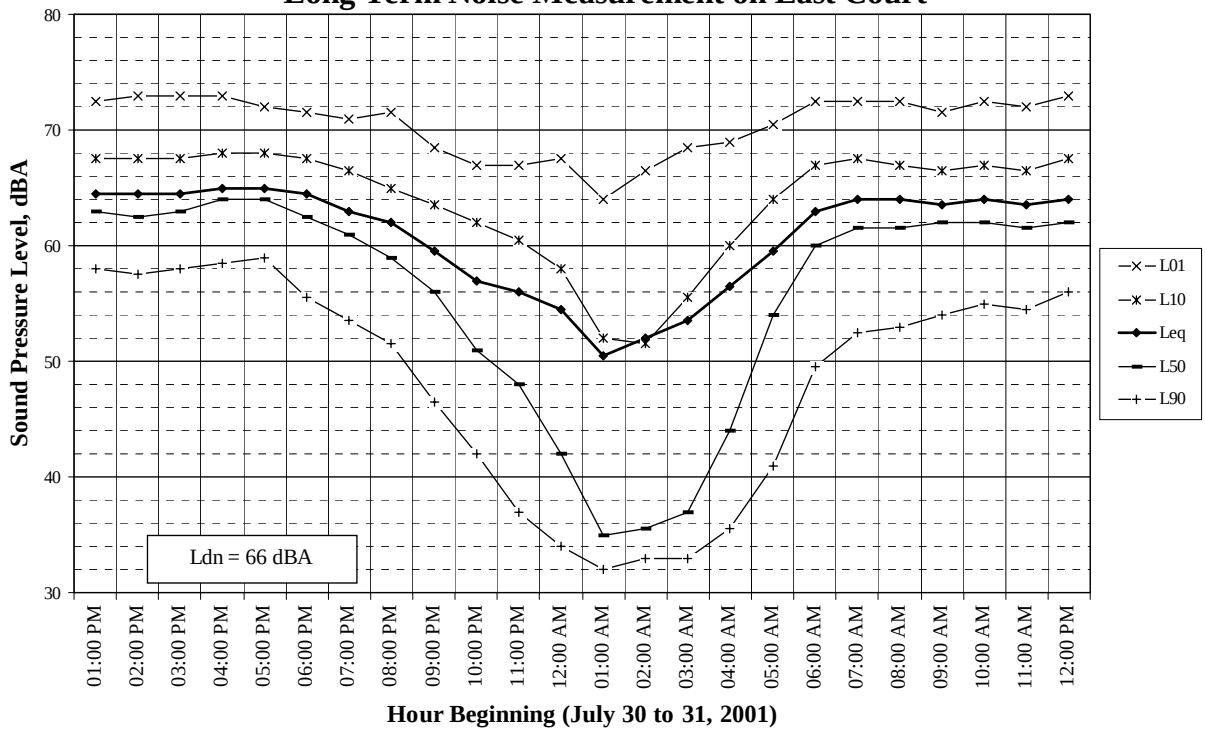
Hopper Street Facility

The existing treatment plant is surrounded by existing urban and industrial uses. The site is bordered by Hopper Street to the north with thoroughfare commercial and industrial land uses to the east, west and south. No noise sensitive receptors are located directly adjacent to the existing plant, with the closest residences approximately 800 feet northwest of the facility in an isolated cluster of single-family homes on East Court north of Lakeville Street. To evaluate the existing noise environment at these nearest sensitive receptors, a 24-hour noise measurement was conducted between July 30th and 31st 2001 on East Court at the setback from Lakeville Street of the first single family home (approximately. 200 feet from the edge of Lakeville Street).

The hourly trend in noise levels at this measurement site including the energy equivalent noise level or L_{eq} and the noise level exceeded 1, 10, 50 and 90 percent of the time (indicated as L_1, L_{10}, L_{50} and L_{90}) are shown on Figure 4.11-1. The L_{eq} noise level is typically considered the average noise level, while the L_1 is considered the intrusive level, the L_{50} is considered the median noise level and the L_{90} is considered the background noise level. A review of this chart shows that daytime and nighttime average (L_{eq}) noise levels were found to range from 60 to 65 dBA and 50 to 63 dBA, respectively. The average daytime L_{eq} was 64 dBA with the average nighttime L_{eq} dropping to 56 dBA. The average day-night noise level (L_{dn}) at the site was calculated to be 66 dBA. The noise environment at this site was dominated by traffic noise generated by vehicles passing on Lakeville Street and Hwy 101. Noise from the existing Hopper Street treatment plant was inaudible.

To determine the noise levels produced during operation of the existing water treatment equipment short-term noise measurements were made at the facility's Hopper Street property line. These measurements show that when operating the plant produces a constant noise level of 62 dBA at the Hopper Street property line.

Figure 4.11-1:
Long Term Noise Measurement on East Court

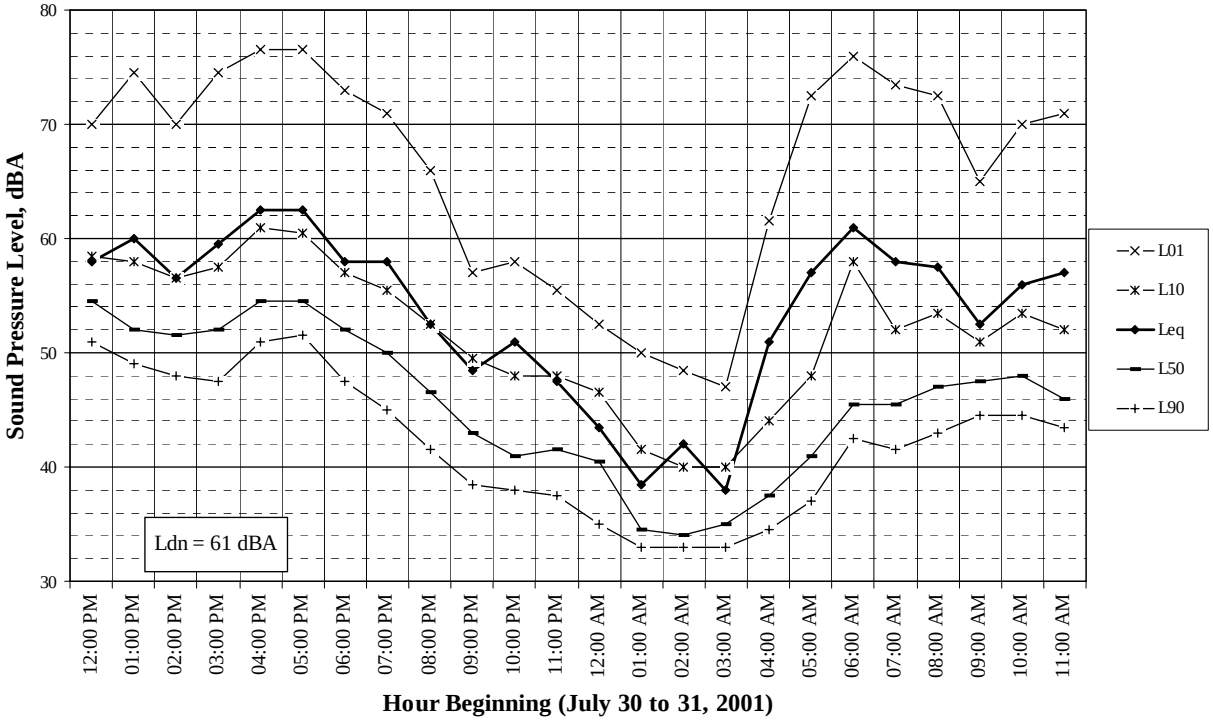


Lakeville Highway Site

The Lakeville Highway site is situated southeast of the developed portion of the City of Petaluma on the southern side of the roadway. Currently the site is occupied by oxidation ponds, but is otherwise undeveloped. The land surrounding the existing oxidation ponds is primarily undeveloped agricultural land with scattered farm and rural residences. The residence nearest the existing oxidation ponds is approximately 1,000 feet to the north across Lakeville Highway. To determine the existing noise environment at this residence a 24-hour noise measurement was conducted on Browns Lane approximately 1,000 feet north of Lakeville Highway between July 30th and 31st 2001 at the property line of the nearest home. The noise environment at this site was found to be dominated by traffic noise generated by vehicles passing on Lakeville Highway with intermittent high noise levels produced by vehicles passing on Browns Lane. Noise from aeration of the oxidation ponds was inaudible.

The hourly trend in noise levels at the measurement site including the energy equivalent noise level or L_{eq} and the noise level exceeded 1, 10, 50 and 90 percent of the time (indicated as $L_{1,}$ L_{10}, L_{50} and L_{90}) are shown on Figure 4.11-2. A review of this chart shows that daytime and nighttime average (L_{eq}) noise levels were found to range from 48 to 62 dBA and 38 to 61 dBA, respectively. The average daytime L_{eq} was 57 dBA with the average nighttime L_{eq} dropping to 48 dBA. The average day-night noise level (L_{dn}) at the site was calculated to be 61 dBA.

Figure 4.11-2:
Long Term Noise Measurement on Browns Lane



Regulatory Background

The state of California, Sonoma County and the City of Petaluma have developed guidelines for evaluating land-use compatibility for different levels of noise. Following is a summary of the relevant portions of these guidelines:

State of California Guidelines

The California Environmental Quality Act (CEQA) has established guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. CEQA asks the following questions relevant to this project:

Would the project result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?

- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Though CEQA does not define what noise level increase would be considered substantial, typically, if the average day-night noise level (L_{dn}) due to the project increases by 5 dBA or more, the impact could be considered significant.

City of Petaluma General Plan Guidelines and Noise Regulations

The City of Petaluma's land use planning policies and guidelines are set forth in Chapter 11, "Community Health and Safety" of its General Plan. The objective of the Noise Element of this document is to minimize the amount of noise created by future development and the overall noise exposure within the City. Policies in the Noise Element that would regulate implementation of the project are as follows:

Policy 25 directs the strict enforcement of local noise standards that define acceptable conditions for use (see Figure 4.11-3). This policy establishes a 60 dBA Day-Night Average sound level (Ldn) as acceptable for residential exterior use.

Policy 26 directs a conservative application of the city's noise standards such that in the case of overlap of acceptable noise levels the quieter standard is to be applied unless the circumstances of the project allow for the less conservative interpretation.

Policy 27 requires sound buffers (particularly landscaped buffers), open space, or other mitigation measures between residential areas and areas producing higher noise levels such as freeways, commercial sites, and industrial developments to achieve the sound level reduction necessary to produce noise compatible land uses.

The following portions of Program 23 of the Noise Element relate to construction noise:

23.f. When feasible and appropriate, limit construction activities to that portion of the day when the number of persons occupying a potential noise impact zone is lowest.

23.h. Require the use of mufflers and muffler maintenance on construction vehicles.

23.i. Require placement of stationary construction equipment, such as compressors, as far as possible from developed areas and require the use of acoustic shielding with such equipment when feasible and appropriate.

City of Petaluma noise regulations are set forth in Section 22-301 of the Municipal Code. Section 22-301.3B further sets forth maximum exterior noise exposure levels. The ordinance generally establishes a maximum hourly average noise level (L_{eq}) of 60 dBA, measured within public or private open/outdoor spaces.

Sonoma County General Plan Guidelines

The Noise Element of the Sonoma County General Plan includes policies and measures to achieve noise compatibility between land uses. Section 3 of the Noise Element sets forth noise-related issues, policies and standards. The following policies are relevant to the noise assessment:

Policy NE-1a: Designate areas within Sonoma County as noise impacted. If they are exposed to existing or projected exterior noise levels exceeding 60 dB L_{dn}, 60 dB CNEL, or the performance standards of Table NE-2 on page 489 (Table 4.11-1).

Policy NE-1c: Control non-transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table NE-2 (Table 4.11-1) as measured at the exterior property line of any affected residential land use. Limit exceptions to the following: (1) If the ambient noise level exceeds the standards in Table NE-2, adjust the standard to equal the ambient level; (2) reduce the applicable standards in Table NE-2 by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises; and (3) reduce the applicable standards in Table NE-2 by 5 decibels if they exceed the ambient level by 10 or more decibels.

Table 4.11-1

Noise Level Performance Standards

		Maximum Exterior Noise Level Standards, dBA	
Category	**Cumulative Duration of Noise Event in Any One-Hour Period**	**Daytime 7AM-10PM**	**Nighttime 10PM-7AM**
1	30-60 Minutes	50	45
2	15-30 Minutes	55	50
3	5-15 Minutes	60	55
4	1-5 Minutes	65	60
5	0-1 Minute	70	65

Source: Sonoma County General Plan, Table NE-2

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

The State, County and City criteria presented in the preceding section and listed below have been used to develop noise impact evaluation criteria to determine the point of significance of the project's noise impacts on area land uses. These criteria are presented in Table 4.11-2, below.

Table 4.11-2

Evaluation Criteria with Point of Significance - Noise

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will construction of the project expose the public to high noise levels?	Projected noise levels at property line or "yard" line[1]	Greater than L_{eq} of 60 dBA	California Office of Noise Control recommended construction noise limits
2. Will construction of the project cause high noise levels from construction traffic?	Projected traffic volume due to construction	Greater than 5 dBA increase in noise, L_{eq}	An increase of 5 dBA or more will be readily noticeable.
3. Will operation and maintenance of the project expose the public to high noise levels?	Projected noise levels at property line or "yard" line[1]	a. Greater than L_{50} of 45 dBA, OR	General Plan of Sonoma County
		b. Greater than 5 dBA increase in noise, L_{eq}	An increase of 5 dBA or more will be readily noticeable.

Source: Parsons, Illingworth & Rodkin 2002

Notes: 1 - The property or yard line of the affected receptor whichever is closer to the affected structure.

IMPACTS AND MITIGATION MEASURES

IMPACT: N-1: Will construction of the project expose the public to high noise levels?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The length of time required to construct the facilities at the Lakeville Highway Site is approximately three and one-quarter years. Typical construction equipment would include scrapers, front loaders, backhoes, rollers, backhoes, cranes and pumps. The typical range of hourly noise levels for various types of construction equipment measured at 50 feet from the primary construction activity are shown in Figure 4.11-4. Based on a spherical sound propagation of 6 dBA per doubling of distance, anomalous atmospheric sound attenuation, and an assumption that all construction operations could occur simultaneously, homes within 1,600 feet of the center of construction activity would be exposed to noise levels of 60 dBA. When construction is taking place at the northern edge of the site up to seven residences will experience this level of noise. Though under current conditions the average noise level in these areas occasionally exceeds a L_{eq} of 60 dBA (see Figure 4.11-2), this is considered a potentially significant noise impact because the point of significance is exceeded.

Construction of the river access improvements may occur simultaneously with the water recycling facility construction or separately over a period of years. In either

case, most construction noise will be similar to that for the water recycling facility, except pile drivers at the river and lower Ellis Creek.

Demolition and cleanup of the Hopper Street facilities has been estimated to take just over six months. The equipment used to demolish the Hopper Street facilities will likely include front loaders, tractors, compressors, dump trucks, hydraulic breakers, and other related equipment. The typical range of hourly noise levels for various types of demolition and construction equipment measured at 50 feet from the primary activity are shown in Figure 4.11-3. Based on a spherical sound propagation of 6 dBA per doubling of distance, the assumption that all demolition operations could occur simultaneously, and taking into account the noise shielding provided by intervening buildings, the estimated level of demolition noise at the nearest noise sensitive receptors is less than 60 dBA.

The potential noise impact associated with demolition activities is considered less than significant because noise levels at the nearest sensitive receptors would be both below the point of significance presented in Table 4.11-2 and the existing average daytime L_{eq} (see Figure 4.11-1) measured at these receptors.

Measure PD-17, Construction Noise Mitigation, adopted as part of this project requires the City to schedule activities and use equipment to reduce construction noise as much as is feasible. With implementation of these measures as part of the project, construction noise is found to be less than significant.

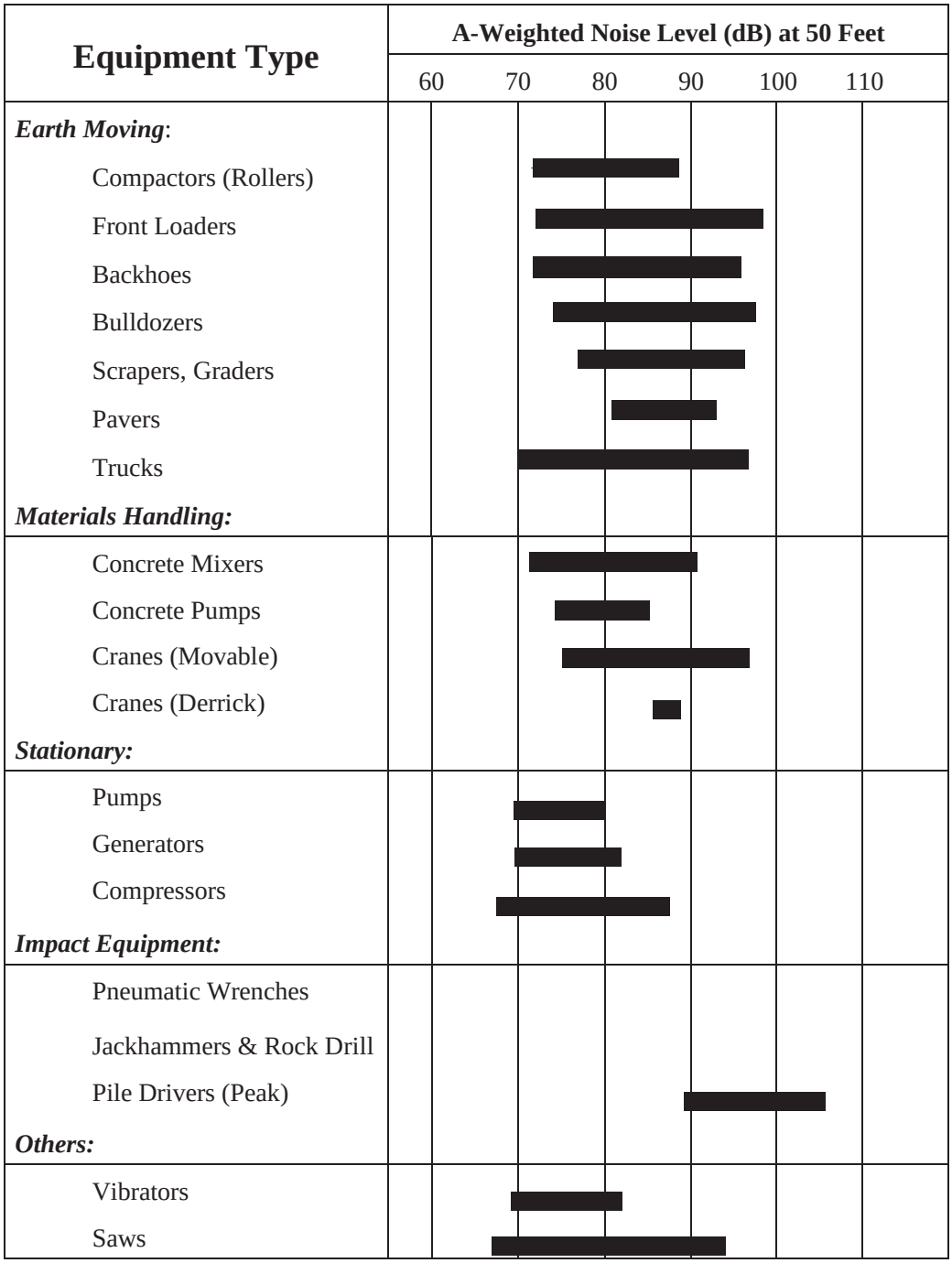
Mitigation: No mitigation is necessary.

IMPACT: N-2: Will construction of the project cause high noise levels from construction traffic?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Construction traffic to and from either the Hopper Street or Lakeville Highway sites will use roadways that are already heavily traveled by truck traffic. The addition of construction related traffic is therefore not expected to cause a substantial change in traffic noise at noise sensitive receptors in the area. This impact is therefore considered to be less than significant.

Haul trucks removing materials from Hopper Street during demolition will also produce noise. It has been estimated that as many as 24 daily truckloads would be required to remove the demolition concrete and steel. Demolition of the facility may also require excavation and backfill which would result in up to 20 to 24 truck loads per day first of contaminated soil and then of fill material.



Source: Handbook of Noise Control, Cyril M. Harris, 1979

City of Petaluma
Water Recycling Facility EIR

CONSTRUCTION EQUIPMENT NOISE LEVEL RANGE

PARSONS

Figure 4.11-3

Haul trucks bringing fill to the Lakeville site will also produce noise. Up to 150 truck loads per day over a period of six months would increase noise levels by less than 0.5 dBA. According to CalTrans, there are currently approximately 1,340 daily truck trips along Lakeville Highway. Because this route is already heavily traveled, the increase of less than 0.5 dBA would not cause a substantial change in the traffic noise. This impact is therefore considered to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: N-3: Will operation and maintenance of the Project expose the public to high noise levels?

Analysis: *Water Recycling Facility – Less than Significant*

New pumps, blowers for oxidation aeration equipment, and centrifuges comprise the primary sources of noise associated with the type of water recycling system proposed under the preferred project and its alternatives. Depending on the type, size, number and location of this equipment unmitigated noise levels may exceed the County's noise standard of 45 dBA at the Lakeville site for equipment operated continuously at night. This potential impact is therefore considered significant. Measure PD-18, Operational Noise Mitigation, adopted as part of this project requires the City to utilize an acoustical engineer during the design process to ensure that the noise levels produced by mechanical equipment at the Lakeville facility do not exceed County standards.

Analysis: *River Access Improvements – No Impact*

These improvements will not cause an increase in noise level off site.

Mitigation**:** No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: N-C1: Will the project have a cumulative potential to disturb noise-sensitive receptors during or after construction?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Simultaneous construction of the new treatment facility along with other projects, such as the City's recycled water pipeline, could result in cumulative construction-noise related impacts to the seven residences closest to the site. Cumulative impacts could include increases in noise levels if both projects occur at the same time, or greater period of time when increased noise levels affect those receptors. Measure PD-17, Construction Noise Mitigation Measure, adopted as part of this project, requires the City to incorporate specific conditions in related construction agreements that will limit the overall noise level and duration of construction activities. They will also give any persons disturbed by occasional loud noises an identifiable method of recourse. In addition, Measure

PD-18, Operational Noise Mitigation, adopted as part of this project requires the City to utilize an acoustical engineer during the design process to ensure that the noise levels produced by mechanical equipment at the Lakeville facility do not exceed County standards. Implementation of construction-period noise controls, would, however reduce those impacts to less than significant. With mitigation, operation of the facilities would not have significant noise impacts, and thus would not contribute to an overall increase in noise in the area.

Mitigation: No mitigation is necessary.

REFERENCES

Brown and Caldwell & Jones and Stokes, 1995. *City of Petaluma Wastewater Facilities Project and Long-Range Management Program.* August.

City of Petaluma & Naphtali H. Knox and Associates, Inc, 1995. *Petaluma General Plan.* June 5.

City of Petaluma Municipal Code, Section 22-301 & 22-301.3B.

Sonoma County, 1994. *Sonoma County General Plan.* March 1.

4.12 CULTURAL RESOURCES

This section identifies potential project impacts to historic and archaeological resources. The analysis includes potential effects both to known sites and previously undiscovered resources.

SETTING

Prehistory

The following brief description of the Santa Rosa and Petaluma ("the region") prehistory and ethnography are based on Moratto's (1984) and Gerike's et al. (1996) reports. The reader is directed to those reports for a more detailed discussion.

The earliest documented period of human use of California, known as the Paleoindian period, occurred between 10,000 and 6000 B.C. Evidence of this early habitation is scarce in the region, presumably because of the small, highly mobile populations involved. The appearance of the first well-represented culture in the region occurs in the Middle Archaic period (3000 to 1000 B.C.), probably reflecting larger populations and a more sedentary settlement pattern.

A new mode of settlement appeared during the Upper Archaic period (1000 B.C. to A.D. 500). The Lower Emergent period (A.D. 500 to 1500) has the greatest number of identified sites in the region. The Upper Emergent period (A.D. 1500 to Historic period) is typified by a settlement shift, in favor of more elevated, creekside locations; at the same time a drastic reduction in the number of sites occurs.

Ethnography

The project area lies within the ethnographic territory of the Coast Miwok. The Miwok, Penutian language speakers, have close ties to the Maidu, Yokut, Wintu, and Costanoan peoples of the Central Valley and San Francisco Bay. The Coast Miwok represent a culturally significant group in that they share characteristics of both Coastal and Valley adaptations.

The Coast Miwok subsistence pattern relied heavily on marine and estuarine resources. The abundance of shellfish and marine mammals supplied a bulk of the nourishment required with large terrestrial mammals making up any losses of nutrition. Some resources used include anadromous species of salmon and steelhead, shore and bay fish, eels, bear, elk, deer, rabbit, wood rat, gophers, and squirrels. The Coast Miwok diet also incorporated vegetal resources. The Miwok used a wide variety of milling and grinding equipment for the manufacture of acorns and hard seeds. Among the seeds exploited are the tanbark oak and valley oak used for acorn mush and bread. Other edible plants used include buckeye, manzanita berry, two kinds of kelp, various grass seeds and tobacco.

The Coast Miwok culture experienced a significant population decline with the intrusion of foreigners beginning in the latter half of the eighteenth century. Many of the traditional livelihoods and land use patterns, which had served these native peoples well for centuries, were

to change radically after 1776, with the establishment of the Spanish Mission at San Francisco. Settlement by foreigners affected the native peoples, through displacement of their settlements and exclusion from the lands from which they had traditionally obtained their livelihood. The Coast Miwok population is estimated to have been at least 2,000 individuals at the time of European contact in 1769. The population reportedly dwindled to approximately 60 individuals by 1888.

History

The Russians first explored the vicinity of Bodega Bay in 1809, in the hopes of locating a suitable site for settlement. From 1812, for three decades, the Russians ran Fort Ross and a network of settlements, farms, and outposts stretching over 55 miles of coastline. Father José Altamira founded Mission San Francisco Solano at the site of present-day Sonoma in 1823 with the express purpose of containing the growth of Fort Ross and establishing a Mexican presence on the northern frontier.

The Mexican thrust against Russian encroachment had resulted, by the mid-1840s, in the granting of virtually all arable land in the North Bay, more than half of what was to become Sonoma County. Meanwhile, scores of foreigners, most from the United States and Great Britain, began arriving to settle in the Sonoma County region in the early 1840s.

The project area is located on land originally granted to Mariano Vallejo by the Mexican government in 1834 (Hoover 1966). Vallejo's Adobe, constructed between 1834 and 1844, is located on Adobe Road in Petaluma. A portion of the grant was acquired by G.W. Keller, who established the City of Petaluma in 1851 (Gudde 1969). By July of 1852, Petaluma had become a bustling town with several hotels and an ever-growing population; in September 1853, there was a cluster of about 50 houses in the town (Heig 1982). In contrast, the town of Santa Rosa consisted of only a few shacks in 1853. In 1854 however, Santa Rosa was chosen by the county's population as the county seat as a result of a series of political maneuvers by a group of developers and local boosters.

Travel between Sonoma County and San Francisco went not through Marin, as it does today, but by stage along the Petaluma River to the steamers docked at the town of Lakeville. The southern terminus of the San Francisco & North Pacific Railroad, where the steamers met the tracks, was operating by January 1871, and was situated near the mouth of the Petaluma River about eight miles downstream from the City of Petaluma. As population increased in Marin County, the terminus was moved in 1882 to Tiburon (Heig 1982).

Beginning with the invention of the chick incubator in 1879 in Petaluma and followed by nationwide promotion, thousands of outsiders moved to southern Sonoma County to take up egg production. In 1885, at least 50 farms in the Petaluma area had purchased incubators and were hatching chicks artificially (Johnson, 1994:18). By 1904, a government report estimated that 90 percent of the people living near Petaluma were raising poultry (Heig, 1982:111). The depression era caused many subsequent foreclosures, however the industry did not reach its peak until the mid 1940's. A flooded market from a variety of areas throughout California and commercial advances from larger corporations led to the industry's decline; by the 1970's few small ranches were participants in the chicken ranching business, and the industry came to an

end shortly thereafter. Today the Sonoma County countryside is dotted with the collapsed remains of many chick hatcheries that have long since been abandoned and left to the elements.

Project Specific History

In 1907, a Swedish immigrant by the name of Joseph Masciorini purchased 247 acres of land four miles southeast of Petaluma on the Lakeville Road (Gregory 1911:1057-1058). He quickly improved the property, and by 1911 had "a large residence and commodious barns…and here he engages in the raising of grain and hay and also in the poultry business." The farm was situated along the Northwestern Railroad and had "a station upon it which bears his name, and there is also a landing on Petaluma creek with a suitable wharf" which was also owned by Mr. Masciorini.

Prior to purchasing the Lakeville property, Mr. Masciorini had settled near Sears Point, Sonoma County, and was leasing a "large tract of one thousand acres of land" from the Mecham estate. Fifty acres were under cultivation while the remaining land was used for dairy farming. The Sears Point farm, a popular stopping-over place for hunters from the city, was operated consecutively with Lakeville farm. In addition to his dairy ranching activities, Mr. Masciorini functioned as the first (and only) postmaster for the Sears Point Post Office from it's inception on June 2,1903 until it was decommissioned on January 14, 1911 (Papp 1996:133).

Today, the ranching and agricultural character of the area has largely been sustained, although suburbia is encroaching into the area.

Methodology

Prefield and Archival Methods

Cultural resource records, maps, and reports pertaining to the project area prehistory and history were reviewed at the Northwest Information Center of the California Historical Resources Information System (NWIC) located at Sonoma State University, Rohnert Park, California. In addition, the following local, state, and federal cultural resource inventories were reviewed: *National Register of Historic Places - National Register Information System* (July 24, 2001); *California Inventory of Historic Resources* (1976); *Historic Properties Data File for Sonoma County* (February 08, 2001); *Five Views: An Ethnic Sites Survey for California* (1988); and *California Historical Landmarks* (1990). Historical maps were reviewed in order to identify architectural and historical archaeological properties and to provide context in documenting architectural properties. In addition, references housed at the Parsons Sacramento office were consulted.

Contact letters were sent to interested parties, including the Native American Heritage Commission, the Petaluma Historical Museum and Library, and the Sonoma County Historical Society. Information relevant to the prehistoric, historic, and ethnographic land uses within the project area was requested.

Field Methods

A cultural resources field survey was conducted on Parcels A and B on April 11, 2001. Access to Parcel C has been denied by the property owner and therefore was not included in the survey. Reconnaissance of Parcel A was restricted by 2- to 4-foot alfalfa crops covering 90 percent of the survey area, making surface visibility 0 to 2 percent at best. The presence of the crops made it impossible to conduct a complete survey strategy with regular transects on Parcel A. Areas of less dense crops were walked, as were natural and man-made irrigation ditches, the perimeter of the project area, and the unnamed-creek bank to the east. At the time of the survey, the lower southern two-thirds of Parcel B was covered by standing water. The northern one-third, adjacent to Parcel A, was covered by dry weedy vegetation making surface visibility about 10 percent. Zig-zag transects at 50-meter intervals were walked on dry surfaces.

In addition, wetland testing was performed by Parsons' staff botanists simultaneously with the cultural resources field survey. Four test pits for the wetland delineation were examined for subsurface cultural remains that otherwise would not have been evident. Each pit was dug to an average depth of 18 inches.

Results

Prefield and Archival Results

A record search was performed on May 10, 2001 at the NWIC by NWIC staff. Site records, reports, maps, and other archival information pertinent to the project area were examined.

One prehistoric site (C-757) has previously been identified within the project area (Parcel C). This site, comprised of a large quantity of clam and mussel shells, charmstones, and bones, was reported in 1990, but has never been formally recorded.

No historic resources have previously been recorded within the project area, however, an "Old Railroad Grade" is shown transecting Parcels B and C on the 1954 (photorevised 1980) Petaluma River USGS 7.5 minute topographic quadrangle.

Seven sites have previously been recorded within one-mile of the project area. One of these sites, CA-SON-2152, is a prehistoric lithic reduction site with sparse shell middens. The remaining five sites, CA-SON-845,-846,-847,-848,-849 consist of schist bedrock with grinding surfaces and petroglyphs. No other cultural resources have been recorded within or adjacent to the project area.

A review of the *Historic Properties Data File for Sonoma County* (February 08, 2001), on file at NWIC, reveals that there are no properties located within the project area that have been evaluated as eligible/appears eligible for listing on the National Register of Historic Places.

There have been no previous cultural resources surveys or studies within the project area on file at the NWIC.

As of the date of this report no response to contact letters has been received.

Field Results

Parcel A. An intuitive field survey for cultural resources was conducted on Parcel A. Areas of less dense crops were walked, as were natural and man-made irrigation ditches, the perimeter of the project area, and the unnamed-creek bank to the east. One historic architectural resource, a farmhouse and associated outbuildings (including the cattle ramp discussed under Parcel B), was noted and recorded within Parcel A adjacent to Lakeville Highway. No other cultural material was noted within Parcel A. Additionally, four test pits were dug by a Parsons staff botanist for a wetland delineation. Each pit and associated backfill was examined for evidence of archaeological resources. No cultural materials were located in any of the delineation testpits.

Parcel B. A zig-zag survey with transects spaced at 50-meter intervals was conducted of the dry areas of Parcel B. Three historic resources were noted and recorded during the field survey. The "Old Railroad Grade" identified on the 1954 (photorevised 1980) Petaluma River USGS 7.5 minute topographic quadrangle, was relocated along the boundary between Parcel A and B (completely within Parcel B), as were the remains of a cattle ramp/junk yard adjacent to the south side of the railroad alignment. The cattle ramp is very likely associated with the farmhouse, and therefore was recorded as a feature of that site. In addition, there is a World War II era communication and radar facility located near the west boundary of the parcel.

Parcel C. Access to Parcel C has been denied by the property owner. No field survey has been conducted on Parcel C for this project.

Findings

Parcel A

One historic resource is located on Parcel A. The dwelling, a farmhouse constructed in 1906-1907 and currently owned by David and Teresa Martinelli, is located adjacent to the south side of Lakeville Highway on a one-acre parcel of land. Five outbuildings in varying stages of disrepair and neglect are located to the south and east of the farmhouse, within the one-acre parcel, as are several palms, junipers, and eucalyptus trees. The parcel is defined by the remnants of a split-rail fence that once encircled the property. Alfalfa fields surround the parcel on the east, south, and west.

The farmhouse is a two-story hipped roof vernacular farmhouse, with a full-length covered front porch, three-paned bay windows on the second floor, and what appears to be a summer porch at the rear of the house. The structure does not appear to have been altered much since its original construction in 1906.

One of the most prominent outbuildings within the one-acre parcel appears to be the remains of a chick hatchery located on the south side of the farmhouse.

The three remaining structures located on Parcel A include a motor-vehicle garage, a collapsed structure that appears to be the remains of a two-story barn, and a one story, normal pitched gabled roofed building of unknown function constructed of concrete footings, approximately four feet high, with wooden half-walls and a corrugated sheet metal roof. One additional feature on the parcel is a circular concrete structure (approximately 5 feet in diameter) that may have been the base for a water tank or silo.

Parcel B

Three historic resources are located on Parcel B, an old railroad grade, a livestock ramp adjacent to and north of the railroad grade, and a World-War II-era communication and radar facility at the west boundary of the parcel.

The railroad grade, which is identified as an "old railroad grade" on the Petaluma River USGS 7.5' topographic map, is presently used as an unpaved road for transportation within the ranch complex. The rails and ties have been removed and a large section of the alignment is missing, having been impacted by construction of existing oxidation ponds.

The livestock ramp is constructed of split-rail fencing, using 2 inch by 6 inch rails attached to 4 inch by 6 inch posts. The ramp is in an advanced state of disrepair. The surrounding area is overgrown with anise and star thistle, there are remains of a modern automobile and other machinery parts near the livestock ramp. The ramp is immediately adjacent to the above-mentioned railroad.

Between the Ranch complex and the livestock ramp there is an irrigation ditch, 8 feet wide by 2 feet deep, that runs parallel to the railroad and bisects the property. Associated with this irrigation ditch is a pump house that appears to be of modern construction.

The World War II communication and radar facility is in a state of disrepair. All windows have been broken, communication equipment has been removed, and modern graffiti is evident throughout the building.

Parcel C

Based on archival research, it appears that the west half of prehistoric site C-757 has been impacted by the construction and operation of the oxidation ponds on Parcel D. However, as of 1990 when the site was reported to Sonoma State University, clam and mussel shells, charmstones, and bones were evident within the eastern half of the site (located on Parcel C). Therefore, it appears that site C-757 may retain significance as a historical resource under criteria D and 4 of the National Register and California Register, respectively. However, further in-depth research, including survey and test excavations of the site should be conducted to conclusively make this determination.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

National Register of Historic Places

The significance of cultural resources is evaluated under the criteria for inclusion on the National Register of Historic Places (NRHP), authorized under the National Historic Preservation Act of 1966, as amended. The criteria defined in 36 CFR 60.4 are as follows:

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, association, and:
>
> a. that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> b. that are associated with the lives of persons significant in our past; or
>
> c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> d. that have yielded, or may be likely to yield, information important to prehistory or history.

Sites younger than 50 years, unless of exceptional importance, are not eligible for the National Register.

An integral part of assessing cultural resource significance, aside from applying the above criteria, is the physical integrity of the resource. Prior to assessing a resource's potential for listing in the National Register, it is important to understand the seven kinds of integrity mentioned above. According to National Register Bulletin 15 (1984), entitled *How to Apply the National Register Criteria for Evaluation*, the types of integrity are defined as follow:

- Location is the place where the historic property was constructed or the place where the historic event occurred;
- Design is the combination of elements that create the form, plan, space, structure, and style of a property;
- Setting is the physical environment of a historic property;
- Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property;
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
- Feeling is a property's expression of the aesthetic or historic sense of a particular period of time; and

- Association is the direct link between an important historic event or person and a historic property.

To qualify for the National Register, a property must be significant; that is, it must represent a significant part of the history, architecture, archeology, engineering, or culture of an area and it must have the characteristics that make it a good representative of properties associated with that aspect of the past.

All properties change over time. It is not necessary for a property to retain all its historic physical features or characteristics to be eligible for the National Register. The property must retain, however, the essential physical features that enable it to convey its historic identity. The essential physical features are those features that define both why a property is significant and when it was significant. A property that is significant for its historic association is eligible if it retains the essential physical features that made up its character or appearance during the period of its association with the important event, historical pattern, or persons. A property important for association with an event, historical pattern, or person ideally might retain some feature of all seven aspects of integrity. A basic integrity test for a property associated with an important event or person is whether a historical contemporary would recognize the property as it exists today (National Park Service 1984:6, 46, 48).

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines Section 15064.5 includes provisions for significance criteria related to archaeological and historical resources. A significant archaeological or historical resource is defined as one which meets the criteria of the California Register of Historical Resources, is included in a local register of historic resources, or is determined by the lead agency to be historically significant. A significant impact is characterized as a "substantial adverse change in the significance of a historical resource."

Public Resource Code Section 5024.1 authorizes the establishment of the California Register. Any identified cultural resources must, therefore, be evaluated against the California Register criteria. In order to be determined eligible for the California Register, a property must be significant at the local, state, or national level under one or more of the following four criteria, modeled after the National Register of Historic Places criteria:

1. It is associated with events or patterns of events that have made a significant contribution to the broad patterns of the history and cultural heritage of California and the United States;
2. It is associated with the lives of persons important to the nation or to California's past;
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. It has yielded, or may be likely to yield, information important to the prehistory or history of the state and the nation.

In addition to meeting one of the above criteria, a significant property must exhibit a measure of integrity. Properties eligible for listing in the California Register must retain enough of their historic character or appearance to be recognizable as historic properties and to convey the reasons for their significance. Integrity is judged in relation to location, design, setting, materials, workmanship, feeling, and association.

Public Resource Code Section 21083.2 governs the treatment of unique archaeological resources, defined as "an archaeological artifact, object, or site about which it can be clearly demonstrated" as meeting any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, appropriate mitigation measures shall be required to preserve the resource in-place, in an undisturbed state. Mitigation measures may include, but are not limited to 1) planning construction to avoid the site, 2) deeding conservation easements, or 3) capping the site prior to construction. If a resource is determined to be a "non-unique archaeological resource" no further consideration of the resource by the lead agency is necessary.

Sonoma County General Plan

The General Plan Open Space Element addresses archeological and historical resources. Specifically, the Plan contains the following policies:

Goal OS-9 states "Preserve significant archaeological and historical sites which represent the ethnic, cultural, and economic groups that have lived and worked in Sonoma County. Preserve unique or historically significant heritage or landmark trees." The following objective supports that goal:

- Objective OS-9.1 – Encourage the preservation and conservation of historic structures by promoting their rehabilitation or adaptation to new uses.

Petaluma General Plan

The Petaluma General Plan contains policies to preserve historic structures. These are:

(j) – Preserve Petaluma's architectural heritage.

(l) – Prevent the destruction of landmark buildings.

Policy 16.1 – The City encourages the restoration and re-use of historic buildings.

Table 4.12-1

Evaluation Criteria with Point of Significance - Cultural Resources

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?	Number of sites affected by Project facilities	Greater than 0 sites	36CFR800; CEQA Section 15064.5 and Appendix G; PRC Section 5020-5024, 21084.1 General Plan of Sonoma County, City of Petaluma General Plan
2. Will the project disturb unknown archaeological resources?	Sensitivity analysis	Greater than 0 projected locations	36CFR800; CEQA Section 15064.5 and Appendix G; PRC Section 5020-5024, 21084.1 General Plan of Sonoma County, City of Petaluma General Plan

Source: Parsons 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: CR-1: Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Structures have been identified at the Hopper Street facility that are over 60 years old. For purposes of Section 106 of the NHPA, and CEQA, these structures must be evaluated for historical significance and potential eligibility to the National or California Registers prior to any construction activities (alteration, demolition, etc.) in the immediate vicinity of these structures. This impact therefore is potentially significant.

No known potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources are present at the Lakeville Highway site or on Parcels A or B.

The communication facility on Parcel B maintains integrity of location, design and setting, however, the materials and workmanship, as well as the association, that conveyed the feeling of a communication facility have been removed. While the location and structure itself are still distinguishable, the site lacks the overall integrity to warrant listing on the National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR).

The farmhouse located on Parcel A does not appear eligible for listing in the NRHP or the CRHR as it is not associated with the lives of persons significant in our past (criteria b and 2 respectively), does not embody the distinctive characteristics of a type, period, or method of construction (criteria c and 3), and is not likely to yield information important to prehistory or history (criteria d and 4). Although the farm complex is associated with a significant period in Petaluma's history (e.g., poultry ranching) it is not the last remaining or best preserved example of this history and therefore is not likely to be eligible under criteria a and 1 of the NRHP and CRHR respectively. However, although development has begun to encroach within the vicinity of the farmhouse, the setting remains primarily that of a rural/agricultural landscape with little apparent alteration to the immediate viewshed. Lakeville Highway remains a two-lane transportation route and the views both to the north (foothills), and to the south (pasture/wetlands) have changed little since the farmhouse was constructed. The farmhouse, outbuildings and landscaping contained within the one-acre parcel are associated with the life of a well-known local citizen, and continue to retain a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association with the historic rural/agricultural character of Petaluma and Sonoma County. Therefore, although the dwelling is not eligible to the federal and state registers, the one-acre site constitutes a cultural landscape with ties to the agricultural heritage of the local community. Destruction or removal of the farmhouse and its immediate setting would contribute to the cumulative loss of character and charm that has historically been a trademark of Petaluma.

As part of the project description, the City will implement PD-19, Protection of Historic and Archaeological Resources, in order to mitigate the potential impacts. The preferred mitigation to preserve cultural resources is avoidance of the sites. If avoidance is not a feasible alternative, subsurface testing, evaluation for significance, and/or recordation will be completed for the Hopper Street facility, the communication facility, and the farm complex on Lakeville Highway.

Mitigation: No mitigation is necessary.

IMPACT: CR-2: Will the Project disturb unknown archaeological resources?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The results of archival research indicates that there is a moderate likelihood of encountering subsurface archaeological resources within Parcels A and B. This impact is potentially significant. With the implementation of PD-20, Protection of Previously Undiscovered Historic and Archaeological Resources, work shall

stop immediately if subsurface archaeological or historical remains are discovered during construction. A qualified professional archaeologist shall be consulted to develop, if necessary, further mitigation measures to reduce any archaeological impact to a less than significant level before construction continues.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: CR-C1: Will the project have a cumulative potential to disturb historical or archaeological resources?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Significant impacts to known and unknown cultural resources could result from many different sources, for example, construction, demolition, or rehabilitation. Continued growth in the region contributes to the conversion of rural/agricultural lands to urban settings. This conversion process will significantly impact the number and types of archaeological and cultural resources present throughout the region. Progressive loss of these resources overtime constitutes a significant cumulative impact. With the implementation of PD-19, Protection of Historic and Archaeological Resources, and PD-20, Protection of Previously Undiscovered Historic and Archaeological Resources, the potential cumulative impacts are reduced to less than significant.

Mitigation: No mitigation is necessary.

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4.13 VISUAL RESOURCES

This section identifies potential impacts to visual resources. The analysis includes consistency with scenic policies, effects on scenic vistas, and the effects of new sources of light and glare.

SETTING

Project Sites

The existing wastewater treatment facility, is located on Hopper Street within the developed part of the City of Petaluma. The other site, the oxidation ponds, is located southeast of the developed portion of the City along Lakeville Highway.

To evaluate the visual character of the project region, assess the quality of the study area's visual resources, and describe views of and from the potential siting areas, data were collected through ground-level reconnaissance including direct observation from public roads, and interpretation of aerial photography and site photographs.

Hopper Street

The Hopper Street site is an overall low-quality visual resource. The existing wastewater treatment facility is located on the east end of Hopper Street. Hopper Street is an unimproved street without curbs, gutters or sidewalks. The street is little used and dead ends just past the treatment plant site. Abandoned railroad tracks, a ditch filled with weedy vegetation, and commercial and light industrial uses are located north of the site. A city corporation yard, an animal control shelter, and a landscaping and building materials company are located to the west of the site.

Lakeville Highway

The Lakeville Highway site is a high-quality visual resource. Northwest-bound motorists on the highway travel through a rural agricultural area that has high visual intactness. Views of the area are striking, with the undeveloped agricultural area sharply differentiated from the developed urban landscape. Most of the views to the south from Lakeville Highway near the site are of rolling hills or agricultural lands, with few isolated dwellings or agricultural buildings. There are scattered rows of eucalyptus trees in the landscape; the primary vegetation in the area is grass. Intact ridgelines enhance the open space and rural character of the area. The developed landscape begins with views of the Oakmead/Northbay Industrial Park's landscaping to the northwest of Parcel A.

The Lakeville Highway treatment facilities are along Lakeville Highway outside the Petaluma city limits. The site of the existing ponds has been annexed to the City, but the surrounding area is not within the City limits. Figure 4.13-1 identifies the locations of the views of the project site which follow in Figures 4.13-2, 4.13-3, 4.13-4, 4.13-5 and 4.13-6.

The area southwest of the highway where the existing oxidation ponds are sited slopes gently toward the Petaluma River. The area north of the highway presents views of broad, flat, irrigated agricultural fields that transition to rolling hills. The views of the project site for southbound travelers on the highway are obscured by roadside vegetation and screened by groves of planted eucalyptus and poplar trees on the west and north sides of the site. The oxidation ponds are visible to northwest-bound travelers on the highway because the highway is slightly elevated south of the ponds, and there is little screening roadside vegetation. Access to the facility is restricted by a 6-foot-high chain-link fence, which is out of character with the rural agricultural character of the area.

Few structures are visible on the site from either northwest-bound or southeast-bound Lakeville Highway, aside from the ponds. One structure, the booster pump station, is relatively large, but is screened by 50-foot tall poplars. There is a two-story white wooden farmhouse located on Parcel A, adjacent to Lakeville Highway, as identified Figure 4.13-1.

The farmhouse is a two-story hipped roof vernacular farmhouse, with a full-length covered front porch, three-paned bay windows on the second floor, and what appears to be a summer porch at the rear of the house. The structure does not appear to have been altered much since its original construction in 1906. Although the dwelling is not eligible to the National Register of Historic Places (see Impact HA-1 in the Cultural Resources section), the site constitutes an attractive cultural landscape with ties to the agricultural roots of Petaluma.

Relevant Plans and Policies

Both the Sonoma County General Plan and Petaluma General Plan recognize the importance of the visual resources along Lakeville Highway.

Sonoma County

The Open Space Element of the Sonoma County General Plan designates a Community Separator along Highway 101 across the Petaluma River from the Lakeville site. Although somewhat close to the existing oxidation pond site, that Community Separator serves to prevent development on the southern border of Petaluma along Highway 101 and is not functionally connected to the Lakeville Highway site.

The Open Space Element also designates a Scenic Landscape Unit across Lakeville Highway from the existing oxidation ponds along the hills to the east and south. Scenic landscape units have been identified in General Plan to protect the openness of these areas and provide important visual relief from urban densities. These landscapes have little capacity to absorb development without significant impacts on their visual quality. The policies of the County General Plan relative to Scenic Landscape Units relate to properties within the Units and do not prescribe restrictions for properties nearby.

The Open Space Element designates Lakeville Highway as a scenic highway corridor and portions of the rolling hills north of Lakeville Highway as a scenic landscape unit. The following discussion provides extracts of the relevant General Plan policies.

Goal OS-3 of the General Plan states: "Identify and preserve roadside landscapes which have a high visual quality as they contribute to the living environment of local residents and to the county's tourism economy." Under Goal OS-3, the following Sonoma County policies to protect scenic corridors are:

- OS-3c – Establish a rural scenic corridor setback of 30% of the depth of the lot to a maximum of 200 feet from the centerline of the road unless a different setback is provided in the planning area policies (Section 3). Prohibit development within the setback with the following exceptions:

  4) Other new structures if they are subject to design review and:

     a) They are associated with existing structures;

     b) There is no other reasonable location for the structures;

     c) The location within the setback is necessary for the use, or

     d) Existing vegetation and topography screen the use.

- OS3h – Design public works projects to minimize tree damage and removal along scenic corridors. Where trees must be removed, design replanting programs so as to accommodate ultimate planned highway improvements. Require revegetation following grading and road cuts.

Petaluma

The Petaluma General Plan contains objectives and policies that focus on protecting the open space character and scenic qualities of the area, identifying Lakeville Highway as a scenic route outside the city's urban limit line. The General Plan recognizes that Lakeville Highway contributes to the quality of life for residents, and aids in the city's tourism potential. It also identifies the highway as "a confusing entrance to Petaluma with strong contradictions between urban and rural land use. One moment it is a country road lined on both sides by a mile-long grove of eucalyptus trees, next is a busy thoroughfare passing the City's oxidation ponds."

The Petaluma General Plan identifies specific route regulations to maintain a scenic route. These include:

- Requiring that all structures be set back a specific distance from a scenic roadway;

- Reviewing buildings for conformance with the surrounding structures and environment;

- Restricting structures from highly visible locations such as ridgelines or prominent foregrounds;

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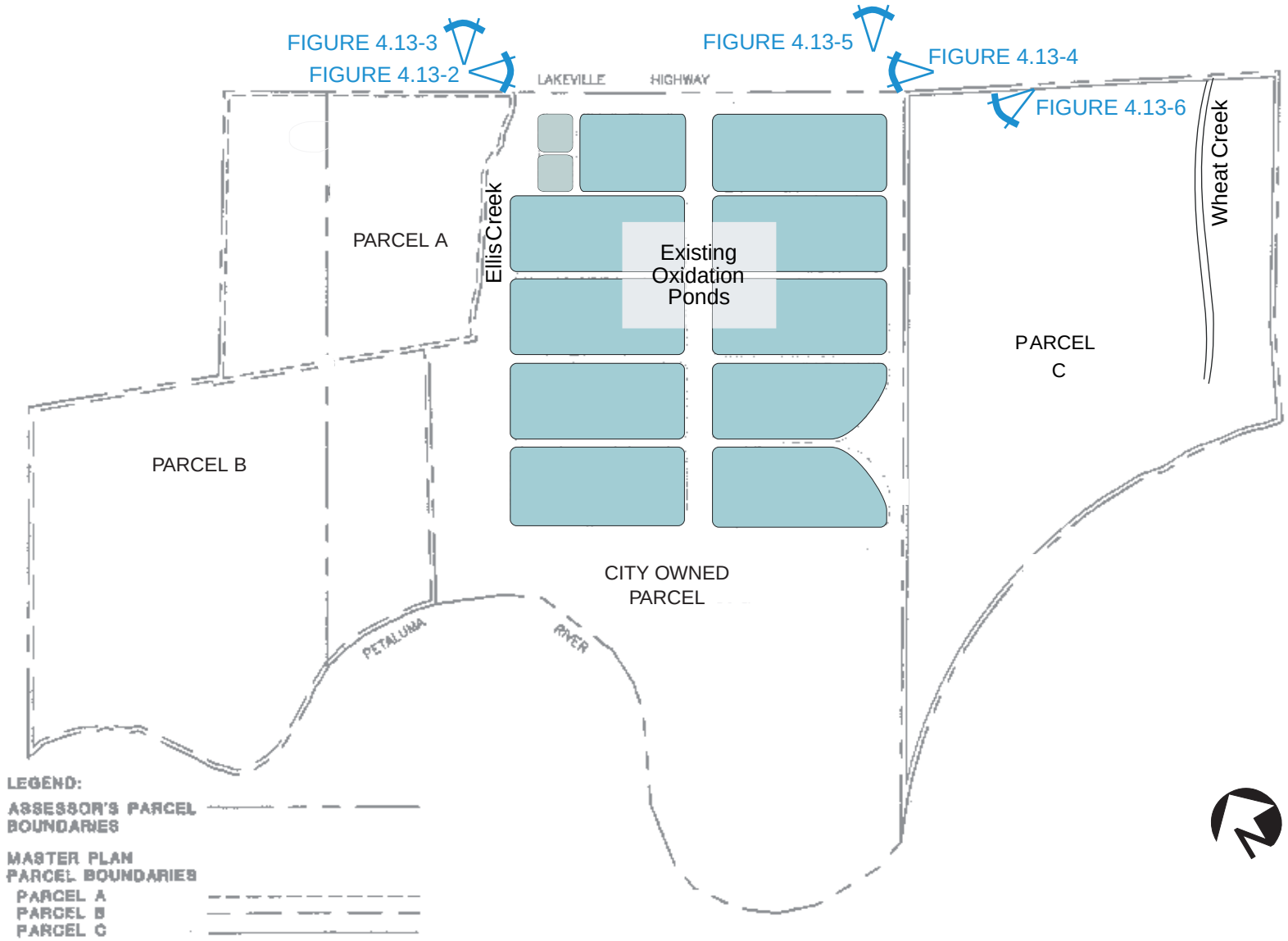

Source: Carollo Engineering

City of Petaluma
Water Recycling Facility EIR

PHOTO LOCATIONS

PARSONS

Figure 4.13-1

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City of Petaluma
Water Recycling Facility EIR

VIEW of PROJECT SITE from NORTHEAST CORNER

PARSONS

Figure 4.13-2

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City of Petaluma
Water Recycling Facility EIR

VIEW of FARMLANDS NORTHEAST of PROJECT SITE

PARSONS

Figure 4.13-3

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City of Petaluma
Water Recycling Facility EIR

VIEW of PROJECT SITE from SOUTHEAST CORNER

PARSONS

Figure 4.13-4

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City of Petaluma
Water Recycling Facility EIR

VIEW of FARMLANDS EAST of PROJECT SITE

PARSONS

Figure 4.13-5

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City of Petaluma
Water Recycling Facility EIR

VIEW of PARCEL C and PROJECT SITE BEYOND from SOUTHEAST

PARSONS

Figure 4.13-6

- Installing all utilities underground;
- Coordinating scenic roadways with bicycle routes, possibly providing wayside stops for the use of both bicyclists and drivers;
- Applying appropriate land use designations; and
- Requiring landscaping.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

These criteria are drawn primarily from local, State, and Federal agency policies and procedures, adapted where necessary to reflect CEQA requirements.

Table 4.13-1

Evaluation Criteria with Point of Significance – Visual Resources

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Sonoma County General Plan
2. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Sonoma County General Plan
3. Will the project be inconsistent with the Sonoma County Open Space Element or Petaluma General Plan regarding Scenic Corridors?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Sonoma County General Plan Petaluma General Plan
4. Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?	Proximity of project facilities to setback line.	Less than 200 feet pursuant to the County General Plan.	Sonoma County General Plan

Table 4.13-1

Evaluation Criteria with Point of Significance – Visual Resources

Evaluation Criteria	As Measured by	Point of Significance	Justification
5. Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Principles of visual management
6. Will the project cause an adverse effect on foreground views from one or more private residences?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Principles of visual management
7. Will the project create a new light source?	High intensity light or glare towards private residences.	Greater than 0 residences affected.	CEQA case law

Source: Parsons 2002

Visual impacts are generally assessed by estimating the amount of visual changes introduced by project components, the degree to which visual changes may be visible to surrounding viewer groups, and the general sensitivity of viewer groups to landscape alterations. In general, residents and travelers along scenic highways are considered to be the most sensitive to visual changes since view frequency is high, view durations are long, and viewers have high expectations of visual quality.

For evaluation criteria 1-3 and 5-6, visual impact significance is measured by three indicators: changes in visual contrast, amount of view obstruction, and degradation in visual quality. Visual contrast is significant if it is strong as a result of regraded landforms, alteration or elimination of ridgelines, and if changes introduced by the project result in landscape colors, textures, and scale of visual components which are inconsistent with the natural surroundings. View obstruction is considered significant if foreground (0-2,000 feet) or middleground (2,000 feet to one mile) views of the view area seen from sensitive viewing areas are obstructed by the project. Degraded visual quality is considered significant if the project severely alters or displaces specific scenic resources composed of striking landform features, aesthetic water bodies, mature stands of native/cultural trees, or historic structures.

IMPACTS AND MITIGATION MEASURES

IMPACT: VR-1: Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?

Analysis: *Water Recycling Facility and River Access Improvements – No Impact*

Neither the Lakeville site nor the Hopper Street site are within a designated Community Separator, and therefore do not have any impact upon the implementation of these General Plan policies.

Mitigation: No mitigation is necessary.

IMPACT: VR-2: Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?

Analysis: *Water Recycling Facility and River Access Improvements – No Impact*

The nearest scenic landscape unit identified by Sonoma County is the hills south of Petaluma, and the Open Space Element contains policies for protecting those views. The project is not located in the hills and, as stated above, is at ground level, with relatively low structures. Thus, no views of either major or minor scenic landscape units are impacted.

Mitigation: No mitigation is necessary.

IMPACT: VR-3: Will the project be inconsistent with the Sonoma County Open Space Element or Petaluma General Plan regarding Scenic Corridors?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Both the City and County designate Lakeville Highway as a Scenic Corridor, and travelers along the highway currently have high-quality views of agricultural lands. The existing facilities are currently obscured to southeast-bound travelers due to the lower elevation of the roadway relative to the site, and dense stands of eucalyptus and poplar trees. The new facilities will be partially visible from portions of Lakeville Highway, see Figure 4.13-7 for the visual simulation of the administration buildings. For northwest-bound travelers, the existing facilities are visible due to the elevation of the road above the surrounding lands, and the absence of dense screening vegetation on the southern side of the site. The existing oxidation ponds and buildings are industrial-type structures set within a relatively intact agricultural landscape. Construction of the new facilities at the Lakeville site will add additional structures and the constructed wetlands on Parcels A and B would convert current agricultural lands to wetlands. Fencing and road improvements associated with the wetlands could reduce the visual quality of views along Lakeville Highway. See Figure 4.13-8 for the visual simulation of the polishing wetlands.

Existing View

Simulated Improvements

As viewed from Lakeville Highway looking to the west.

Source: William Kanemoto & Associates

Visual Simulation
Administration Buildings

Existing View

Simulated Improvements

As viewed from Lakeville Highway looking to the south.

Source: William Kanemoto & Associates

City of Petaluma
Water Recycling Facility and
River Access Improvements EIR

Visual Simulation
Polishing Wetlands

PARSONS

Figure 4.13-8

Measure PD-19, Landscaping Design, adopted as part of this project will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway.

Because the farmhouse will be retained in approximately the same condition as existing, the project has no impact upon views of the structure and surroundings.

Mitigation: No mitigation is necessary.

IMPACT: VR-4: Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?

Analysis: *Water Recycling Facility and River Access Improvements – No Impact*

The Sonoma County General plan has a policy requiring a 200-foot minimum building setback from the center of the highway for structures along Sonoma County-designated scenic corridors. The project plan specifies a 200-foot landscaped buffer for the facilities to be constructed at the Lakeville site. Thus, the proposed project would be consistent with this Sonoma County General Plan policy.

Mitigation: No mitigation is necessary.

IMPACT: VR-5: Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

As discussed above the existing facilities are visible to northwest-bound travelers on Lakeville Highway, which can be considered a high volume travelway and the City's main entry point from the southeast.

The Hopper Street site is not visible from a high volume travelway or public use area.

Portions of the polishing wetlands on Parcel A, together with the parking area, levee stabilization, bridges, and Petaluma River dock, may be visible from Shollenberger Park. Small portions of project facilities at the oxidation pond site may also be visible from certain parts of the Park. Most of the project facilities will be about a mile away from the Park, too far from the Park to affect views adversely. Some improvements, such as the bridges and Petaluma River dock will be clearly visible from Shollenberger Park or from boat traffic on Petaluma River. Both improvements are river-related and for recreational use; although visible they will not provide a strong contrast with other man-made made river-related improvements in the area, such as the surrounding levees, radar structure, train bridge, etc. This impact is considered to be less than significant.

Measure PD-19, Landscaping Design, adopted as part of this project, will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway.

Mitigation: No mitigation is necessary.

IMPACT: VR-6: Will the project cause an adverse effect on foreground views from one or more private residences?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The nearest private residences to the project site are two or three houses associated with surrounding agricultural operations, northeast from Lakeville Highway 1,000 to 2,000 feet from the eastern boundary of the existing oxidation ponds, and are elevated slightly above them. Any changes on Parcels A and B and at the existing pond site would be potentially visible from these residences. However, since these homes are at the far edge of the foreground view, the new facilities would not provide strong visual contrast or obstruction when compared to the existing site with its wastewater treatment facilities as viewed from that distance. Conversion of agricultural lands to wetlands will not block views nor provide a major visual contrast and is not considered a significant impact. Measure PD-19, Landscaping Design, adopted as part of this project, will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway.

The Hopper Street site is not visible from private residences.

Mitigation: No mitigation is necessary.

IMPACT: VR-7: Will the project create a new light source?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The new administration and maintenance buildings at the Lakeville site will be lighted to accommodate normal office operations, the treatment facilities will be illuminated for operation and maintenance, and the parking lot on Parcel A and B will be illuminated for safety. These activities will introduce new light sources to the area, visible to both travelers and residents to the northeast. Lighting impacts to nearby residences are considered a significant impact. Demolition of the Hopper Street site would not entail new light and glare sources. Measure PD-21, Lighting Design, adopted as part of this project, requires the City to design lighting for the administration and maintenance buildings, treatment facilities and partking areas to utilize shielded, low-intensity light sources.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACT

IMPACT: VR-C1: Will the project have a cumulative potential to impact visual and open space resources?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

A number of future development projects in the City of Petaluma will result in changes to the visual resources along Lakeville Highway. However, mitigation required as part of this project (i.e., new landscaping along Lakeville Highway, retention or relocation of the farmhouse, lighting design) will soften the appearance, not only of the new facilities, but also of the existing facility. Project facilities, after implementation of mitigation, will not contribute to a regional decrease is visual values, not detract from the Lakeville entrance to Petaluma. Therefore, the project does not contribute to a cumulative visual degradation in the region.

Demolition and eventual reuse of the Hopper Street site would not have the potential for cumulatively considerable visual or open space impacts in the area because any reuse would be consistent with the provisions of the General Plan.

Mitigation: No mitigation is necessary.

REFERENCES

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City of Petaluma & Naphtali H. Knox and Associates, Inc, 1995. *Petaluma General Plan.* June 5.

Sonoma County, 1994. *Sonoma County General Plan.* March 1.

4.14 PUBLIC SERVICES AND UTILITIES

This section identifies potential impacts to public services and utilities.

SETTING

Project Sites

The existing wastewater treatment facility is located at 950 Hopper Street within a developed portion of Petaluma. The oxidation ponds and parcels A and B are located at 4400 Lakeville Highway just southeast of the Petaluma city limits.

Hopper Street

The Hopper Street facility is located in a light-industrial part of the City, and the following public services and utilities are currently being provided: fire and police protection, gas and electricity, water, telephone and solid waste disposal. Fire protection service is provided from three stations located within Petaluma (1001 North McDowell Boulevard, 831 South McDowell Boulevard, and 198 D Street) and any of the three stations can respond to an emergency at the site in less than four minutes. PG&E provides natural gas and electricity, the City of Petaluma provides potable water. Pacific Bell provides telephone service by means of an aboveground telephone line along Hopper Street. At the facility's property line, the telephone line goes underground (McAuliffe, 1995). Solid waste and biosolids produced from the treatment facilities at Hopper Street are disposed of at Redwood Sanitary Landfill.

Lakeville Highway

Oxidation Ponds

The existing oxidation ponds at the Lakeville site are located outside the City limits. The site is an island of incorporated land under the jurisdiction of Petaluma surrounded by unincorporated land under the jurisdiction of Sonoma County. The site is within the City of Petaluma Police Department's sphere of influence, but is outside the four-minute response area for the City of Petaluma Fire Department. City water service does not extend to the site. Potable water is stored in a large water tank adjacent to the administration building. PG&E supplies gas and electrical service to the site. Solid waste and biosolids produced in the oxidation ponds are disposed of at Redwood Sanitary Landfill.

Parcels A and B

Parcels A and B lie on the western boundary of the oxidation ponds, between the oxidation ponds and Oakmead/Northbay Industrial Park. They are under the jurisdiction of Sonoma County and are adjacent to the Petaluma city limits. Water and sewage services are provided by a well and septic tank.

Relevant Plans and Policies

Both the Petaluma General Plan and the Sonoma County General Plan discuss the importance of having effective services available to the public. The relevant plans and policies are discussed below.

City of Petaluma General Plan

The Petaluma General Plan includes goals, objectives and policies that focus on the importance of identifying and maintaining an acceptable level of service and utilities to the public. The General Plan addresses the issues of public services and utilities in two separate elements, which are Community Health and Safety, and Parks, Recreation, Schools, and Child Care.

Fire and Police. The Plan offers the following objective and policy as a means to provide effective fire service response:

> Objective (I): Maintain safety services at an approved level.
>
> Policy 19: The City shall continue to assure a four-minute response time for emergency vehicles unless other fire suppression measures approved by the fire chief have been instituted.

Parks and Recreation**.** One of the goals in the Parks and Recreation element is to "effectively use public facilities to serve the greatest number of Petalumans". The following objective and policy discuss how the City plans to reach the goal:

> Objective (a): Bring the amount of Petaluma park land into compliance with the City's adopted minimum standards (community park land at 3 acres per 1,000 population, and neighborhood park land at 2 acres per 1,000 population).
>
> Policy 3: The City shall acquire community parks consistent with growth of the City's population.

Water. According to the General Plan, the sources of Petaluma's water supply are 12 local wells, 6 connections to the Sonoma County Water Agency (SCWA) aqueduct, and a plant that treats water from the Lawler Reservoir and the Adobe Creek watershed.

> Objective (o): Anticipate new or peak demand for water and develop adequate supplies.
>
> Policy 31: The City shall determine the demand for water for the expected population within the Petaluma water service area, and shall consider the impacts of a peak drought or peak fire-fighting demand and determine how it would operate during a drought.

Sewage. The issue of sewage treatment is discussed in the subsection 11.12 Water Quality in the Community Health and Safety Element Policy 33 states, "The City shall maintain an updated sewage/wastewater treatment plan."

Sonoma County General Plan

The Sonoma County General Plan discusses goals, objectives and policies of public services and utilities in their Public Facilities and Services Element. The purpose of the element is to "assess the current status of these services in terms of system capacity and demand and to evaluate future capacity in relation to projected growth." The element is intended to ensure that public services are available when needed.

General Public Services and Utilities

- AR-2.3. Limit extension of urban services such as sewer beyond the urban service boundaries.

- AR-2a. Apply agricultural land use categories based on the capability of the land to produce food, fiber and plant material. Unless allowed by policy OS-1c or OS-2c (please refer to Land Use section), limit extension of urban services to these lands except by out-of-district agreement to solve a health and safety problem.

- PF-2a. Plan, design, and construct park and recreation, fire and emergency medical, public education, and solid waste services and public utilities in accordance with projected growth, except as provided in policy LU-4d.

Police and Fire. The goal regarding fire and emergency services is to assure that fire suppression and emergency services are available to meet future needs of Sonoma County residents.

- PF-2a. See PF-2a in General Public Services and Utilities above.

- PF-2.6. Integrate fire protection systems into new structures as a means of improving fire protection services through adoption of a county ordinance.

- PF-2m. Prepare a Fire Services Master Plan for urban and rural areas in cooperation with the cities, state, and other fire service agencies. The minimum contents necessary for an adequate master plan are:

  1) a statement of objectives, policies and programs,

  2) a forecast of growth,

  3) projected fire and emergency medical service needs, and

  4) a level of service assessment.

Parks and Recreation. The following objective and policy discuss the goal that assures that park and recreation sites are available to meet future needs of Sonoma County residents:

- PF-2.1. Provide an adequate supply and equitable geographic distribution of regional and local parks and recreation services, based on population projections.

- PF-2c. Use the following standards for determination of park needs. Twenty acres of regional parks per 1,000 residents countywide and five acres of local and community parks per 1,000 residents in unincorporated areas. A portion of state parklands may be included to meet the standard for regional parks.

Water and Sewer. The goal for water and sewer is to assure that water supply and wastewater management facilities are adequate to meet projected needs and are provided in a manner that preserves riparian habitats, supports water dependent resources, enhances recreational opportunities, and preserves and enhances water quality and the environment. The following objectives and policies promote this goal:

- PF-1.1. Plan for healthful water supplies and wastewater facilities adequate to serve the growth projected in the general plan.

- PF-1d. Avoid extension of sewer or water service outside a sphere of influence or urban service area. Consider exceptions to this policy only:

    1) where necessary to resolve a public health hazard resulting from existing development, or

    2) where a substantial overriding public benefit authorized by policy OS-1c or OS-2c would result, unless LAFCO has adopted a "no annexation" policy.

    3) Water service only may be approved for a property which is located within a water district boundary in existence as of March 1989.

- PF-1e. Use the following guidelines for any exception allowed by PF-1d:

    1) the property must adjoin the urban service boundary, and where water service is requested, the property must be located within a water district boundary in existence as of March 1989;

    2) size facilities to serve development consistent with the general plan;

    3) include written certification that service capacity is available;

    4) give preference to out of service area agreements rather than annexations;

5) require dedications of scenic easements to the extent allowed by law; and

6) ensure that any offered term of easement is co-terminus with the duration of service.

Solid Waste**.** According to the Sonoma County General Plan, their adopted Solid Waste Management Plan was revised in 1985. This plan is mandated by state law to identify and reserve sites for solid waste facilities and ensure that land uses adjacent to or near solid waste facilities are compatible with those facilities. The following objective allows the County to address solid waste issues:

- PF-2.9. Use the County Solid Waste Management Plan as the policy document for solid waste management in the county.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.14-1

Evaluation Criteria with Point of Significance – Public Services and Utilities

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?	• Ratio of service personnel or facilities to population; ratio of park acreage to population. • Change in response time. • Availability of water service.	• Greater than 0 change in the ratio. • Exceeds established response time standard. • Ability to meet water demand .	General Plan of Sonoma County, City of Petaluma General Plan
2. Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	Change in response times or distance away from the Project construction.	Greater than 0 change in the response time, or within 500 feet of construction.	General Plan of Sonoma County, Petaluma General Plan

Source: Parsons 2002

IMPACTS AND MITIGATION MEASURES

IMPACT: PS-1: Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Fire: The City of Petaluma Fire Department requires a four-minute response time to emergencies. This standard has been determined by Policy 19 of the 1987 Petaluma General Plan, which states, "The City shall continue to assure a four-minute response time for emergency vehicles unless other fire suppression measures approved by the fire chief have been instituted." The Lakeville Highway site is located just outside the four-minute response area. Petaluma Fire Chief Terry Krout reviewed the department response time map and determined that the four-minute response time ends at Browns Lane, which is located across Lakeville Highway on the northeast edge of the site (Ban, 2001). Measure PD-21, Fire Protection, adopted as part of this project, requires the city to provide sprinklers in new buildings, as well as fire alarms and and a weather station at the site. With implementation of this measure, the project impact on fire response time is considered less than significant.

Police: The oxidation ponds and Parcels A and B are located within the City of Petaluma Police Department's sphere of influence and would not require any modifications to the existing service. The types of police calls the Department responds to are Priority 1 calls and Priority 2 calls. Priority 1 calls are critical emergencies, such as a vehicle accident or shooting, and the current response time is under four minutes. Priority 2 calls are all other calls and the response time is between approximately 15 and 20 minutes (Sears, 2001). The Petaluma Police Department is currently serving the Lakeville site and the Project will not impede police services or response times. This impact is thus considered less than significant.

Parks and Recreation: The number of employees at the Lakeville Highway plant will increase from eight to fifteen. Because of the small increase in the number of employees, the additional seven workers will likely come from the existing population in Petaluma and will not create an impact on parks and recreation facilities. In addition, the project is providing substantial recreational opportunities on Parcels A and B.

Water and Sewer: New water service will be provided by an extension of the City water main. The existing water line terminates at the Oakmead/Northbay Business Park, approximately 0.5 miles west of the existing ponds. Sonoma County General Plan policy PF-1d states that the extension of water services outside of the urban service area should be avoided. While the existing Lakeville site is within both the urban limit line and the water service boundary, Parcels A and B are not. The Lakeville site is an island of incorporated land under the

jurisdiction of Petaluma surrounded by unincorporated land under the jurisdiction of Sonoma County. According to Policy 3 of the Urban Growth Boundary Ballot Measure:

> It is the policy of the City to build within the agreed upon Urban Growth Boundary (UGB). No urban development shall be permitted beyond the UGB. "Urban development" shall mean development requiring one or more basic municipal services including, but not limited to, water service, sewer, improved storm drainage facilities, fire hydrants and other physical public facilities and services; but shall not mean providing municipal or public services to open space uses, public or quasi-public uses such as schools or public safety facilities. Said municipal or public services or facilities can be developed beyond the UGB to provide services within the UGB.

Although Parcels A and B are outside the Urban Growth Boundary, Policy 3 allows the extension of services through the parcels in order to provide public services within the urban limit line and to serve the open space, public recreational and educational facilities on Parcels A and B. Because the Water Recycling Facility provides service to the City of Petaluma, water services may be extended through Parcels A and B, and this impact is considered less than significant.

The project is a wastewater treatment facility and any additional sewage created from the Project will be added to the treatment system. This impact is considered less than significant.

Solid Waste: Biosolids generation will increase in proportion to the capacity increase of the treatment plant. Solid waste will be taken to the Redwood Sanitary Landfill in northern Marin County. The landfill uses biosolids, as opposed to soil, when covering waste at their facility. Because the landfill will reuse the solid waste as cover, the additional biosolids taken to the facility as a result of this project will be a less than significant impact.

The demolition of the Hopper Street facility would generate materials that could either be disposed of at the Redwood Sanitary Landfill or recycled. Most of the materials can be recycled, including metals (such as copper, brass and iron), cement, electrical materials, pumps, wood, and windows and glass. Local recycling companies, such as Industrial Carting and Global Recycling in Santa Rosa, will accept most construction demolition materials. There may be a nominal transfer and handling fee for materials such as iron and payment for items such as copper and brass (Michelini, 2001). If the materials were to be disposed of, the current and anticipated landfill capacity can accommodate the demolition materials. This potential impact is considered less than significant.

Mitigation: No mitigation is necessary.

IMPACT: PS-2: Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?

Analysis: *Water Recycling Facility and River Access Improvements - No Impact*

The proposed project is not located adjacent to a police or fire department, school, park or recreation facility, therefore it will not disrupt these services. The project itself is a wastewater treatment facility and because facility operations will not be halted during construction, there will be no impact to the treatment of sewage.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: PS-C1: Will the Project have a cumulative potential to impact public services and utilities?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Cumulative development in the City of Petaluma will place additional burdens on services in the project area. However, the project has minimal impacts to public services. Thus the project is not expected to result in cumulatively significant impacts to services.

Mitigation: No mitigation is necessary.

REFERENCES

Brown and Calwell & Jones and Stokes, 1995. *City of Petaluma Wastewater Facilities Project and Long-Range Management Program.* August.

City of Petaluma & Naphtali H. Knox and Associates, Inc, 1995. *Petaluma General Plan.* June 5.

Personal Communication with Michael Ban, City of Petaluma Water Resources and Conservation Department. July 6, 2001.

Personal Communication with Tom Hargis, City of Petaluma Water Resources and Conservation Department. August 17, 2001.

Personal Communication with Chris McAuliffe. 1995.

Personal Communication with Pamela Tuft, City of Petaluma. August 17, 2001.

Personal Communication with Curtis Michelini, Industrial Carting and Global Recycling. August 14, 2001.

Personal Communication with Lieutenant Dave Sears, City of Petaluma Police Department. August 13, 2001.

Sonoma County, 1994. *Sonoma County General Plan.* March 1.

5 ALTERNATIVES TO THE PROPOSED PROJECT

INTRODUCTION

The California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) (CEQA) and the State CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.) require that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (CEQA Guidelines Section 15126.6(a)). If a project alternative would substantially lessen the significant environmental effects of a proposed project, the decision maker should not approve the proposed project unless it determines that specific technological, economic, social, or other considerations make the project alternatives infeasible (PRC Section 21002, CEQA Guidelines Section 15091 (a)(3)). The EIR must also identify alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and should briefly explain the reasons underlying the lead agency's determination (CEQA Guidelines Section 15126.6(c)).

One of the alternatives analyzed must be the "No Project" alternative. The "No Project" analysis must discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved and development continued to occur in accordance with existing plans and consistent with available infrastructure and community services (CEQA Guidelines Section 15126.6(e)(2)).

A description of the proposed project and the project objectives are provided in Chapter 2. This Chapter provides a description and analysis of the alternatives. This Chapter also provides a summary of the impacts of the alternatives in Table 5-5.

DEVELOPMENT OF ALTERNATIVES

Petaluma's efforts to replace their existing Wastewater Treatment Facility began in 1988, at which time the City was intending to use a privatized design/build/own/operate process. Contract negotiations with the selected firm were underway when the City recognized the need to develop a publicly-owned wastewater treatment alternative. In September 1998, the City began preparing a wastewater treatment facility Master Plan with the goal of defining a City-owned facility that would meet the City's wastewater treatment needs and that could serve as a benchmark for comparison with the privately-owned facility. The Master Plan was presented to the City Council on June 7, 1999, and on July 19, 1999, the City decided not to pursue the privatization option.

During preparation of the Master Plan, it was determined that additional evaluation of alternatives was appropriate. In April 2000, the City selected Carollo Engineers to review the Master Plan project and identify other treatment alternatives. Review of the Master Plan project and selection of alternatives was conducted in a four-day project workshop held in May 2000.

Criteria for evaluation of alternatives were developed and presented to the City Council on September 5, 2000. The project team was reassembled in October 2000, to review and discuss the analysis of alternatives and to determine the recommended alternatives. Criteria fall into several general categories: costs, neighborhood quality, wastewater treatment, sustainability and environment, and community amenities. The City Council considered the alternatives in November and December 2000 and selected Extended Aeration with wetlands as the preferred alternative and DAFs as an alternate algae removal process.

Predesign of the project proceeded with two options being considered for algae removal: wetlands or dissolved air flotation. In January 2002, the City Council reviewed the project and decided that wetlands for algae removal would be part of the preferred alternative. This option is now the proposed project and the subject of this EIR.

DESCRIPTION OF ALTERNATIVES

Alternatives Evaluated in EIR

All of the alternatives have common features: preliminary treatment, algae removal, nitrifying rock filter, tertiary filtration and disinfection. These facilities are described in Chapter 2, the project description. Other features of the alternatives vary as described below.

No Project Alternative

If the project or one of the treatment alternatives is not constructed, the existing treatment system will remain as the wastewater treatment facility for the City of Petaluma and Penngrove. Because the existing facility is not sized to accommodate flows projected by the adopted general plans of Petaluma and Sonoma County (relative to Penngrove), a building moratorium would be implemented at an unknown time in the future.

Alternative 1 – Advanced Facultative Ponds

This alternative would require acquisition of an additional parcel of land, known as Parcel C, located southeast of the existing oxidation ponds. Two advanced facultative ponds, which use aerobic and anaerobic zones to provide primary and secondary treatment of wastewater, would be constructed on this site. Berms for the new ponds would have to be 4 feet high on the northeast and 24 feet high on the southwest, and would have to be designed to meet small dam requirements due to their height and the volume of the pond.

Flow from the headworks would enter deep pits at the bottom of the advanced facultative ponds, where solids would be captured and anaerobically digested. Soluble organic compounds move to the upper pond layers where they are oxidized in the aerobic zones at the surface of the ponds. Mechanical aeration is provided at the surface for mixing, to maintain an aerobic cap on the pond, and to provide oxygen to reduce biological oxygen demand, thereby preventing odors. There would be 8 pits in each pond (16 pits total) each with dimensions 100 feet by 100 feet and 18 feet deep (12 feet below pond bottom). The pits would be submerged under 6-foot aerobic water zone. Figure 5-1[1] shows the layout for this alternative.

Oxidation Ponds

This option would use the existing oxidation ponds, with the exact amount of oxidation ponds available depending on the choice of an algae removal option. Surface aerators would be installed in the oxidation ponds to provide a continuous supply of oxygen during cloud-covered winter conditions. Aerators would not be needed during other times of year.

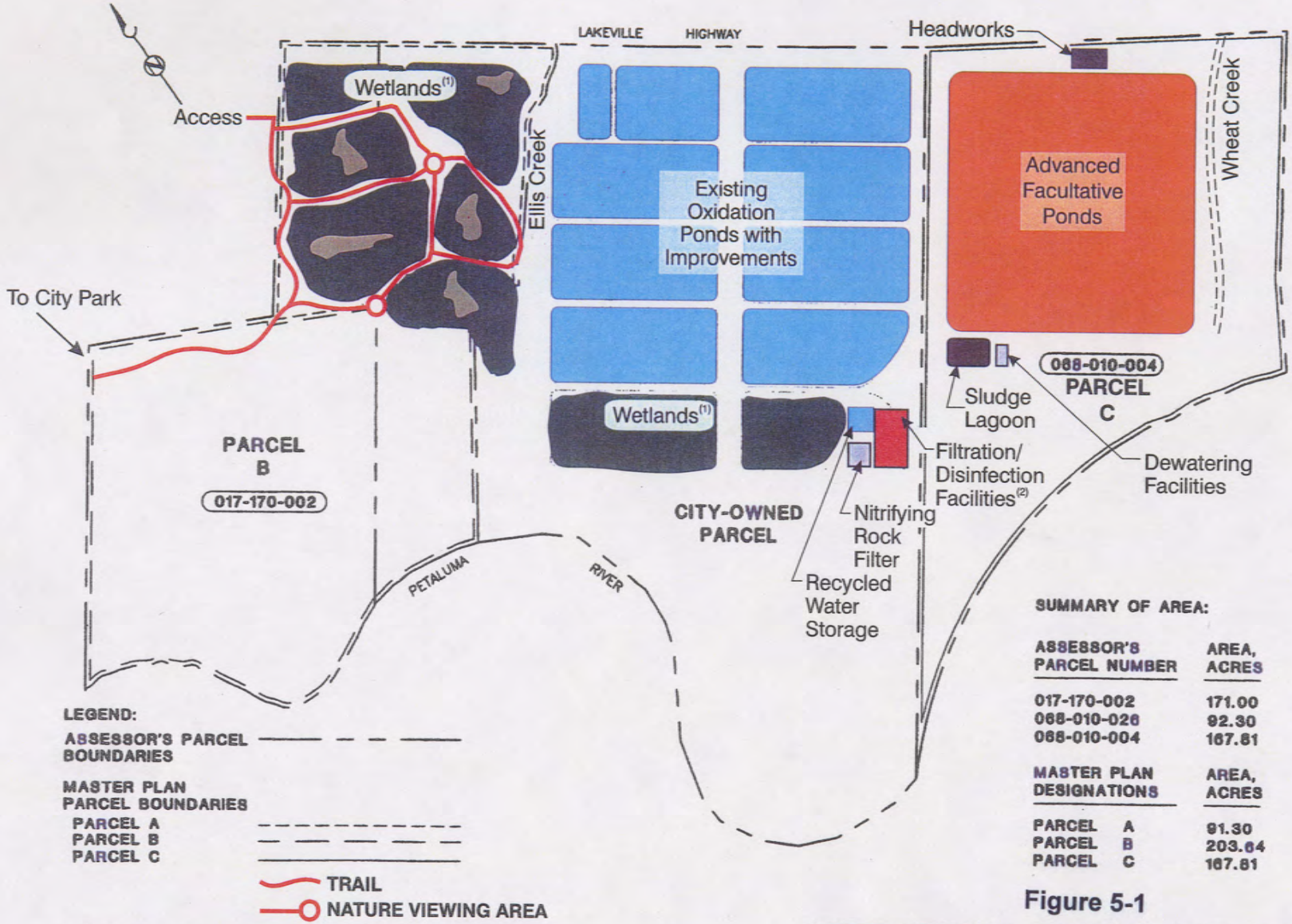
Solids Handling

Solids handling for this alternative includes dredging solids out of the pits in the advanced facultative ponds, storage of solids in a sludge lagoon, and sludge dewatering prior to beneficial reuse or disposal.

Alternative 2 – Aerated Lagoons

The aerated lagoon alternative would supply oxygen to the wastewater treatment pond through surface mechanical aerators. From the headworks, flow would enter an aerated complete mix cell, and then a series of partially mixed cells, which allow solids to settle, but are aerated to keep an aerobic cap for further treatment and odor prevention. Solids would accumulate in the bottom of the partially mixed cells, where they would be anaerobically digested. Figure 5-2 shows the layout for this alternative.

[1] The figures illustrating the various alternatives have been taken from the *Project Report* (Carollo 2000). The design of the project has continued to be refined after publication of this document, and the design of the alternatives does not reflect all of the changes to the project. The primary illustration of the alternatives is satisfactory for comparative environmental review.



SUMMARY OF AREA:

ASSESSOR'S PARCEL NUMBER	AREA, ACRES
017-170-002	171.00
068-010-026	92.30
068-010-004	167.81

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.81

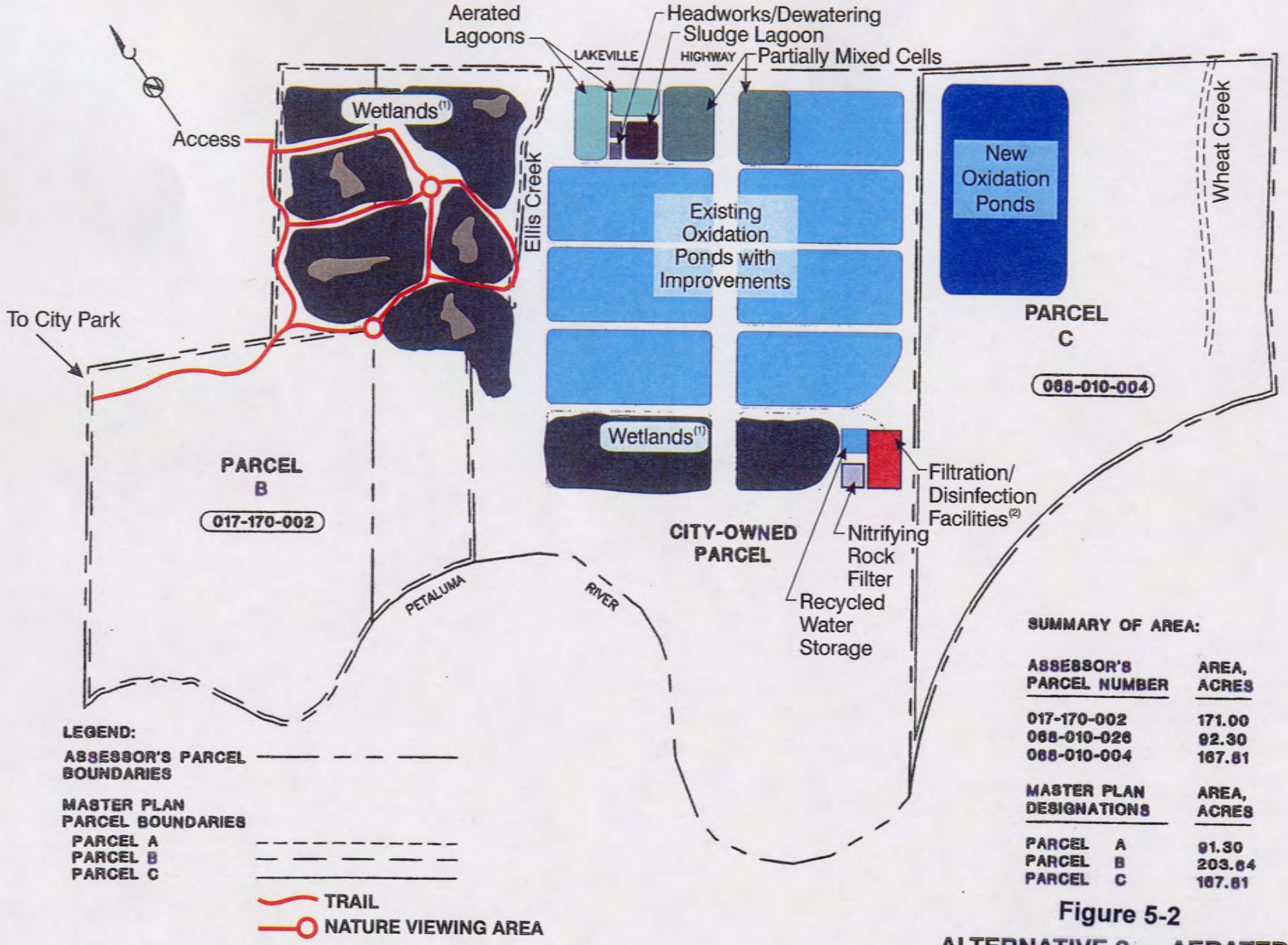
(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.

Figure 5-1

ALTERNATIVE 1 - ADVANCED FACULTATIVE POND LAYOUT (WETLANDS)

CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

Pet900rf21-6069.cdr



SUMMARY OF AREA:

ASSESSOR'S PARCEL NUMBER	AREA, ACRES
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068-010-026	92.30
068-010-004	167.61

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.61

Figure 5-2

ALTERNATIVE 2 - AERATED LAGOON LAYOUT (WETLANDS)

CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.

Pet900rf31-6069.cdr

Oxidation Ponds

This option would also use the existing oxidation ponds, but the available acreage of ponds would less because some of the existing pond area would be used for the aerated lagoons. The exact amount of oxidation ponds available depends on the choice of an algae removal option.

Solids Handling

Solids would be dredged from the bottom of the partially mixed cells on an annual basis and would be stored in a sludge lagoon. Sludge would be dewatered before reuse or disposal.

Alternative 3 – Primary Clarifiers/Ponds

This alternative uses primary clarifiers located at the site of existing Pond 1 for removal of solids and anaerobic digesters for digestion of solids and recover of methane. New oxidation ponds would have to be constructed on Parcel C. Flow from the headworks would go to four 65-foot diameter clarifiers for advanced primary treatment; ferric chloride would be added for odor control. Figure 5-3 shows the layout for this alternative.

Oxidation Ponds

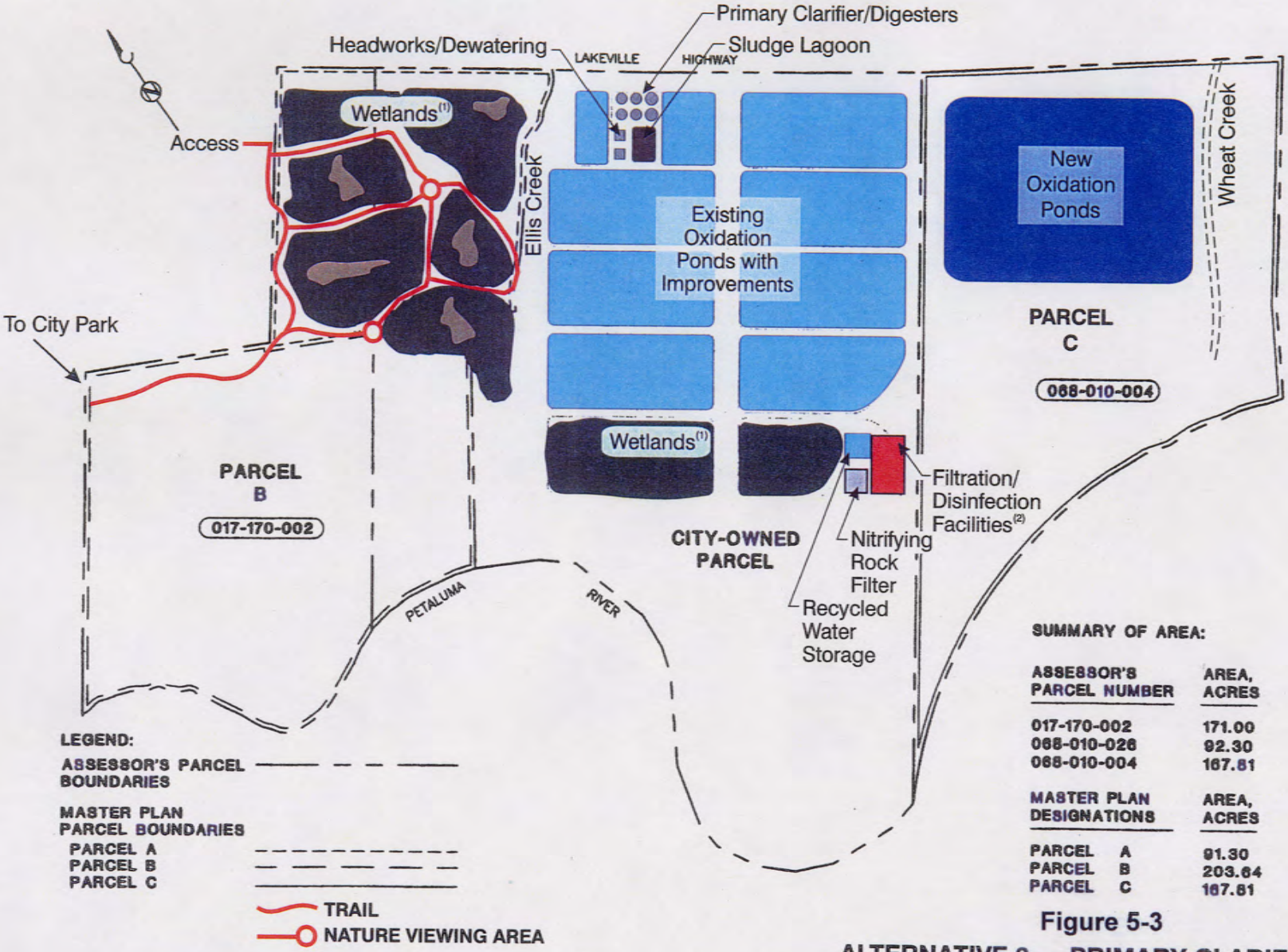
Effluent from the primary clarifier would be diverted to the existing aerated lagoon, where a large portion of the remaining solids would be captured. Effluent from the aerated lagoon would then go to the existing oxidation ponds. The exact amount of oxidation ponds available would depend on the choice of an algae removal option. Berms for any new oxidation ponds would be designed to meet small dam requirements. Surface aerators would be installed in the existing aerated lagoon and oxidation ponds to ensure adequate treatment is provided.

Solids Handling

Primary solids would be digested in two 60-foot-diameter anaerobic digesters. A cogeneration facility would convert the methane gas captured in the anaerobic digester into electricity to provide power for the plant facilities. Primary effluent solids collected in the aerated lagoon would be dredged out, stored in a sludge lagoon and mixed with the digested solids for sludge dewatering before reuse or disposal.

Alternative 4 – Hopper Street (Activated Sludge)

In this alternative, the headworks/preliminary treatment, primary clarifiers, aeration basins, secondary clarifiers and solids handling facilities would all be located at Hopper Street. Secondary effluent would be transported to the existing



SUMMARY OF AREA:

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068-010-004	167.81

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.81

Figure 5-3

ALTERNATIVE 3 - PRIMARY CLARIFIERS/ PONDS LAYOUT (WETLANDS)

CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.

Pet900rf23-6069.cdr

Lakeville Highway oxidation pond system for storage, tertiary treatment and disinfection. Figures 5-4 and 5-5 show the layout of treatment facilities at Hopper Street and Lakeville Highway.

Oxidation Ponds

The exact amount of available oxidation ponds available would depend on the choice of an algae removal option. During winter months bypass of effluent flows above 8.5 mgd would occur at Hopper Street, increasing the loading rate to the oxidation ponds. At these times, the existing aerators in the aerated lagoon and Pond 1 would be used to provide additional treatment and prevent odor on cloud-covered days.

Solids Handling

Solids handling includes thickening of waste activated sludge, digestion of primary and waste activated sludge solids, cogeneration of the methane produced in the digesters, and dewatering of the digested solids. All solids handling facilities would be located at Hopper Street.

Design Options Evaluated in the EIR

There are three design issues associated with the project and each of the alternatives. These are: methodology for algae removal; implementation of River Access Improvements; and treatment for metals, nutrients, and organics. Each of these design issues and the related options are discussed below.

Algae Removal

Algae, which are generated in the oxidation ponds and provide oxygen for biological treatment of the wastewater, will need to be removed in order to meet discharge and reuse requirements. Algae removal can be provided by either a wetlands treatment system or dissolved air flotation (DAF) thickeners. Alternatives 1 through 4 can be designed with either the wetlands (Option A) or the dissolved air flotation (Option B) option for algae removal. For the proposed project, the wetlands option has been selected, although extended aeration could be combined with dissolved air flotation. Wetlands remove algae biologically and would be located on the oxidation pond site. DAF thickeners remove algae mechanically, and chemicals are added to enhance performance. DAF thickeners would be located on the existing plant site, in a portion of the southeast pond.

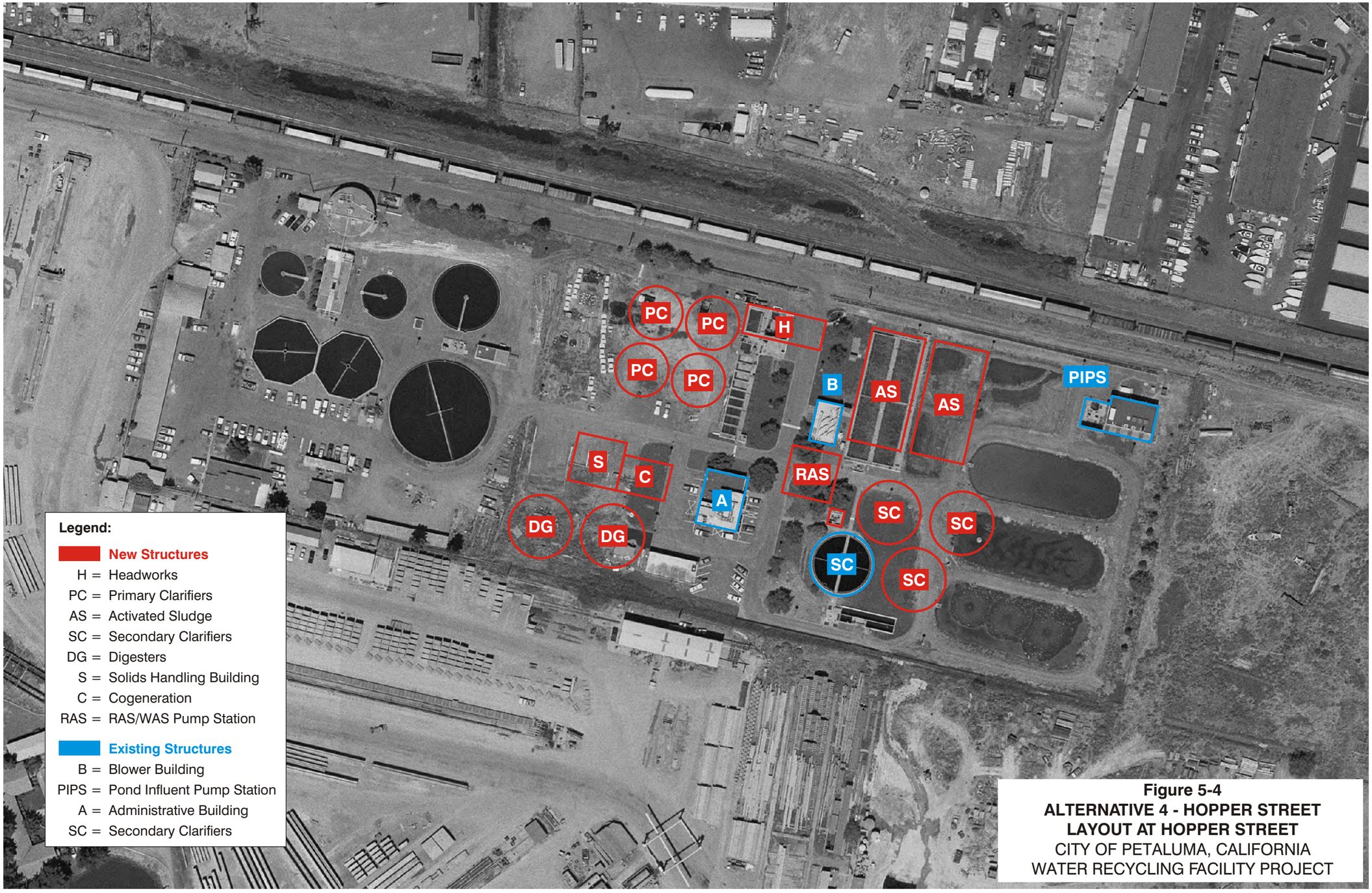
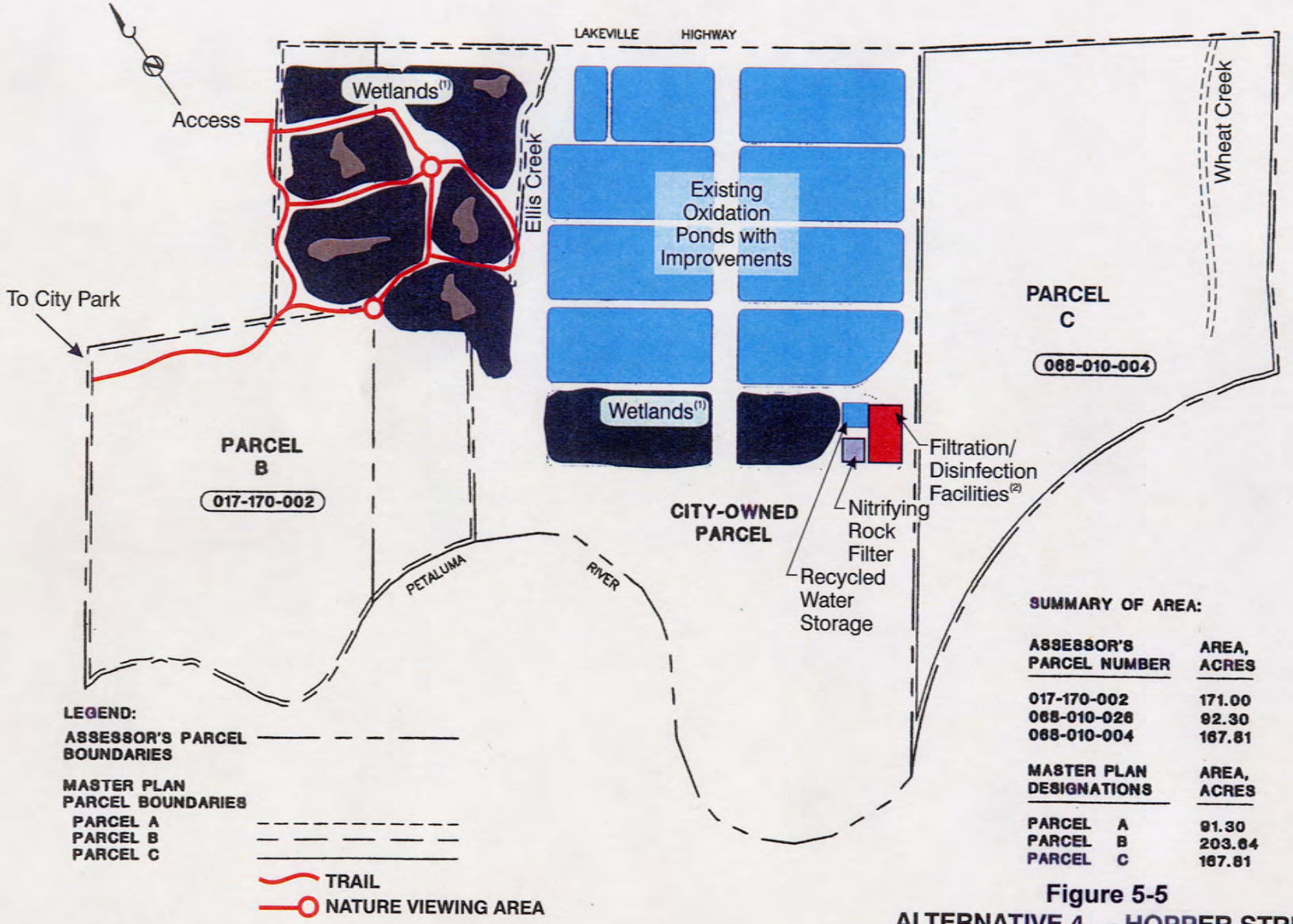


Figure 5-4
ALTERNATIVE 4 - HOPPER STREET
LAYOUT AT HOPPER STREET
CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

pet1000rf1.cdr



SUMMARY OF AREA:

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068-010-004	167.81

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.81

(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.
(3) Primary clarifiers, activated sludge and solids handling located at Hopper Street.

Figure 5-5
ALTERNATIVE 4 - HOPPER STREET LAYOUT(3) (WETLANDS)
CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

Pet900rf24-6069.cdr

River Access Improvements

The River Access Improvements are included in the project and are described in Chapter 2, the Project Description. They can be implemented in conjunction with any of the alternatives. It is also feasible to meet most of the project objectives even if the River Access Improvements are not built.

Treatment for Metals, Nutrients, and Organics

Treatment for metals, nutrients, and organics can be accomplished by any of three options:

- Small treatment wetlands in Ponds No. 9 and 10 plus polishing wetland
- DAFs plus polishing wetland
- Large treatment wetland

Each of these options can be combined with alternatives 1-4 or extended aeration. The project is designed with small treatment wetlands in Ponds No. 9 and 10 plus the polishing wetlands.

Cost Comparison

Table 5-1 shows the preliminary costs for the five treatment alternatives considered in the Carollo 2000 Project Report Costs include capital costs to construct the facilities, annual operation and maintenance costs, and total annualized costs. Costs are shown for both options for algae removal: wetlands and dissolved air flotation (DAFs). The preferred alternative, extended aeration, was further developed and modified during predesign for both the wetlands and DAF options. Table 5-2 shows the revised cost estimates for the preferred alternative based on the Carollo 2002 Predesign Report. The basis of costs for Tables 5-1 and 5-2 are different in a number of ways: the 2002 costs were based on a higher construction cost index and higher electrical costs but did not include costs for land acquisition or demolition of Hopper Street Facilities.

Table 5-1

Preliminary Cost Estimate from November 2000 (in millions)

	Extended Aeration (Preferred Alternative)		Alternative 1 Advanced Facultative Ponds		Alternative 2 Aerated Lagoon		Alternative 3 Primary Clarifiers/Ponds		Alternative 4 Hopper Street	
	Wetlands	**DAFs**	**1A Wetlands**	**1B DAFs**	**2A Wetlands**	**2B DAFs**	**3A Wetlands**	**3B DAFs**	**4A Wetlands**	**4B DAFs**
Construction Cost[1]	$63.8	$58.8	$65.9	$63.3	$59.2	$49.9	$67.4	$58.3	$78.3	$74.4
Total Project Cost[2]	$90.7	$81.3	$94.8	$87.3	$85.9	$69.2	$96.9.	$80.6	$109.7	$101.7
Annualized Project Cost[3]	$7.1	$6.4	$7.4	$6.8	$6.7	$5.4	$7.6	$6.3	$8.6	$8.0
Annual Operation & Maintenance Cost[4]	$3.1	$3.6	$2.4	$3.0	$2.7	$3.2	$2.5	$3.0	$3.3	$3.8
Total Annualized Cost[5]	$10.2	$10.0	$9.8	$9.8	$9.4	$8.6	$10.1	$9.3	$11.9	$11.8

Source: Carollo Engineers, November 2000

[1]Construction costs based on June 2004 dollars (the mid-point of construction) using a San Francisco Engineering News Record Construction Cost Index of 7800. Each alternative assumes ultraviolet light disinfection.
[2]Includes demolition of facilities at Hopper Street, land acquisition, and a contingency of 35 percent for engineering, legal, administration and construction change orders.
[3]Annualized costs were calculated by using a 25-year life at an interest rate of 6 percent.
[4]Based on June 2004 dollars. Includes equipment replacement, chemical use, power, labor and solids handling.
[5]Annualized project cost + annual operation and maintenance cost.

Table 5-2

Predesign Cost Estimates of Wetlands and DAF Options from February 2002 (in millions)

	DAF	Wetlands [6]
Construction Costs[1]	$58.7	$63.0
ELAC Costs[2]	$20.5	$22.1
Annualized Total Project Costs[3]	$6.2	$6.7
Annual Operation & Maintenance Costs[4]	$5.0	$4.9
Total Annualized Costs[5]	$11.2	$11.6

Source: Carollo Engineers, February 2002

[1]Construction costs are based on December 2004 dollars (mid-pt. of construction) using a San Francisco ENRCCI of 7925.
[2]ELAC costs include engineering, legal, administration, and construction contingency. Costs do not include Hopper Street Plant demolition, land acquisition, easements, or right of way.
[3]Project costs annualized over 25 years at 6 percent interest rate.
[4]Includes equipment replacement, chemical use, power, labor, solids handling, and wetlands maintenance based on December 2004 dollars.
[5]Annualized total project costs plus annual O&M cost.
[6]Cost includes 30 "wet" acres of polishing wetlands on Parcels A/B.

Alternatives Considered but Rejected

Disinfection Options

The City proposes to use ultraviolet light (UV) as the primary mode of disinfection for meeting Title 22 unrestricted reuse. The existing sodium hypochlorite system and bisulfite at the Lakeville site is being retained to provide disinfection for river discharge and for agricultural reuse as well as to control potential algae growth in the recycled water distribution system. The City also considered sodium hypochlorite and ozone for the overall method of disinfection. The comparison is presented in Section 7.7.1 of the Project Report. Ozone was rejected because of its very high construction and operations and maintenance cost. In addition, because there is little experience using ozone to meet Title 22 criteria for recycling. Design criteria are not well-established.

Reuse of Existing Hopper Street Facilities

During the value engineering workshop conducted for the project alternatives, it was determined that existing Hopper Street facilities are mostly unusable to the general age of the facilities, cracking and leaking of most of the concrete structures, severe corrosion of the underground piping and utilities, failure to meet current building and seismic codes, and the large expense required to rehabilitate the facilities. The workshop participants concluded that for reliable long-term treatment, any alternative that includes treatment facilities at Hopper Street would require construction of new facilities. A detailed

evaluation of each facility at Hopper Street is presented in Table 3 of Appendix A of the Project Report.

Alternative Treatment Processes

A variety of alternative treatment processes were considered in the value engineering workshop conducted for the project, but were rejected for a variety of reasons. Table 5-4, provides a summary of the treatment trains considered, and the reason that each was rejected.

Table 5-3

Treatment Processes Considered but Rejected

Treatment Train	Reason for Rejection
AFP⇒AFP⇒smaller oxidation ponds⇒wetlands	This alternative was determined to have no advantages over the Advanced Facultative Pond alternative, and it has the disadvantage that AFPs are more difficult to manage than smaller oxidation ponds.
Expanded oxidation ponds⇒wetlands	This alternative requires 360 acres of land and would therefore not allow sufficient room for wetlands, while staying within Parcels A, B, and C.
AFP⇒aerated lagoon⇒oxidation ponds⇒wetlands	This alternative was determined to have no advantages over the Advanced Facultative Pond alternative, as it does not provide any savings in either land or aeration requirements.
Upflow anearobic sludge blanket reactor	This alternative was eliminated due to a lack of experience with this process at comparably sized facilities in the United States. This process also has high operation and maintenance cost because frequent grit and solids removal from the tanks is required.
Primary clarifiers⇒trickling filters/solids contact⇒oxidation ponds	This option was eliminated because trickling filters have no significant advantage over other alternatives. They would be significantly taller than any other facilities, resulting in aesthetic impacts.
Primary clarifiers⇒activated sludge/submerged microfilter⇒oxidation ponds	This option was eliminated due to high costs. It is also a relatively new process and does not provide clear advantage over the other alternatives to justify the increased cost.
Primary clarifiers⇒roughing filters⇒oxidations ponds	This option was eliminated because roughing filters have no significant advantage over other alternatives. They would be significantly taller than any other facilities, resulting in aesthetic impacts.
Extended aeration (Carousel/Oxidation Ditch) ⇒oxidation ponds	This option is a minor variation of the proposed process, which employs extended aeration using the Biolac process, then oxidation ponds. This minor variation would not have substantially different impacts and could be evaluated

Table 5-3

Treatment Processes Considered but Rejected

Treatment Train	Reason for Rejection
	further in predesign.
Sequencing batch reactor⇒oxidation ponds	This option is a minor variation of the proposed process, which employs extended aeration using the Biolac process, then oxidation ponds. This minor variation would not have substantially different impacts and could be evaluated further in predesign.
Options for wet weather flow equalization – bypass conventional secondary treatment to oxidation ponds or add wet weather facilities such as additional primary clarifiers or ballasted flocculation	Wet weather options were evaluated for each alternative, and it was determined that a temporary wet weather bypass to the ponds would be more cost-effective than construction of wet weather treatment facilities.

Source: Carollo Engineers, May 2001

AFP = Advanced Facultative Pond

Privatization

On July 19, 1999 the City Council determined that the City would no longer pursue development of a privately owned wastewater treatment facility and that the new facility would be publicly owned. The City Council formalized this action with adoption, on September 21, 1999, of Resolution No. 99-188, which terminated the privatization process and established City ownership of the new wastewater treatment facility. Reasons cited for this determination included:

- Risk of change required over 30-year contract term. Changes in the City's needs and State and federal requirements may occur during the 30-year life of the contract. The City is at a disadvantage by being able to negotiate with only one part for changes in the facility's capacity.
- Requirement of fair market value purchase. In order for the private company, Montgomery United Water, to retain tax ownership, the City's option to purchase the facility at the end of the term would have to be at fair market value. The price of the facility could not be fixed in the contract, but would depend on the value of the facility at the time of the exercise of the option, thereby putting the city and ratepayers at risk of having to pay for part of the plant twice.
- Lack of City approval of design. In order for Montgomery United Water to retain tax ownership, Section 4.8.1 of the agreement limited the City's participation in the design process.

- Third party services. For Montgomery United Water to reatin tax ownership, Section 5.2.4 of the agreement would allow the company to provide services to others (in addition to the City) at the project site.
- Inability to agree on contract language. After extensive negotiations between the City and Montgomery United Water, specific agreed upon contract language on the above and other critical issues became more difficult, and complexities continued to grow.

Relocate Polishing Wetlands to Parcel B

The project includes an option to create wetlands on Parcels A and B. Relocation of the wetlands to site them entirely within Parcel B has been suggested. This was determined not to be feasible for two reasons. The City's intent is to avoid effects to existing wetlands to the extent possible. If existing, naturally-occurring wetland sites were used for the proposed wetlands, created wetlands used for polishing would not fully mitigate the loss of existing wetlands. Second, Parcel B is too low and water would have to be pumped up to get it back to the discharge pipeline. To minimize energy requirements, it is desirable that flows travel through the treatment system by gravity flow, avoiding pumping where possible.

ALTERNATIVES IMPACT COMPARISON

Table 5-4 provides a comparison of the impacts associated with the alternatives to the Petaluma Water Recycling Facility. The primary alternatives differ in type of treatment, utilization of Parcel C, and maintenance of facilities at Hopper Street. Except for a few issues, the impacts of each basic alternative are the same. Table 5-4 lists only the issues where substantial differences in environmental impacts have been identified. Directly after Table 5-4 is a comparison of the impacts of the three design options.

TABLE 5-4

Alternative Impact Comparison

Impact	Project	No Project	1-Advanced Facultative Ponds	2-Aerated Lagoons	3-Primary Clarifiers/Ponds	4-Hopper Street
AG-1. Will the project or alternatives cause loss of farmland?	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B. With mitigation this can be reduced to about 80 acres.	No impact.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B plus 60 acres on Parcel C. With mitigation this can be reduced to about 140 acres.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B plus 25 acres on Parcel C. With mitigation this can be reduced to about 105 acres.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B plus 40 acres on Parcel C. With mitigation this can be reduced to about 120 acres.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B. With mitigation this can be reduced to about 80 acres.
GEO-4. Will the project or alternatives be subject to geological hazards?	Less than Significant	Significant. Existing facilities include older structures that will be less likely to withstand strong ground shaking, or associated seismic hazards.	Less than Significant	Less than Significant	Less than Significant	Less than Significant
GW-1. Will the project or alternatives degrade groundwater at existing drinking water wells?	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Significant. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.

TABLE 5-4

Alternative Impact Comparison

Impact	Project	No Project	1-Advanced Facultative Ponds	2-Aerated Lagoons	3-Primary Clarifiers/Ponds	4-Hopper Street
WQ-1, 2. Will discharge from the project or alternatives exceed criteria for surface water quality?	Less than Significant after mitigation.	Significant. With growth of the population, as projected in the adopted general plans of Petaluma and the County of Sonoma for Penngrove, water quality criteria will be exceeded.	Less than Significant after mitigation.	Less than Significant after mitigation.	Less than Significant after mitigation.	Less than Significant after mitigation.
BIO-7. Will the project or alternatives cause loss of wetlands or waters of the U.S.?	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss.	No impact	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss, plus likely loss of some wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss.

Impact Comparison of Design Options

Algae Removal

Both the wetlands and DAFs for algae removal can be placed in ponds 9 and 10 on the existing oxidation pond site. The DAFs require slightly more energy to operate. Otherwise environmental impacts are similar.

River Access Improvements

The River Access Improvements cause impacts to a number of biological resources, each of which can be mitigated. These impacts could be avoided by not implementing the River Access Improvements.

Treatment for Metals, Nutrients, and Organics

The option for a small algae-removal wetland plus polishing wetland and the option for DAFs plus polishing wetland have essentially the same impacts. The option for the large treatment wetlands requires slightly more land on Parcels A and B than the polishing wetlands, but the difference is not substantial. In either case, Parcels A and B would be converted from an agricultural use to a wetlands and public recreational and education use, since they will function as a buffer for the Water Recycling Facility.

5 ALTERNATIVES TO THE PROPOSED PROJECT

INTRODUCTION

The California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) (CEQA) and the State CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.) require that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (CEQA Guidelines Section 15126.6(a)). If a project alternative would substantially lessen the significant environmental effects of a proposed project, the decision maker should not approve the proposed project unless it determines that specific technological, economic, social, or other considerations make the project alternatives infeasible (PRC Section 21002, CEQA Guidelines Section 15091 (a)(3)). The EIR must also identify alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and should briefly explain the reasons underlying the lead agency's determination (CEQA Guidelines Section 15126.6(c)).

One of the alternatives analyzed must be the "No Project" alternative. The "No Project" analysis must discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved and development continued to occur in accordance with existing plans and consistent with available infrastructure and community services (CEQA Guidelines Section 15126.6(e)(2)).

A description of the proposed project and the project objectives are provided in Chapter 2. This Chapter provides a description and analysis of the alternatives. This Chapter also provides a summary of the impacts of the alternatives in Table 5-5.

DEVELOPMENT OF ALTERNATIVES

Petaluma's efforts to replace their existing Wastewater Treatment Facility began in 1988, at which time the City was intending to use a privatized design/build/own/operate process. Contract negotiations with the selected firm were underway when the City recognized the need to develop a publicly-owned wastewater treatment alternative. In September 1998, the City began preparing a wastewater treatment facility Master Plan with the goal of defining a City-owned facility that would meet the City's wastewater treatment needs and that could serve as a benchmark for comparison with the privately-owned facility. The Master Plan was presented to the City Council on June 7, 1999, and on July 19, 1999, the City decided not to pursue the privatization option.

During preparation of the Master Plan, it was determined that additional evaluation of alternatives was appropriate. In April 2000, the City selected Carollo Engineers to review the Master Plan project and identify other treatment alternatives. Review of the Master Plan project and selection of alternatives was conducted in a four-day project workshop held in May 2000.

Criteria for evaluation of alternatives were developed and presented to the City Council on September 5, 2000. The project team was reassembled in October 2000, to review and discuss the analysis of alternatives and to determine the recommended alternatives. Criteria fall into several general categories: costs, neighborhood quality, wastewater treatment, sustainability and environment, and community amenities. The City Council considered the alternatives in November and December 2000 and selected Extended Aeration with wetlands as the preferred alternative and DAFs as an alternate algae removal process.

Predesign of the project proceeded with two options being considered for algae removal: wetlands or dissolved air flotation. In January 2002, the City Council reviewed the project and decided that wetlands for algae removal would be part of the preferred alternative. This option is now the proposed project and the subject of this EIR.

DESCRIPTION OF ALTERNATIVES

Alternatives Evaluated in EIR

All of the alternatives have common features: preliminary treatment, algae removal, nitrifying rock filter, tertiary filtration and disinfection. These facilities are described in Chapter 2, the project description. Other features of the alternatives vary as described below.

No Project Alternative

If the project or one of the treatment alternatives is not constructed, the existing treatment system will remain as the wastewater treatment facility for the City of Petaluma and Penngrove. Because the existing facility is not sized to accommodate flows projected by the adopted general plans of Petaluma and Sonoma County (relative to Penngrove), a building moratorium would be implemented at an unknown time in the future.

Alternative 1 – Advanced Facultative Ponds

This alternative would require acquisition of an additional parcel of land, known as Parcel C, located southeast of the existing oxidation ponds. Two advanced facultative ponds, which use aerobic and anaerobic zones to provide primary and secondary treatment of wastewater, would be constructed on this site. Berms for the new ponds would have to be 4 feet high on the northeast and 24 feet high on the southwest, and would have to be designed to meet small dam requirements due to their height and the volume of the pond.

Flow from the headworks would enter deep pits at the bottom of the advanced facultative ponds, where solids would be captured and anaerobically digested. Soluble organic compounds move to the upper pond layers where they are oxidized in the aerobic zones at the surface of the ponds. Mechanical aeration is provided at the surface for mixing, to maintain an aerobic cap on the pond, and to provide oxygen to reduce biological oxygen demand, thereby preventing odors. There would be 8 pits in each pond (16 pits total) each with dimensions 100 feet by 100 feet and 18 feet deep (12 feet below pond bottom). The pits would be submerged under 6-foot aerobic water zone. Figure 5-1[1] shows the layout for this alternative.

Oxidation Ponds

This option would use the existing oxidation ponds, with the exact amount of oxidation ponds available depending on the choice of an algae removal option. Surface aerators would be installed in the oxidation ponds to provide a continuous supply of oxygen during cloud-covered winter conditions. Aerators would not be needed during other times of year.

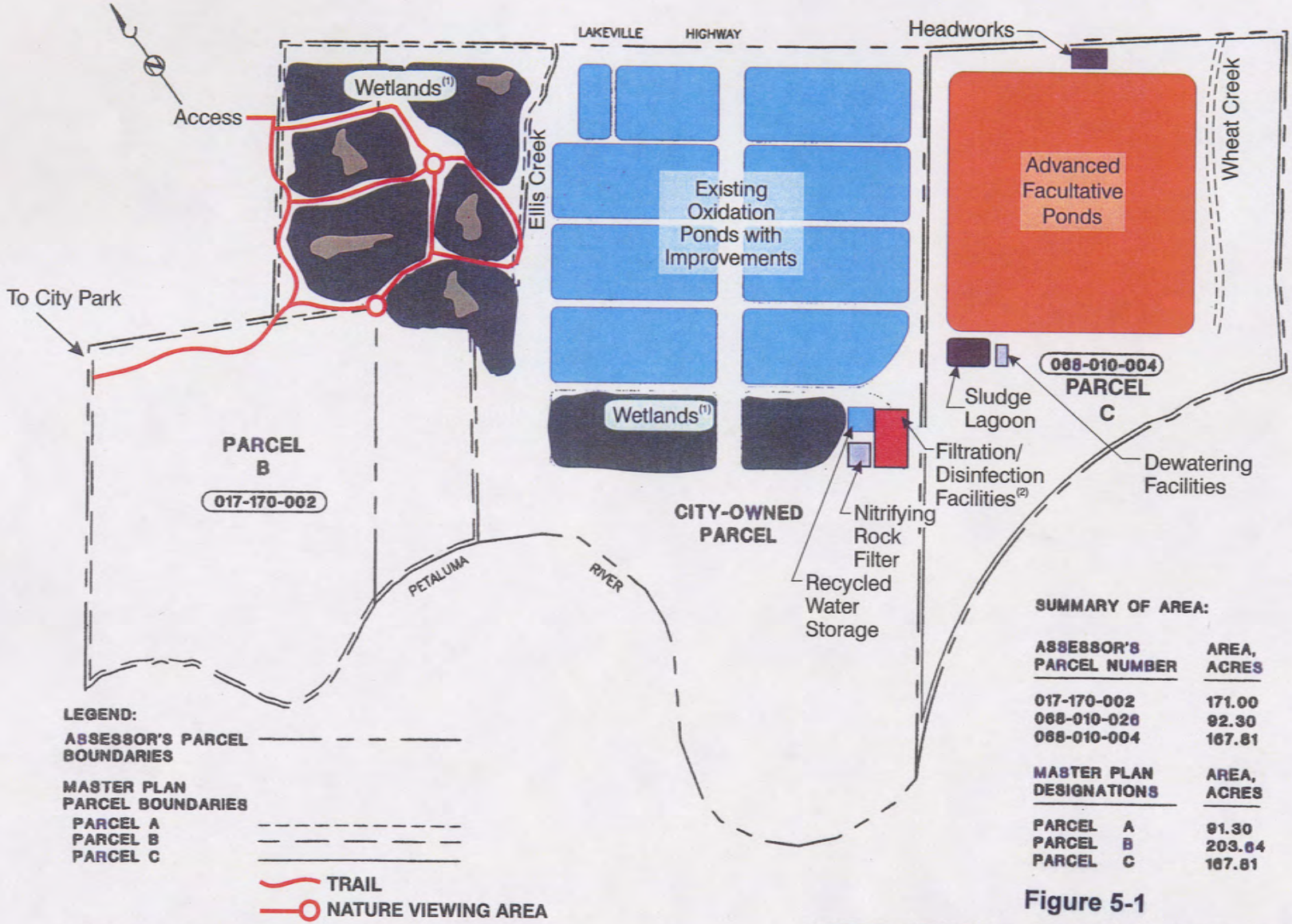
Solids Handling

Solids handling for this alternative includes dredging solids out of the pits in the advanced facultative ponds, storage of solids in a sludge lagoon, and sludge dewatering prior to beneficial reuse or disposal.

Alternative 2 – Aerated Lagoons

The aerated lagoon alternative would supply oxygen to the wastewater treatment pond through surface mechanical aerators. From the headworks, flow would enter an aerated complete mix cell, and then a series of partially mixed cells, which allow solids to settle, but are aerated to keep an aerobic cap for further treatment and odor prevention. Solids would accumulate in the bottom of the partially mixed cells, where they would be anaerobically digested. Figure 5-2 shows the layout for this alternative.

[1] The figures illustrating the various alternatives have been taken from the *Project Report* (Carollo 2000). The design of the project has continued to be refined after publication of this document, and the design of the alternatives does not reflect all of the changes to the project. The primary illustration of the alternatives is satisfactory for comparative environmental review.



SUMMARY OF AREA:

ASSESSOR'S PARCEL NUMBER	AREA, ACRES
017-170-002	171.00
068-010-026	92.30
068-010-004	167.81

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.81

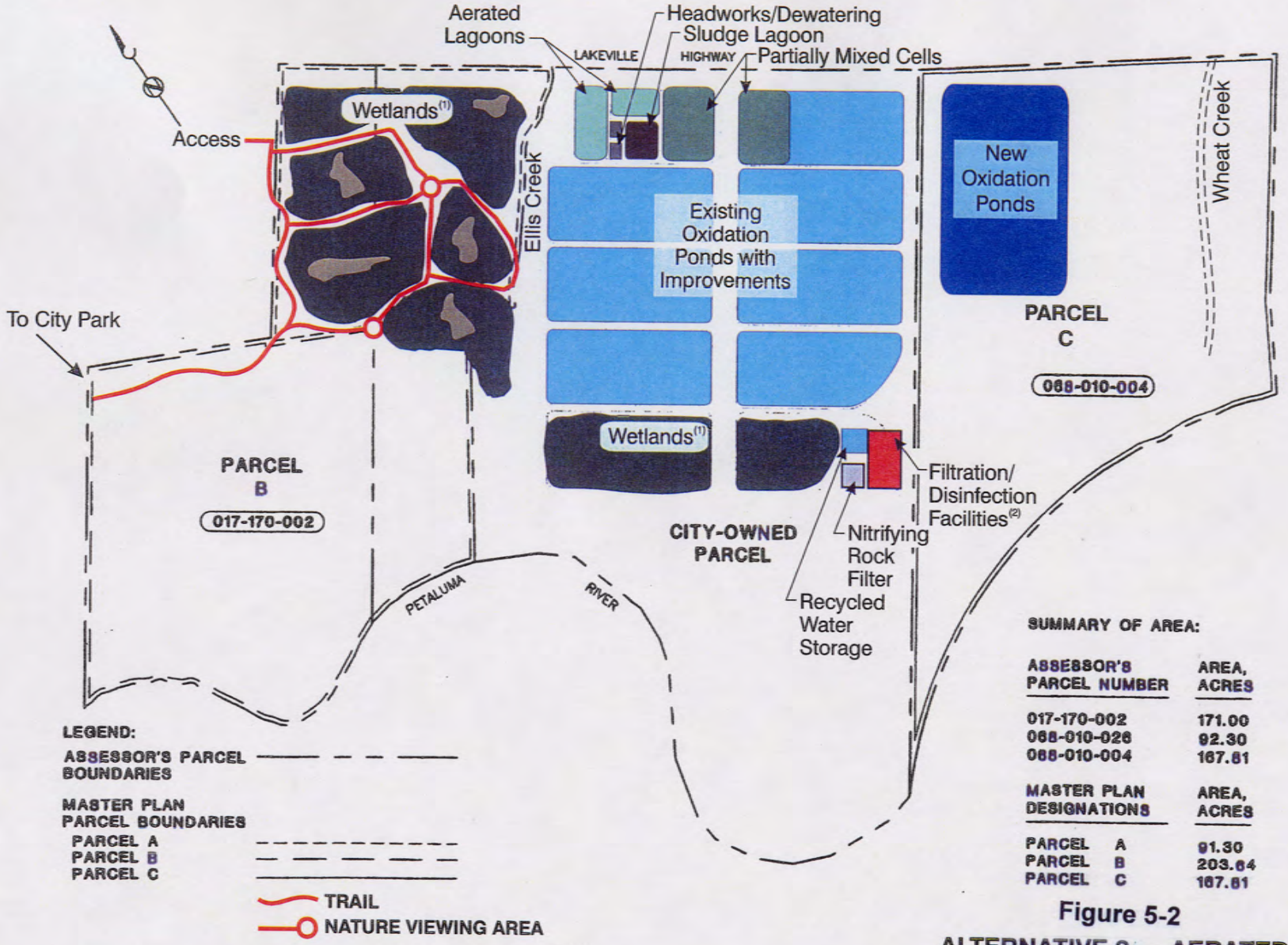
(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.

Figure 5-1

ALTERNATIVE 1 - ADVANCED FACULTATIVE POND LAYOUT (WETLANDS)

CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

Pet900rf21-6069.cdr



SUMMARY OF AREA:

ASSESSOR'S PARCEL NUMBER	AREA, ACRES
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068-010-026	92.30
068-010-004	167.61

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.61

Figure 5-2

ALTERNATIVE 2 - AERATED LAGOON LAYOUT (WETLANDS)

CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.

Pet900rf31-6069.cdr

Oxidation Ponds

This option would also use the existing oxidation ponds, but the available acreage of ponds would less because some of the existing pond area would be used for the aerated lagoons. The exact amount of oxidation ponds available depends on the choice of an algae removal option.

Solids Handling

Solids would be dredged from the bottom of the partially mixed cells on an annual basis and would be stored in a sludge lagoon. Sludge would be dewatered before reuse or disposal.

Alternative 3 – Primary Clarifiers/Ponds

This alternative uses primary clarifiers located at the site of existing Pond 1 for removal of solids and anaerobic digesters for digestion of solids and recover of methane. New oxidation ponds would have to be constructed on Parcel C. Flow from the headworks would go to four 65-foot diameter clarifiers for advanced primary treatment; ferric chloride would be added for odor control. Figure 5-3 shows the layout for this alternative.

Oxidation Ponds

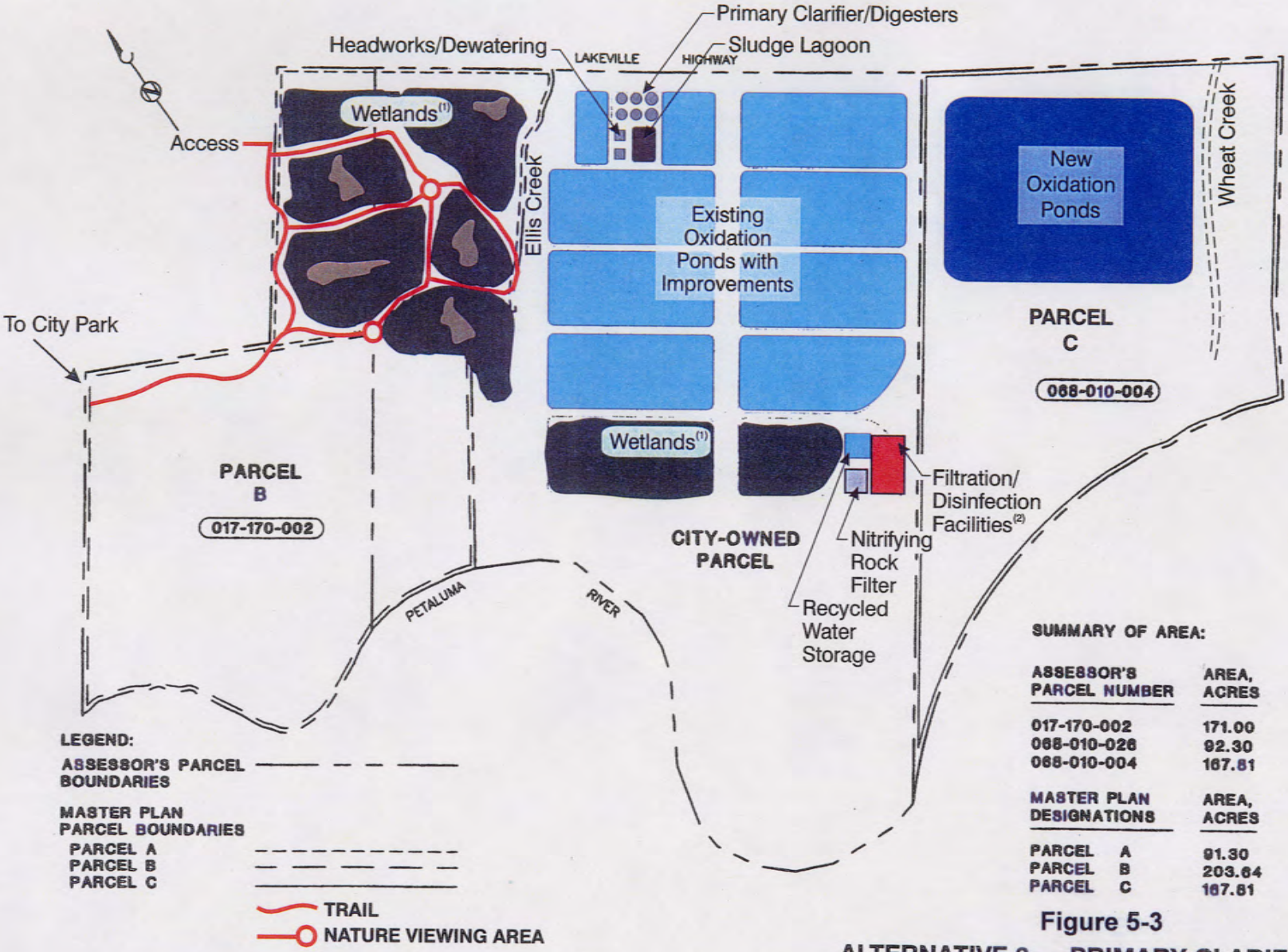
Effluent from the primary clarifier would be diverted to the existing aerated lagoon, where a large portion of the remaining solids would be captured. Effluent from the aerated lagoon would then go to the existing oxidation ponds. The exact amount of oxidation ponds available would depend on the choice of an algae removal option. Berms for any new oxidation ponds would be designed to meet small dam requirements. Surface aerators would be installed in the existing aerated lagoon and oxidation ponds to ensure adequate treatment is provided.

Solids Handling

Primary solids would be digested in two 60-foot-diameter anaerobic digesters. A cogeneration facility would convert the methane gas captured in the anaerobic digester into electricity to provide power for the plant facilities. Primary effluent solids collected in the aerated lagoon would be dredged out, stored in a sludge lagoon and mixed with the digested solids for sludge dewatering before reuse or disposal.

Alternative 4 – Hopper Street (Activated Sludge)

In this alternative, the headworks/preliminary treatment, primary clarifiers, aeration basins, secondary clarifiers and solids handling facilities would all be located at Hopper Street. Secondary effluent would be transported to the existing



SUMMARY OF AREA:

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068-010-026	92.30
068-010-004	167.81

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.81

Figure 5-3

ALTERNATIVE 3 - PRIMARY CLARIFIERS/ PONDS LAYOUT (WETLANDS)

CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.

Pet900rf23-6069.cdr

Lakeville Highway oxidation pond system for storage, tertiary treatment and disinfection. Figures 5-4 and 5-5 show the layout of treatment facilities at Hopper Street and Lakeville Highway.

Oxidation Ponds

The exact amount of available oxidation ponds available would depend on the choice of an algae removal option. During winter months bypass of effluent flows above 8.5 mgd would occur at Hopper Street, increasing the loading rate to the oxidation ponds. At these times, the existing aerators in the aerated lagoon and Pond 1 would be used to provide additional treatment and prevent odor on cloud-covered days.

Solids Handling

Solids handling includes thickening of waste activated sludge, digestion of primary and waste activated sludge solids, cogeneration of the methane produced in the digesters, and dewatering of the digested solids. All solids handling facilities would be located at Hopper Street.

Design Options Evaluated in the EIR

There are three design issues associated with the project and each of the alternatives. These are: methodology for algae removal; implementation of River Access Improvements; and treatment for metals, nutrients, and organics. Each of these design issues and the related options are discussed below.

Algae Removal

Algae, which are generated in the oxidation ponds and provide oxygen for biological treatment of the wastewater, will need to be removed in order to meet discharge and reuse requirements. Algae removal can be provided by either a wetlands treatment system or dissolved air flotation (DAF) thickeners. Alternatives 1 through 4 can be designed with either the wetlands (Option A) or the dissolved air flotation (Option B) option for algae removal. For the proposed project, the wetlands option has been selected, although extended aeration could be combined with dissolved air flotation. Wetlands remove algae biologically and would be located on the oxidation pond site. DAF thickeners remove algae mechanically, and chemicals are added to enhance performance. DAF thickeners would be located on the existing plant site, in a portion of the southeast pond.

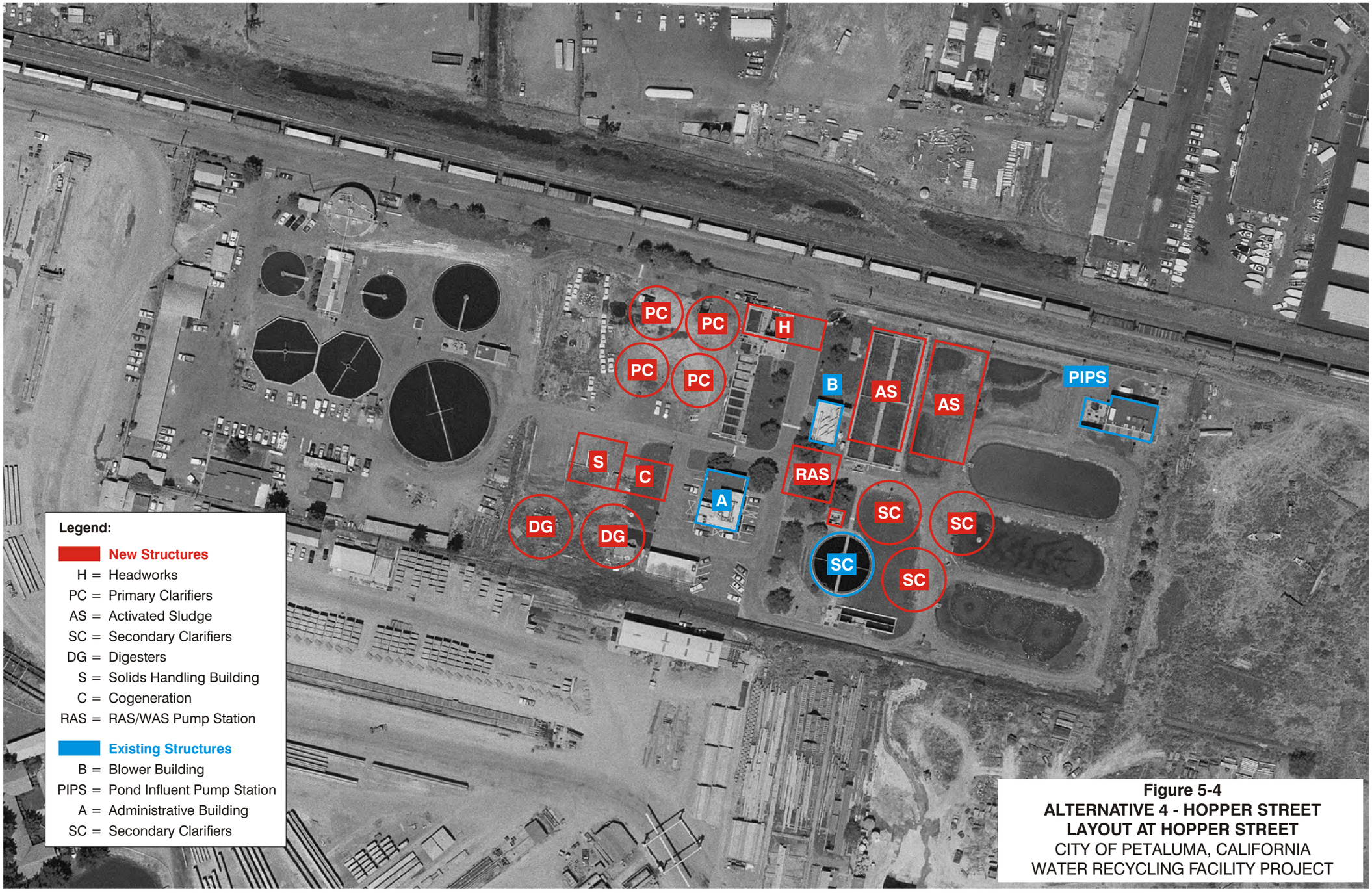
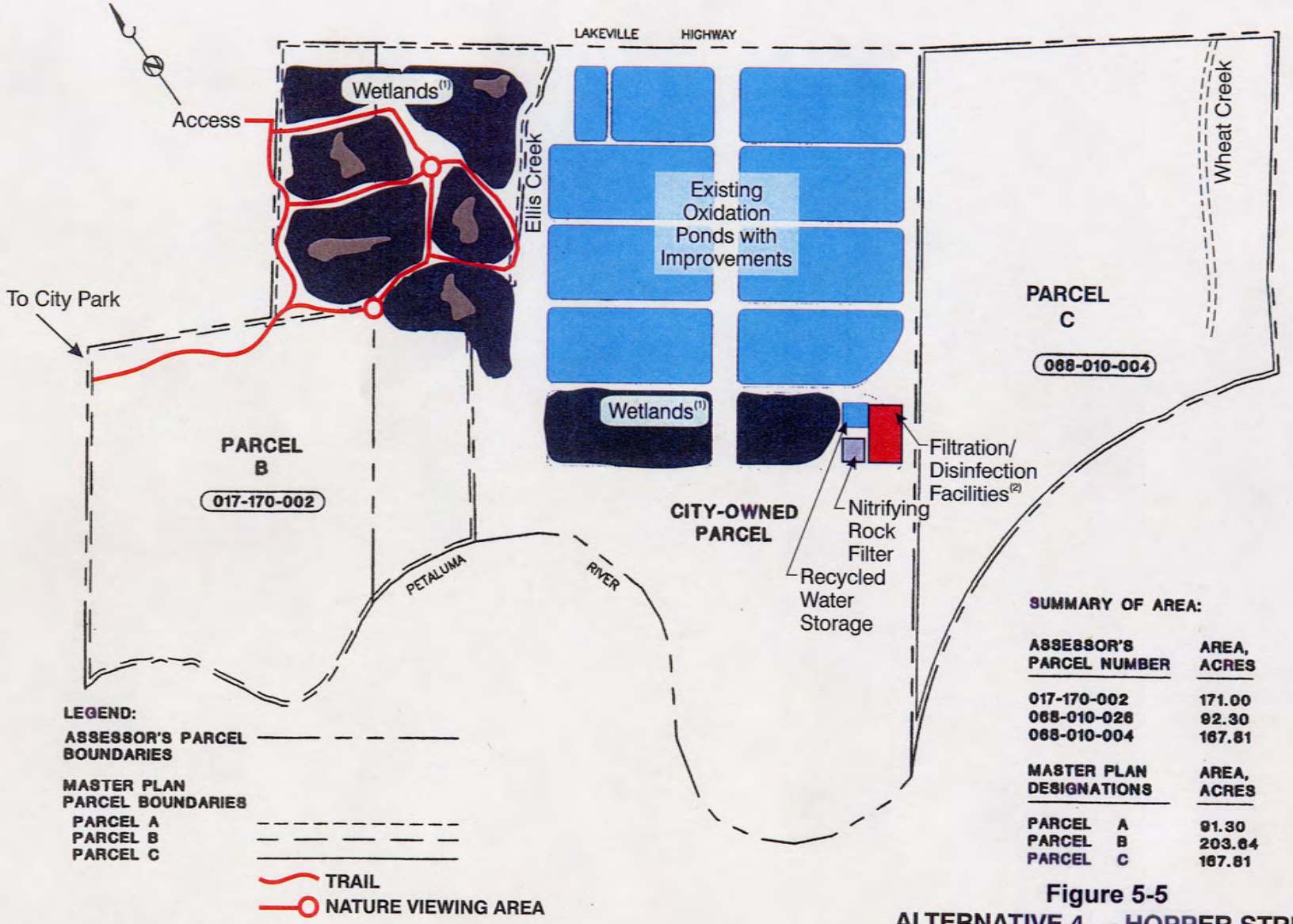


Figure 5-4
ALTERNATIVE 4 - HOPPER STREET
LAYOUT AT HOPPER STREET
CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

pet1000rf1.cdr



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068-010-004	167.81

MASTER PLAN DESIGNATIONS	AREA, ACRES
PARCEL A	91.30
PARCEL B	203.64
PARCEL C	167.81

(1) Dissolved Air Flotation Thickeners could replace wetlands for removal of algae.
(2) Chlorination/Dechlorination or ultraviolet light.
(3) Primary clarifiers, activated sludge and solids handling located at Hopper Street.

Figure 5-5
ALTERNATIVE 4 - HOPPER STREET LAYOUT(3) (WETLANDS)
CITY OF PETALUMA, CALIFORNIA
WATER RECYCLING FACILITY PROJECT

Pet900rf24-6069.cdr

River Access Improvements

The River Access Improvements are included in the project and are described in Chapter 2, the Project Description. They can be implemented in conjunction with any of the alternatives. It is also feasible to meet most of the project objectives even if the River Access Improvements are not built.

Treatment for Metals, Nutrients, and Organics

Treatment for metals, nutrients, and organics can be accomplished by any of three options:

- Small treatment wetlands in Ponds No. 9 and 10 plus polishing wetland
- DAFs plus polishing wetland
- Large treatment wetland

Each of these options can be combined with alternatives 1-4 or extended aeration. The project is designed with small treatment wetlands in Ponds No. 9 and 10 plus the polishing wetlands.

Cost Comparison

Table 5-1 shows the preliminary costs for the five treatment alternatives considered in the Carollo 2000 Project Report Costs include capital costs to construct the facilities, annual operation and maintenance costs, and total annualized costs. Costs are shown for both options for algae removal: wetlands and dissolved air flotation (DAFs). The preferred alternative, extended aeration, was further developed and modified during predesign for both the wetlands and DAF options. Table 5-2 shows the revised cost estimates for the preferred alternative based on the Carollo 2002 Predesign Report. The basis of costs for Tables 5-1 and 5-2 are different in a number of ways: the 2002 costs were based on a higher construction cost index and higher electrical costs but did not include costs for land acquisition or demolition of Hopper Street Facilities.

Table 5-1

Preliminary Cost Estimate from November 2000 (in millions)

	Extended Aeration (Preferred Alternative)		Alternative 1 Advanced Facultative Ponds		Alternative 2 Aerated Lagoon		Alternative 3 Primary Clarifiers/Ponds		Alternative 4 Hopper Street	
	Wetlands	**DAFs**	**1A Wetlands**	**1B DAFs**	**2A Wetlands**	**2B DAFs**	**3A Wetlands**	**3B DAFs**	**4A Wetlands**	**4B DAFs**
Construction Cost[1]	$63.8	$58.8	$65.9	$63.3	$59.2	$49.9	$67.4	$58.3	$78.3	$74.4
Total Project Cost[2]	$90.7	$81.3	$94.8	$87.3	$85.9	$69.2	$96.9.	$80.6	$109.7	$101.7
Annualized Project Cost[3]	$7.1	$6.4	$7.4	$6.8	$6.7	$5.4	$7.6	$6.3	$8.6	$8.0
Annual Operation & Maintenance Cost[4]	$3.1	$3.6	$2.4	$3.0	$2.7	$3.2	$2.5	$3.0	$3.3	$3.8
Total Annualized Cost[5]	$10.2	$10.0	$9.8	$9.8	$9.4	$8.6	$10.1	$9.3	$11.9	$11.8

Source: Carollo Engineers, November 2000

[1]Construction costs based on June 2004 dollars (the mid-point of construction) using a San Francisco Engineering News Record Construction Cost Index of 7800. Each alternative assumes ultraviolet light disinfection.
[2]Includes demolition of facilities at Hopper Street, land acquisition, and a contingency of 35 percent for engineering, legal, administration and construction change orders.
[3]Annualized costs were calculated by using a 25-year life at an interest rate of 6 percent.
[4]Based on June 2004 dollars. Includes equipment replacement, chemical use, power, labor and solids handling.
[5]Annualized project cost + annual operation and maintenance cost.

Table 5-2

Predesign Cost Estimates of Wetlands and DAF Options from February 2002 (in millions)

	DAF	Wetlands [6]
Construction Costs[1]	$58.7	$63.0
ELAC Costs[2]	$20.5	$22.1
Annualized Total Project Costs[3]	$6.2	$6.7
Annual Operation & Maintenance Costs[4]	$5.0	$4.9
Total Annualized Costs[5]	$11.2	$11.6

Source: Carollo Engineers, February 2002

[1]Construction costs are based on December 2004 dollars (mid-pt. of construction) using a San Francisco ENRCCI of 7925.
[2]ELAC costs include engineering, legal, administration, and construction contingency. Costs do not include Hopper Street Plant demolition, land acquisition, easements, or right of way.
[3]Project costs annualized over 25 years at 6 percent interest rate.
[4]Includes equipment replacement, chemical use, power, labor, solids handling, and wetlands maintenance based on December 2004 dollars.
[5]Annualized total project costs plus annual O&M cost.
[6]Cost includes 30 "wet" acres of polishing wetlands on Parcels A/B.

Alternatives Considered but Rejected

Disinfection Options

The City proposes to use ultraviolet light (UV) as the primary mode of disinfection for meeting Title 22 unrestricted reuse. The existing sodium hypochlorite system and bisulfite at the Lakeville site is being retained to provide disinfection for river discharge and for agricultural reuse as well as to control potential algae growth in the recycled water distribution system. The City also considered sodium hypochlorite and ozone for the overall method of disinfection. The comparison is presented in Section 7.7.1 of the Project Report. Ozone was rejected because of its very high construction and operations and maintenance cost. In addition, because there is little experience using ozone to meet Title 22 criteria for recycling. Design criteria are not well-established.

Reuse of Existing Hopper Street Facilities

During the value engineering workshop conducted for the project alternatives, it was determined that existing Hopper Street facilities are mostly unusable to the general age of the facilities, cracking and leaking of most of the concrete structures, severe corrosion of the underground piping and utilities, failure to meet current building and seismic codes, and the large expense required to rehabilitate the facilities. The workshop participants concluded that for reliable long-term treatment, any alternative that includes treatment facilities at Hopper Street would require construction of new facilities. A detailed

evaluation of each facility at Hopper Street is presented in Table 3 of Appendix A of the Project Report.

Alternative Treatment Processes

A variety of alternative treatment processes were considered in the value engineering workshop conducted for the project, but were rejected for a variety of reasons. Table 5-4, provides a summary of the treatment trains considered, and the reason that each was rejected.

Table 5-3

Treatment Processes Considered but Rejected

Treatment Train	Reason for Rejection
AFP⇒AFP⇒smaller oxidation ponds⇒wetlands	This alternative was determined to have no advantages over the Advanced Facultative Pond alternative, and it has the disadvantage that AFPs are more difficult to manage than smaller oxidation ponds.
Expanded oxidation ponds⇒wetlands	This alternative requires 360 acres of land and would therefore not allow sufficient room for wetlands, while staying within Parcels A, B, and C.
AFP⇒aerated lagoon⇒oxidation ponds⇒wetlands	This alternative was determined to have no advantages over the Advanced Facultative Pond alternative, as it does not provide any savings in either land or aeration requirements.
Upflow anearobic sludge blanket reactor	This alternative was eliminated due to a lack of experience with this process at comparably sized facilities in the United States. This process also has high operation and maintenance cost because frequent grit and solids removal from the tanks is required.
Primary clarifiers⇒trickling filters/solids contact⇒oxidation ponds	This option was eliminated because trickling filters have no significant advantage over other alternatives. They would be significantly taller than any other facilities, resulting in aesthetic impacts.
Primary clarifiers⇒activated sludge/submerged microfilter⇒oxidation ponds	This option was eliminated due to high costs. It is also a relatively new process and does not provide clear advantage over the other alternatives to justify the increased cost.
Primary clarifiers⇒roughing filters⇒oxidations ponds	This option was eliminated because roughing filters have no significant advantage over other alternatives. They would be significantly taller than any other facilities, resulting in aesthetic impacts.
Extended aeration (Carousel/Oxidation Ditch) ⇒oxidation ponds	This option is a minor variation of the proposed process, which employs extended aeration using the Biolac process, then oxidation ponds. This minor variation would not have substantially different impacts and could be evaluated

Table 5-3

Treatment Processes Considered but Rejected

Treatment Train	Reason for Rejection
	further in predesign.
Sequencing batch reactor⇒oxidation ponds	This option is a minor variation of the proposed process, which employs extended aeration using the Biolac process, then oxidation ponds. This minor variation would not have substantially different impacts and could be evaluated further in predesign.
Options for wet weather flow equalization – bypass conventional secondary treatment to oxidation ponds or add wet weather facilities such as additional primary clarifiers or ballasted flocculation	Wet weather options were evaluated for each alternative, and it was determined that a temporary wet weather bypass to the ponds would be more cost-effective than construction of wet weather treatment facilities.

Source: Carollo Engineers, May 2001

AFP = Advanced Facultative Pond

Privatization

On July 19, 1999 the City Council determined that the City would no longer pursue development of a privately owned wastewater treatment facility and that the new facility would be publicly owned. The City Council formalized this action with adoption, on September 21, 1999, of Resolution No. 99-188, which terminated the privatization process and established City ownership of the new wastewater treatment facility. Reasons cited for this determination included:

- Risk of change required over 30-year contract term. Changes in the City's needs and State and federal requirements may occur during the 30-year life of the contract. The City is at a disadvantage by being able to negotiate with only one part for changes in the facility's capacity.
- Requirement of fair market value purchase. In order for the private company, Montgomery United Water, to retain tax ownership, the City's option to purchase the facility at the end of the term would have to be at fair market value. The price of the facility could not be fixed in the contract, but would depend on the value of the facility at the time of the exercise of the option, thereby putting the city and ratepayers at risk of having to pay for part of the plant twice.
- Lack of City approval of design. In order for Montgomery United Water to retain tax ownership, Section 4.8.1 of the agreement limited the City's participation in the design process.

- Third party services. For Montgomery United Water to reatin tax ownership, Section 5.2.4 of the agreement would allow the company to provide services to others (in addition to the City) at the project site.
- Inability to agree on contract language. After extensive negotiations between the City and Montgomery United Water, specific agreed upon contract language on the above and other critical issues became more difficult, and complexities continued to grow.

Relocate Polishing Wetlands to Parcel B

The project includes an option to create wetlands on Parcels A and B. Relocation of the wetlands to site them entirely within Parcel B has been suggested. This was determined not to be feasible for two reasons. The City's intent is to avoid effects to existing wetlands to the extent possible. If existing, naturally-occurring wetland sites were used for the proposed wetlands, created wetlands used for polishing would not fully mitigate the loss of existing wetlands. Second, Parcel B is too low and water would have to be pumped up to get it back to the discharge pipeline. To minimize energy requirements, it is desirable that flows travel through the treatment system by gravity flow, avoiding pumping where possible.

ALTERNATIVES IMPACT COMPARISON

Table 5-4 provides a comparison of the impacts associated with the alternatives to the Petaluma Water Recycling Facility. The primary alternatives differ in type of treatment, utilization of Parcel C, and maintenance of facilities at Hopper Street. Except for a few issues, the impacts of each basic alternative are the same. Table 5-4 lists only the issues where substantial differences in environmental impacts have been identified. Directly after Table 5-4 is a comparison of the impacts of the three design options.

TABLE 5-4

Alternative Impact Comparison

Impact	Project	No Project	1-Advanced Facultative Ponds	2-Aerated Lagoons	3-Primary Clarifiers/Ponds	4-Hopper Street
AG-1. Will the project or alternatives cause loss of farmland?	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B. With mitigation this can be reduced to about 80 acres.	No impact.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B plus 60 acres on Parcel C. With mitigation this can be reduced to about 140 acres.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B plus 25 acres on Parcel C. With mitigation this can be reduced to about 105 acres.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B plus 40 acres on Parcel C. With mitigation this can be reduced to about 120 acres.	Significant before and after mitigation. Approximately 150 acres of farmland will be lost on Parcels A and B. With mitigation this can be reduced to about 80 acres.
GEO-4. Will the project or alternatives be subject to geological hazards?	Less than Significant	Significant. Existing facilities include older structures that will be less likely to withstand strong ground shaking, or associated seismic hazards.	Less than Significant	Less than Significant	Less than Significant	Less than Significant
GW-1. Will the project or alternatives degrade groundwater at existing drinking water wells?	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Significant. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.	Less than Significant after mitigation. There is 1 drinking water well within ¼ mile.

TABLE 5-4

Alternative Impact Comparison

Impact	Project	No Project	1-Advanced Facultative Ponds	2-Aerated Lagoons	3-Primary Clarifiers/Ponds	4-Hopper Street
WQ-1, 2. Will discharge from the project or alternatives exceed criteria for surface water quality?	Less than Significant after mitigation.	Significant. With growth of the population, as projected in the adopted general plans of Petaluma and the County of Sonoma for Penngrove, water quality criteria will be exceeded.	Less than Significant after mitigation.	Less than Significant after mitigation.	Less than Significant after mitigation.	Less than Significant after mitigation.
BIO-7. Will the project or alternatives cause loss of wetlands or waters of the U.S.?	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss.	No impact	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss, plus likely loss of some wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and 0.53 acres of permanent disturbance or loss.

Impact Comparison of Design Options

Algae Removal

Both the wetlands and DAFs for algae removal can be placed in ponds 9 and 10 on the existing oxidation pond site. The DAFs require slightly more energy to operate. Otherwise environmental impacts are similar.

River Access Improvements

The River Access Improvements cause impacts to a number of biological resources, each of which can be mitigated. These impacts could be avoided by not implementing the River Access Improvements.

Treatment for Metals, Nutrients, and Organics

The option for a small algae-removal wetland plus polishing wetland and the option for DAFs plus polishing wetland have essentially the same impacts. The option for the large treatment wetlands requires slightly more land on Parcels A and B than the polishing wetlands, but the difference is not substantial. In either case, Parcels A and B would be converted from an agricultural use to a wetlands and public recreational and education use, since they will function as a buffer for the Water Recycling Facility.

6 CEQA-REQUIRED SECTIONS

GROWTH-INDUCING IMPACTS OF THE PROJECT

Section 15126.2(d) of the CEQA Guidelines states that an EIR should discuss "…the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas)." Growth can be induced in a number of ways, including through the elimination of obstacles to growth or through the stimulation of economic activity within the region.

The proposed project is thus a typical example of a project that CEQA has identified as inducing growth. The project is intended to provide wastewater treatment to serve buildout of the City of Petaluma's 1987 General Plan. It will thus allow the City to develop according to the projections in the General Plan. The EIR for the City's General Plan identifies the following environmental effects of General Plan buildout:

- Change of land use from vacant and/or open space to developed urban uses;
- Cumulative increase in traffic on local and regional roadways with corresponding increases in noise levels and fossil fuel consumption, and a decrease in air quality;
- Increased demand for public services and facilities; and
- An increase in impervious surfaces resulting in increased surface runoff.

The EIR found that the adoption of the General Plan and implementation of its programs would reduce adverse effects of the City's future growth due to new policies and land use controls. The EIR concluded that the adverse impacts of growth would be "eliminated over time as the programs are implemented".

The project would also allow growth in the Penngrove area, which is in unincorporated Sonoma County. The EIR for the County's General Plan (Sonoma County 1986), identifies a number of unavoidable effects of growth across the County. These include:

- Increased exposure to geologic hazards
- Change in ground surface relief
- Conversion of soils to non-resource uses
- Erosion and sedimentation of streams
- Reduced groundwater supply
- Reduced water supplies

- Adverse effects on water quality
- Increased runoff, flooding and sedimentation
- Changes in natural vegetative cover
- Loss of wildlife habitat
- Pollution of aquatic communities
- Increased exposure to wildland fire hazards
- Increased need for fire suppression services
- Deterioration of air quality
- Increased traffic noise
- Increased demand for energy
- Increased need for housing, especially affordable housing
- Change in land use character of underdeveloped areas
- Loss of agricultural land
- Conflicts between agricultural and non-agricultural uses
- Increased demand for public services
- Increased traffic and demand for transit
- Potential impacts on archaeological sites
- Change in scenic vistas as a result of development

The County's General Plan EIR also found that policies of the land use, public facilities, and circulation and transit elements encouraged mechanisms for phasing development with the orderly expansion of sewer and water supplies and traffic improvements. These policies were determined to limit the potential growth-inducing effects of public services and transportation improvements.

The project is thus growth inducing, but both the City of Petaluma and Sonoma County have policies in place to manage that growth, and to ensure that impacts of the growth are minimized to the extent possible.

SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

Section 2100(b)(2)(A) of CEQA requires that an EIR identify any significant environmental effects that cannot be avoided if the project were implemented. Significant unavoidable impacts are identified in Section 4 of this EIR, as those impacts that remain significant after implementation of mitigation. Although the project has the potential to result in a number of significant environmental impacts, most can be avoided through the adoption of appropriate mitigation measures that will reduce those effects to

a less-than-significant level. However, one significant unavoidable impact of the project remains:

- Impact **AG-1**: Loss of approximately 149 acres of farmland

This impact is also considered cumulatively significant. Mitigation Measure AG-1 has been proposed that keeps approximately 79 acres of farmland in production on Parcels A and B; in doing so, however, some butterfly habitat and trails would need to be removed from the project. Even with this mitigation, the project would still cause significant and unavoidable impacts of farmland conversion.

If the City decides to implement the project, either with or without Mitigation Measure AG-1, a statement of overriding considerations should be adopted stating the overriding benefits the polishing wetlands and public educational and recreational facilities provide to warrant approval despite this significant impact on farmland.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Please refer to Table 5-4 in Chapter 5, Alternatives to the Proposed Project, for a comparison of the primary differences in environmental impacts among the basic alternatives.

The No Project Alternative would have greater impacts than the project, because it would have significant water quality impacts. If no project were approved, then no upgrades would occur to the existing wastewater treatment plant, and significant water quality impacts could be expected as the growth identified in the approved general plans happens. The No Project Alternative, therefore, does not qualify as the environmentally superior alternative.

The remainder of the alternatives are differentiated by their impacts to farmland and wetlands. The alternatives that utilize Parcel C, Alternatives 1 (Advanced Facultative Ponds), 2 (Aerated Lagoons), and 3 (Primary Clarifiers/Ponds), have greater impacts to farmland and potentially greater impacts on wetlands. Alternative 4 (Hopper Street) and the project do not require development on Parcel C and would have basically the same impacts relative to farmland and wetlands. Alternative 4, Hopper Street, and the proposed project, Extended Aeration, would have similar levels of environmental impacts and therefore both qualify as the Environmentally Superior Alternative.

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APPENDIX

Abbreviations and Definitions

ABBREVIATIONS AND DEFINITIONS

AA	Average Annual
ABAG	Association of Bay Area Governments
ac-ft	acre feet
ACM	Asbestos containing material
ACOE	Army Corps of Engineers
Activated Sludge	Suspended growth biological treatment of wastewater used for the removal of carbonaceous matter. Can also be designed to remove ammonia
ADMM	Average Day Maximum Month
ADMMF	Average Day Maximum Month Flow
Advanced Facultative Pond (AFP)	A pond providing biological wastewater treatment, differing from other pond systems by the existence of a fermentation pit at the bottom of the pond. Solids are captured in the pit. Treatment is provided by the combination of anaerobic (deep, no oxygen) zones and aerobic (oxygenated) zones. Additional oxygen/air is provided by surface aeration.
ADW	Average Dry Weather.
ADWF	Average Dry Weather Flow.
Aerated Lagoon or Pond	A pond providing biological wastewater treatment, differing from other pond systems by the addition of surface aerators. Aeration provides oxygen/air for treatment and allows for a smaller pond footprint than pond treatment without aeration.
Aeration	Process of supplying oxygen for wastewater treatment.
Aerobic	Referring to biological processes that take place in the presence of oxygen. Dependent on micro- organisms that require oxygen.
Alum	Aluminum Sulfate - Chemical added to water to help flocculate solids.
Ammonia (NH_3-N)	Constituent in wastewater which can result in toxicity to fish and reduce river dissolved oxygen.
Anaerobic	Referring to biological processes that take place at low oxygen concentrations or at the absence of oxygen. Dependant on micro-organisms that require the absence of oxygen. Methane gas is a byproduct of anaerobic processes.
ASTM	American Society for Testing and Materials
ATAD	Auto Thermal Aerobic Digestion.
BAAQMD	Bay Area Air Quality Management District
BAAT	Bay Area Air Toxics
BOD_5	Biochemical oxygen demand (5-day). The measurement of dissolved oxygen used by micro-organisms in the biochemical oxidation of organic matter.
CAP	Clean Air Plan
CBW	Continuous Backwash Filtration.
CCC	Criterion continuous concentration
CCR	California Code of Regulations
CDFG	California Department of Fish and Game

CDMG	California Division of Mines and Geology
CEQA	California Environmental Quality Act.
CESA	California Endangered Species Act
CF	Cubic Feet.
CF/MG	Cubic Feet per Million Gallons.
cfm	Cubic Feet per Minute.
CFR	Code of Federal Regulations.
Cl_2	Chlorine.
CNPS	California Native Plant Society
CO_2	Carbon Dioxide.
Cogeneration	The recovery and reuse of the methane gas produced in the digesters. Methane gas is used as a fuel in an engine that drives a generator to produce power. Heat is recovered and used to heat the digesters.
Constructed Wetlands	Wetlands that are created for the purpose of treating secondary effluent. Wetlands act as a polishing step and as proposed in this project remove algae from the effluent.
CRHR	California Register of Historic Resources
CTR	California Toxics Rule
CWA	Clean Water Act
CY	cubic yards.
dBA	A-weighted decibel
Digesters	Concrete tanks used to stabilize biological solids and organic material. In the anaerobic digestion process, the solids are converted to methane and carbon dioxide.
Disinfection	Chlorination, ozone or ultraviolet light added to the end of the treatment process to kill pathogens.
Dissolved Air Flotation Thickener (DAF)	Mechanical removal of solids (in this case, algae) through bubbling air through water in a tank, encouraging solids to float to the top of the tank. Chemicals are added to enhance removal.
DHS	Department of Health Services.
DPR	Department of Parks and Recreation
DSOD	Division of Safety of Dams.
EIR	Environmental Impact Report.
EL or Elev.	Elevation.
ENR–CCI	Engineering News Record construction cost index which is used to adjust construction costs based on geographic region and time frame.
EPA	Environmental Protection Agency.
Extended Aeration	Extended aeration is a biological, activated sludge process with a long detention time (up to 24 hours). Mechanical aeration is provided. Typically followed by secondary clarifiers which remove the solids. A portion of the solids are returned to the front of the process to help with treatment. Extended aeration produces a high quality, nitrified secondary effluent. Ponds or concrete tanks may be used for this process.
FEMA	Federal Emergency Management Agency

FESA	Federal Endangered Species Act
Filters	Beds of sand used to remove fine particles.
Filter Backwash	Periodic filter cleansing process to remove filtered material.
FM	Force main.
F/M or F:M	food to microorganism ratio. A term used in the activated sludge process to determine the ratio of food (or BOD) per mass of microorganisms available in the tank to degrade the BOD.
ft	foot.
fps	feet per second.
gal	gallon.
GBT	Gravity Belt Thickener.
gpcd	gallons per capita per day.
gpd/sf	Gallons per day per square foot.
gph	gallons per hour.
gpm	gallons per minute (a measurement of flow).
gpm/sf	gallons per minute per square foot.
GWI	Groundwater Infiltration.
HCM	Highway Capacity Manual
Headworks	First step in the treatment process which includes screening of large debris, flow measurement, and grit and sand removal.
hp	horsepower.
hr	hour.
HRT	Hydraulic retention time.
HVAC	Heating, Ventilation, and Cooling.
H_2S	Hydrogen Sulfide.
I/I	Inflow and Infiltration.
in	inches.
kcf/d	thousand cubic feet per day.
kV	kilovolts.
kVA	kilovolts amperes.
kW	kilowatts.
lb	pound.
lb/ac-d	pounds per acre per day.
lb/kcf-d	pounds per thousand cubic feet per day.
LAFCO	Local Agency Formation Commission
LEED™	Leadership in Energy and Environmental Design.
LOS	Level of service
LP/HO	low pressure, high output.
LP/LO	low pressure, low output.
m	meter.
M	million.

mcc	motor control center.
MF (microfiltration)	Membrane used to remove fine particles.
MG	million gallons.
mgd	million gallons per day (a measurement of flow).
mg/L	milligrams per liter (a measurement of concentration of a substance in liquid).
MBTA	Migratory Bird Treaty Act
min	minute.
mL	milliliters.
mm	millimeters.
MMI	Modified Mercali Intensity
MUW	Montgomery United Water
MOU	Memorandum of Understanding
MP	medium pressure.
MPN	Most Probable Number - a measurement of number of coliform present in a sample.
MTC	Metropolitan Transportation Commission
μg/L	micrograms per liter.
μm	micrometers.
NAAQS	National ambient air quality standards
NFPA	National Fire Protection Agency.
NGVD	National Geodetic Vertical Datum
Nitrification	Advanced treatment process of converting ammonia to nitrates which are less toxic to aquatic life.
NH_4-N	ammonia nitrogen.
NO_3-N	nitrate nitrogen.
NOAA	National Oceanic and Atmospheric Administration.
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System – a permit issued for discharge of treated wastewater effluent into a waterbody of the United States.
NPSH	net positive suction head.
NRF	Nitrifying Rock Filter.
NRHP	National Register of Historic Places
NTR	National Toxics Rule.
NTU	Nephelometric turbidity unit. A measurement of turbidity in water.
Nutrient Removal	Treatment process which removes nitrogen and/or phosphorus from wastewater.
NWI	National Wetlands Institute
NWIC	Northwest Information Center of the California Historical Resources Information system
NWRI	National Water Research Institute.
nm	nanometers.

O&M	Operation and maintenance.
O_2	oxygen.
OHWM	Ordinary high water mark
OPE	Oxidation Pond Effluent.
OPR	Governor's Office of Planning and Research
Oxidation Pond	A pond providing biological wastewater treatment. Mechanical aeration is typically not provided. Oxygen is supplied primarily from algae. Oxidation ponds require a larger pond footprint than ponds that are aerated.
PAD	Phased Aerobic Digestion.
PC (Primary Clarifiers)	Concrete tanks used as a first step to settle out suspended solids from the wastewater.
PC/PLC	personal computer / programmable logic controller.
PGA	peak ground acceleration
pg/L	Pico grams per liter
pH	A numerical measurement of the acidity or alkalinity of a chemical solution. pH = 7 is neutral pH. pH <7 is acidic. pH>7 is alkaline or basic.
Photoreactivation	Refers to a process by which the DNA in pathogens that have been damaged by exposure to ultraviolet light disinfection can sometimes repair after exposure to sunlight.
PHWWF	Peak Hour Wet Weather Flow.
PIPS	Pond influent pump station. Existing pump station at the Hopper Street WWTP.
PLC	programmable logic controller.
PM	Particulate matter
POTW	Publicly owned treatment works
ppd	pounds per day.
ppm	parts per million.
Preliminary Treatment	Physical treatment to remove large articles such as rags and plastics which can clog pumps and subsequent treatment processes. Processes include screening and grit removal.
Primary Treatment	Physical treatment to remove solids, generally provided through settling in clarifiers.
PS	Pump Station.
psi	pounds per square inch.
psig	pounds per square inch gauge.
PVC	polyvinyl chloride.
VOC	Volatile organic compound
RAS	return activated sludge – that portion of biological solids from the activated sludge process returned to the head of the processes.
RDII	Rainfall Dependant Inflow and Infiltration.
RFP	Request for Proposal
RS or RSG	Raw Sewage.

RW (Recycled Water)	Water treated to a level suitable for reuse by groundwater recharge, agricultural irrigation or industrial use. Should meet Title 22 requirements.
RWQCB	Regional Water Quality Control Board – the agency responsible for protecting waters of the Sate and issuing NPDES permits.
SCADA	Supervisory Control and Data Acquisition.
scfm	standard cubic foot per minute.
SCWA	Sonoma County Water Agency
Secondary Clarifiers	Final settling process for TSS removal.
Secondary Treatment	Biological treatment to reduce the organic content of the wastewater, typically to a 30 mg/L BOD/TSS level.
sf	square foot.
Sludge Lagoon	A lined lagoon used to store and further stabilize sludge prior to dewatering.
Solids Dewatering	Removing water from waste solids stream.
SOQ	Statement of Qualfications
SOTE	Standard Oxygen Transfer Efficiency.
SRF	State Revolving Fund Loan.
SSCRCD	Southern Sonoma County Resource Conservation District
SRT	Solids retention time.
SWPPP	Storm Water Pollution Prevention Plan
tbd	to be determined.
Tertiary Treatment	Physical/chemical treatment generally consisting of filtration to remove any solids and organics remaining after secondary treatment.
Title 22	California Administrative Code citation which defines recycled water treatment requirements.
TKN	Total Kjeldahl Nitrogen. Lab analysis to determine the total of ammonia and organic nitrogen.
TM	Technical Memorandum.
TMDL	Total maximum daily loads – the amount of loading of a constituent from all sources that a water body can receive and still meet water quality standards
TEF	Toxic equivalency factor
Toxicity	Measure of harm to aquatic life based upon test of fish mortality.
TS	Total Solids.
TSS	Total Suspended Solids. A measure of solids in wastewater.
Turbidity	Measure of the clarity of water in Nephelometric Turbidity Units (NTU).
Typ	Typical.
UGB	Urban Growth Boundary
USDA	U. S. Department of Agriculture
USFWS	U. S. Fish and Wildlife Service
USGBC	United States Green Building Council.
USGS	U. S. Geological Survey
UV	Ultraviolet light. Ultraviolet light disinfection used to inactivate coliform organisms.

VE	Value Engineering
VFD	Variable Frequency Drive.
VSS	Volatile Suspended Solids.
WAS	Waste activated sludge – byproduct of activated sludge processes which must be wasted from the system, thickened and further stabilized in digesters.
WRF	Water recycling facility.
WWTP	Waste Water treatment plant.
Yr	Year.

APPENDIX A

Executive Summary
Predesign Report
Water Recycling Facility Project
City of Petaluma, California,
by Carollo Engineers

February 2002

City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

EXECUTIVE SUMMARY
PREDESIGN REPORT

FINAL
February 2002

2700 YGNACIO VALLEY ROAD, SUITE 300 • WALNUT CREEK, CALIFORNIA 94598 • (925) 932-1710 • FAX (925) 930-0208

City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

EXECUTIVE SUMMARY

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City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

EXECUTIVE SUMMARY

LIST OF TECHNICAL MEMORANDA

TM NO.	NAME
1	Preliminary Treatment Facilities
2	Secondary Treatment Facilities
3	Oxidation Pond Improvements
4	Algae Removal Facilities
5	Tertiary Treatment Facilities
6	Disinfection Facilities
7	Sludge Treatment and Disposal Facilities
8	Sustainable Design
9A	Water Balance
9B	Recycled Water Storage and Pumping Facilities
10	Site Master Plan/Improvements
11	Administrative Facilities
12	Architectural and Aesthetic Facilities
13	Landscaping
14	Structural Design Criteria
15	Electrical Power and Distribution
16	Instrumentation and Control
17	Project Delivery Analysis
18	Hydraulic Profile/Design Criteria
19	Preliminary Construction Cost Estimate
20	Staffing Evaluation

1.0 INTRODUCTION

This summary report presents the major findings and recommendations of the Predesign Report for the Lakeville Highway Water Recycling Facility (WRF). The summary report is a compilation of the findings and recommendations from a series of twenty technical memoranda (TM), which detail the basis for the final design.

2.0 PROJECT OBJECTIVES

The City of Petaluma, California proposes to construct a WRF to meet the following objectives:

- To develop an economically and ecologically sustainable WRF to accommodate growth and development anticipated by the City's General Plan. The buildout population for Petaluma and Penngrove is estimated to be 70,650, requiring treatment of 6.7 mgd during average dry weather flow (ADWF).

- To comply with Federal, State and regional air and water quality regulations through appropriate design and operation of the WRF. Reliability and redundancy features will be included to be able to meet applicable regulations consistently.

- To replace or upgrade the existing wastewater treatment facility that is operating near its capacity and the end of its useful life.

- To protect the water quality of the Petaluma River and the San Francisco Bay by continuing to conduct wastewater treatment in an environmentally sensitive manner. The WRF will include the additional step of ammonia removal in the process to reduce the risk of ammonia toxicity in the river. The WRF will also include polishing wetlands to provide additional treatment of metals, organics and nutrient removal.

- To stabilize and treat the biosolids generated in the wastewater treatment process to EPA's Class B standards for beneficial reuse of the biosolids.

- To produce tertiary recycled water in accordance with California Title 22 regulations so water can be recycled to irrigation users throughout the City.

- To provide storage in the oxidation ponds during river discharge prohibitions from May 1 to October 20 and to balance the recycled water program during this non-discharge period.

- To develop a facility that serves as an amenity to the community by providing educational and recreational opportunities.

3.0 PROJECT OVERVIEW

A Project Report was completed for the City of Petaluma, California in November 2000, which evaluated five treatment alternatives. These five treatment alternatives were selected in the May 2000 project workshop and were discussed in the Value Engineering Workshop Technical Memorandum (August 2000). In no particular order, the alternatives were:

- Alternative 1 – Advanced Facultative Ponds: Advanced Facultative Ponds • Oxidation Ponds • Wetlands (or Dissolved Air Flotation [DAF] units).
- Alternative 2 – Aerated Lagoons: Aerated Lagoons • Oxidation Ponds • Wetlands (or DAF).
- Alternative 3 – Primary Clarifiers/Ponds: Primary Clarifiers (with Anaerobic Digesters and Cogeneration) • Oxidation Ponds • and Wetlands (or DAF).
- Alternative 4 – Hopper Street: Primary Clarifiers (with Anaerobic Digesters and Co-generation) • Activated Sludge at Hopper Street • Oxidation Ponds • and Wetlands (or DAF) at Lakeville Highway.
- Alternative 5 – Extended Aeration: Extended Aeration • Oxidation Ponds • Wetlands (or DAF)

Sub-alternatives to each of these alternatives include using DAF thickeners instead of wetlands for algae solids removal and using either chlorination/dechlorination or ultraviolet light for disinfection.

Comparisons of costs, sustainability, and land use for the alternatives were presented in the Project Report. Alternative 5 – Extended Aeration was the recommended project. It had comparable costs to the other alternatives and the lowest ecological footprint. In December 2000, the City decided to proceed with predesign of Alternative 5 – Extended Aeration. For the algae removal process, both options, wetlands and DAF, were carried into the predesign process for further development.

The draft Predesign report was reviewed during a Value Engineering (VE) workshop on October 8 through 12, 2001. The VE review was conducted by a six person team and team facilitator selected by the City of Petaluma. The results of the VE review workshop were presented in a draft report dated October 12, 2001. These results focused on cost reductions and process improvements. The VE recommendations were reviewed and where applicable, incorporated into this Predesign Report. A separate response was published entitled Final Report Review of Value Engineering, dated February 2002.

3.1 Basis of Design

The WRF is designed to provide wastewater treatment for the projected flows and loads estimated in the Project Report, which were based on build-out projections from the City's adopted General Plan (1987-2005). The Basis of Design is summarized in Table ES.1.

Table ES.1 Basis of Design
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

	Value
Flow	
Average Dry Weather, mgd	6.7
Annual Average, mgd	8.0
Secondary Effluent Quality (River Discharge)	
BOD, mg/L	30
TSS, mg/L	30
Recycled Water (RW) Quality	
Urban – Turbidity	2 NTU
Urban – Coliform	2.2 MPN/mL
Agriculture - Coliform	23 MPN/mL

3.2 Existing NPDES Requirements

The City's NPDES permit (No. CA 0037810) was adopted on July 15, 1998 by the San Francisco Bay Regional Water Quality Control Board. The existing wastewater treatment plant (WWTP) effluent must meet the NPDES permit requirements when discharging into the Petaluma River, October 21 to April 30. The WRF is being designed to provide secondary treatment that meets current permit requirements. The existing permit requirements are shown in Table ES.2, and the NPDES permit is included in the Appendix.

From May 1 to October 20, the City is prohibited from discharging treated effluent into the Petaluma River. During this period, the City must store and recycle all the effluent. The City provides secondary treated, disinfected water for irrigation of approximately 800 acres of agricultural lands and 60 acres of Adobe Golf Course.

3.3 Water Reuse (Title 22)

Recycled water regulations are contained in the California Code of Regulations, Title 22, Division 4, Chapter 3, Section 60301 through 60355 (Title 22). Title 22 specifies treatment requirements depending on the ultimate use of the water. Three treatment levels are defined by the regulations: disinfected secondary-23, disinfected secondary-2.2, and disinfected tertiary.

Table ES.2 Existing WWTP NPDES Requirements
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

Effluent Limitations	Units	Monthly Average	Weekly Average	Daily Maximum	Daily Average	Instantaneous Maximum
BOD_5	mg/L	30	45	60	---	---
TSS	mg/L	45	65	70	---	---
Seattleable Matter	mL/l-hr	0.1	---	---	---	0.2
Oil and Grease	mg/L	10	---	20	---	---
Chlorine residual	mg/L	---	---	---	---	0.0
Total Coliform	MPN/100 mL	---	23(1)	---	---	240(2)
Acute Toxicity Bioassay	% Survival	90%(3)	---	70%(4)	---	---
Metals						
Cadmium	μg/L	---	---	---	2.0	---
Chromium(VI)	μg/L	---	---	---	11.0	---
Copper	μg/L	---	---	---	14(5)	---
Lead	μg/L	---	---	---	5.6	---
Mercury	μg/L	0.07(6)	---	---	---	---
Nickel	μg/L	---	---	---	7.1	---
Lindane	μg/L	0.16	---	---	---	---
PAHs	μg/L	0.049	---	---	---	---
Cyanide	μg/L				14(7)	
Receiving Water Limitations	**Units**	**Annual Median**				**Maximum**
Unionized Ammonia	mg/L	0.025	---	---	---	0.16

(1) Median of 7 samples.
(2) No sample shall exceed 240-MPN/100 mL.
(3) 90% survival on 11 sample median.
(4) Must show better than 70% survival in 90% of samples.
(5) Interim limit, final limit - effective 7/2005 is 4.9 μg/L.
(6) Interim limit, final limit - effective 7/2005 is 0.012 μg/L.
(7) Interim limit.

Disinfected tertiary recycled water is commonly referred to as ‘unrestricted use’. The City’s goal is to provide unrestricted use water for urban reuse, which is the highest quality of water specified with the greatest number of uses allowed. Recycled tertiary water uses include recreational impoundments with full body contact, spray irrigation of all food crops and irrigation of landscapes with unlimited access by the public, such as parks and schools. Unrestricted use, Title 22 water must be secondary treated, coagulated, filtered and

disinfected to effluent total coliform less than 2.2 MPN/100 mL and an effluent turbidity of a daily average of 2 NTU.

Currently, the WRF provides disinfected secondary effluent to agricultural users. The effluent is disinfected to a less restrictive coliform standard of 23 MPN/100 mL.

3.4 Metals

Receiving water metals concentrations are established by several regulations, including the San Francisco Basin Plan and the National and California Toxics Rule. The City's existing NPDES permit contains requirements for metals concentrations in the final effluent. Those requirements are listed in Table ES.2. There are also mass limits and mass triggers for mercury (see the NPDES permit in the Appendix for details).

3.5 Ammonia and Effluent Toxicity

The San Francisco Bay Basin Plan and the City's existing NPDES permit require an annual median unionized ammonia concentration of 0.025 milligrams per liter (mg/L) in the receiving water. Historically, the existing WWTP has not experienced violations of this receiving water limitation. However, since the Petaluma River does not provide significant dilution for the City's discharge during certain times of the year, the effluent ammonia would need to be reduced to a level of approximately 8 mg/L, depending on pH, to meet an end-of-pipe unionized ammonia limit of 0.025 mg/L. Ammonia in the effluent also affects the plant's ability to pass the effluent toxicity tests. Current plant effluent chronic toxicity testing with fathead minnow larvae indicate sensitivity and decreased survival at ammonia levels above 8 mg/L.

4.0 SITE MASTER PLAN

The existing facilities at the Lakeville Highway pond site consist of an aerated lagoon, oxidation ponds built in 1972 and disinfection facilities built in 1972 and 1982 and upgraded in 1999. The layout of the existing facilities at Lakeville Highway is shown in Figure ES.1 (at the end of the text). A flow schematic of the new facilities is shown on Figure ES.2. The layout of the proposed facilities for the preferred wetlands option is shown on Figure ES.3. As discussed in subsequent sections, this is the layout adopted by the City Council in their January 7, 2002 resolution. This section describes the existing site layout and then identifies the site planning constraints including site access, site geology including groundwater, and master planning for future capacity expansion.

The site layout is based on master planning the site to accommodate a future plant treatment capacity increase of 25 percent. Therefore, the site plans include a preliminary layout that shows future treatment units. These future units are not required under the current project but are shown to address the potential for future expansion.

4.1 Existing Pond Site Layout

Wastewater from the Pond Influent Pump Station (PIPS) at the Hopper Street treatment plant is pumped through a 14,100-foot force main to the aerated lagoon and Pond No. 1. Approximately 60 percent of the flow goes directly to the aerated lagoon, while the other 40 percent goes to Pond No. 1. The aerated lagoon is approximately 3 acres in area and 16 feet deep. Three 15 horsepower (hp) vertical surface aerators provide aeration in the aerated lagoon. The first oxidation pond (Pond No. 1) also has surface aeration provided by four 15 hp vertical aerators and three 10 hp horizontal aerators. Pond No.1 is approximately 10 acres and 8 feet deep. The remaining Pond Nos. 2 through 10 provide further treatment and storage. Each pond is approximately 15 acres and the depths vary from 5 to 11 feet. Approximately 1,300 acre-feet of volume is provided in Pond Nos. 2 though 10. Pond Nos. 2, 3, 6, and 7 are normally used for treatment. The full depth of the ponds cannot be used for active storage due to the location of the water transfer structures. The usable volume in Pond Nos. 4, 5, 8, 9, and 10 provides storage from April through October when no discharge to the Petaluma River is allowed. The storage is also used to balance the needs of the water recycling program during the summer months.

The original disinfection facilities were constructed in 1972 and 1982 and consisted of a chlorine contact basin and gaseous chlorine and sulfur dioxide facilities. The City completed construction of liquid sodium hypochlorite and sodium bisulfite facilities in 1999 to replace the gaseous chlorine. The chlorine contact basin has a volume of 0.36 million gallons (MG) and will provide a contact time of 90 minutes at 8 million gallons per day (mgd).

4.2 Site Access

Site access is an issue that is under review. There are two entrances into the Lakeville site from Lakeville Highway (State Route 116), east gate and west gate. Due to the speed and volume of traffic on the highway, alternative access and highway improvements are under consideration. These are summarized below.

- Business Park Access. The preferred access option is to have a new access road enter the site from the adjacent Oakmead/Northbay Business Park. The road would run across Parcels A and B. This would primarily be for staff and public. Chemical deliveries and sludge hauling trucks would still enter the site through the existing East gate entrance. The new access road will require a bridge across Ellis Creek. The site for the crossing is under review which will consider environmental impacts and other issues.

- Lakeville Highway Improvements. The existing East gate entrance into the site will be improved to handle truck access. A right turn lane could be added, for east bound right turns into the site, and an acceleration lane could be added for right turns out of the site, for east bound traffic. A left turn bay could be added for left turns into the site at the East gate.

- In-Plant Road Improvements. Two in-plant roadways will be improved for the project. The east road will be widened and the road section increased to handle truck traffic. The north road will be widened and the road section improved to provide a safer road way for daily use. The north road improvements will also include a bridge across the drainage swale to connect the west and east sides of the plant.

4.3 Site Geotechnical Issues

The entire site has issues related to the underlying geology. First, groundwater is fairly shallow, ranging from 10 feet below existing grade on the northern portion of the site to 5 feet below grade on the southern portion of the site. Second, the site can be divided into two areas with respect to foundation requirements. The northern 2/3 of the site is underlain by silty gravel which provides sufficient support for new structures. A layer of bay mud underlies the southern 1/3 of the site, including Pond No.10. Facilities located in the Pond No. 10 area will require additional support including piles for heavy structures.

4.4 Site Buffer

An important site master planning criteria is the maintenance of a site buffer area. In general, a site buffer provides separation between the treatment processes and the nearest neighbors. Separation will lower the risk of complaints especially with respect to odors, noise, and night time lighting. Treatment facilities in growing areas have found that a minimum buffer to reduce neighbor impact is 1,000 feet. The options to create buffer are limited, and it is recommended that the city purchase the land to the west of the plant site (Parcels A/B) to provide a site buffer. In the future, the City should consider purchasing the land east of the site (Parcel C).

5.0 PRELIMINARY TREATMENT FACILITIES

Preliminary treatment facilities for the WRF include influent flow metering, screening, screening compaction / dewatering, influent sampling, vortex grit removal, grit pumps, grit classifier and washer and septage receiving station. The preliminary treatment facilities will be located on the west side of the plant in the area adjacent to the existing aerated lagoon. The existing raw sewage (RS) force main enters the ponds in this area and can be connected to the new headworks with a minimum of modifications. Screenings and grit will be removed from the wastewater flow and stored in containers for landfill disposal. The headworks will be designed for a peak hour hydraulic flow of 36 mgd.

Influent flows will be metered through a flow meter. Influent sampling will occur downstream of the barscreens. Recycle and sidestream flows are collected in a sump and pumped through a recycle flowmeter downstream of the influent sampling and metering location.

Climber screens are proposed for the WRF. Two screens will be provided with a capacity of 18 mgd each. A manual bypass / overflow screen will also be provided for reliability. Screenings will be washed, compacted, and stored in removable storage hoppers for landfill disposal.

Vortex grit removal is recommended over aerated grit removal because it uses less power and is, therefore, the more sustainable alternative. A simple vortex grit chamber will be provided. Grit will be pumped from the grit chambers, classified, washed and stored in removable storage hoppers for landfill disposal.

6.0 SECONDARY TREATMENT FACILITIES

The secondary treatment facilities proposed for the WRF include extended aeration basins, secondary clarifiers, blower building, return activated sludge (RAS) pumps and waste activated sludge (WAS) pumps. The secondary process will be designed for a peak hydraulic flow of 24 mgd. These facilities will be located in the aerated lagoon area and Pond No. 1 area, as shown on Figure ES.3.

Effluent from preliminary treatment will be conveyed to the aeration basin flow split structure. The flows will be split over weirs to the three extended aeration basins. Return activated sludge will be split hydraulically to the three aeration basins and mixed with the influent flow to each basin.

The extended aeration basin design will be based on a floating aeration lateral system. Three 4.5 MG extended aeration basins will be provided for biochemical oxygen demand (BOD_5) removal, nitrification, and partial denitrification. The basins will be constructed in the area of the existing aerated lagoons, using a flexible membrane liner over compacted soil. A selector compartment will be provided for filamentous organism control.

Mixed liquor is conveyed from the aeration basins to a mixed liquor flow split structure and divided between three 105-foot diameter secondary clarifiers. The clarifiers have individual scum sumps with dedicated submersible pumps.

Effluent from the secondary process will be conveyed by gravity to the disinfection facilities and then to the outfall during river discharge. Up to 6 mgd of secondary effluent can be conveyed by gravity to the ponds for additional treatment and/or storage, as needed.

During summer reuse, secondary effluent will be conveyed to the tertiary facilities for Title 22 treatment and urban reuse. A combination of secondary effluent and pond effluent will be disinfected to 23 MPN/mL for agricultural reuse. If influent flows exceed reuse during the river discharge prohibition, then secondary effluent will be conveyed by gravity to the existing oxidation pond system for storage.

Aeration air will be provided from centrifugal blowers. The blowers will be housed in a separate blower building located east of the existing aerated lagoon area. The blower system will be designed to minimize energy use, while providing sufficient aeration air.

Individual RAS pumps will be provided for each clarifier with a common spare. WAS will be pumped to the sludge treatment facilities.

7.0 OXIDATION POND SYSTEM

The existing oxidation ponds provide secondary treatment (for a blend of raw, primary and secondary wastewater), metals reduction, seasonal ammonia reduction and storage during the non-discharge season. While the ponds currently provide many treatment benefits, they also produce algae which increases effluent suspended solids during river discharge. After construction of the new facilities, secondary treatment and ammonia reduction will be provided upstream of the ponds. The existing oxidation pond system, including Pond Nos. 2 through 8 will be used for storage and polishing of secondary effluent. The ponds are shown on Figure ES.1. Although the ponds will serve mainly as storage, algae will still grow in the ponds so algae removal facilities must be provided. The ponds also provide metals reduction. Flexibility will be retained in the design to use the ponds for metals polishing.

The original concept for the new facilities assumed all treated wastewater would pass through the ponds for metals reduction prior to river discharge, as historically the ponds have played a key role in meeting effluent metals requirements. With all flow passing through the ponds, facilities for algae removal would be necessary for the full flow. In addition, nitrogen in the secondary effluent could be converted to ammonia in the ponds, and therefore, ammonia reducing facilities downstream of the ponds would be necessary. The two alternatives considered were: 1) wetlands sized for both algae removal (with densely vegetated sections) and ammonia reduction (with open water sections) and 2) DAF for algae removal followed by nitrifying rock filters for ammonia reduction.

Limited data collected in the fall of 2001 from the existing secondary system indicate that the secondary effluent blended with some pond effluent should be able to meet the metals limits for river discharge. For the secondary effluent and pond effluent blend scenario, the ponds are still required for storage during non-discharge periods (May 1 through October 20) due to the seasonal variation in the water demand for irrigation. The water stored in the ponds during non-discharge periods would be blended with the secondary effluent for river discharge during the discharge period (October 21 through April 30). The pond effluent would still contain algae and ammonia; however, blending pond effluent with secondary effluent allows the facilities downstream of the ponds to be downsized for less than the full flow resulting in significant cost savings. Effluent from the oxidation ponds can be conveyed to the algae removal facilities prior to disinfection for the river discharge or agricultural reuse scenarios.

During wet weather, peak hour flows over 24 mgd will bypass the secondary treatment facilities and will be conveyed by gravity to the ponds for treatment. Pond No. 2 will include surface aeration equipment for treatment during the construction period and will provide additional treatment during wet weather flows.

8.0 ALGAE REMOVAL FACILITIES

Wetlands and DAF/Nitrifying Rock Filters (NRF) treatment options for removal of algae from the oxidation pond effluent were considered in the predesign study. A wetland is a natural system requiring low operational energy and offering many public and wildlife benefits. DAF is a mechanical process alternative that offers operational control and stability. Both treatment alternatives were developed in detail and are summarized below.

Two scenarios for pond operation and downstream algae removal facility sizing were reviewed in the predesign report:

- All flow (12-mgd maximum month flow) through the ponds and downstream algae removal and ammonia reduction facilities.
- Blend of secondary and pond effluent which allows downsizing of algae removal and ammonia reduction facilities downstream of the ponds.

Only the blended flow scenario for wetlands and DAF is summarized here as this pond operational scenario was recommended.

8.1 Blended Flow Scenario

Blending secondary effluent with pond effluent for river discharge allows a significant reduction in the algae removal facility capacity. Ponds are still needed for storage during non-discharge periods, particularly during low reuse such as early spring and fall. The water stored in the ponds during the non-discharge period must be discharged during the river discharge periods to make room for storage the following reuse season. A worst case scenario assumes fifty percent of the river discharge would be pond effluent blended with secondary effluent, although in most cases the pond water could be managed to be less than 20 to 30 percent of the total discharge. At a fifty percent blend or less, the effluent ammonia will meet the desired 8 mg/L without ammonia reducing facilities downstream of the ponds. Therefore, ammonia reduction facilities are not required. The pond effluent and algae removal facilities would be sized for a maximum flow of 6 mgd for river discharge. These facilities could also be used for agricultural reuse.

8.1.1 Wetlands for Algae Removal

If the wetlands are to be used only for algae removal and not ammonia reduction, open water sections are not required. The densely vegetated wetlands in Pond Nos. 9 and 10 would provide adequate detention time for algae removal for 6 mgd of flow. This eliminates the need for treatment wetlands on Parcels A/B. However, in addition to ammonia reduction, open water wetlands provide nutrient reduction, metals polishing, recreation and wildlife habitat opportunities. By using densely vegetated wetlands in Pond Nos. 9 and 10 only, the habitat and public benefits are greatly reduced.

8.1.2 DAF for Algae Removal

With only 6 mgd of pond effluent used for discharge, only one - 50 foot diameter DAF unit is needed. The DAF unit would be located in the Pond No.10 area. Support facilities would include an air supply system, pressurization pumps, polymer storage and feed system, and thickened float collection and pumping. Thickened float would be returned to the pond system, or to the sludge treatment facilities. Nitrifying rock filters would not be required as the blend of secondary, nitrified effluent and pond effluent would meet an effluent ammonia of 8 mg/L.

8.1.3 Comparison of Algae Removal Alternatives

The advantages and disadvantages for the wetlands and DAF alternatives are discussed in detail in TM No. 4. The addition of the optional polishing wetlands component to either wetlands or DAF alternatives results in the following benefits/issues:

- Habitat benefit of wetlands is greatly increased.
- Public education/recreation benefit of wetlands is created.
- CEQA impact for wetlands on Parcel A/B is significant due to loss of ag land.

Capital and O&M costs for both alternatives are presented in Table ES.3. Cost savings for the blended flow scenario range from $4.6 to $5.9 million for the DAF and wetland alternative, respectively. The wetlands alternative has lower project and O&M costs.

8.1.4 Optional Polishing Wetlands

An optional component for both treatment alternatives is the development of polishing wetlands on Parcels A and B. Figure ES.4 shows approximately 30 wet acres of polishing wetlands. The polishing wetlands would provide wildlife habitat and public benefits as well as additional polishing of fully treated wastewater for metals, organics and nutrients. Creating polishing wetlands with disinfected water would likely allow greater public access opportunities than the treatment wetlands on Parcel A/B with undisinfected water, which would likely require restricted access. This polishing wetlands concept is recommended for either DAF or wetlands alternative.

8.2 Recommended Alternative

Based on the significant cost savings of the blend of secondary effluent with pond effluent, it was recommended that the algae removal facilities be sized for 6 mgd. The wetlands alternative for the 6-mgd facilities has a slightly lower project cost. The use of wetlands for algae removal has advantages over the DAF alternative, including creation of habitat, additional effluent polishing and lower operational costs, particularly due to low energy use. Therefore, it was recommended that wetlands be used for algae removal.

On January 7, 2002, the Petaluma City Council adopted a resolution to move ahead with final design of the project including a 6-mgd wetlands for algae removal and a 30 “wet” acre polishing wetlands on Parcels A/B.

Table ES.3 Algae Removal Costs – Blended Effluent
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

Costs in Millions[1]	Wetlands Ponds 9 and 10	DAF	Polishing[2] Wetlands
Construction Costs, $[1]	2.70	2.95	4.50
Project Costs, $[3]	3.60	4.00	6.10
Operation and Maintenance Costs, $/yr[4]	0.07	0.16	0.20
Total Annual Cost, $[5]/25 yr.	0.35	0.47	0.68
Total Annual Cost, $[6]/50 yr.	0.30	0.41	0.59

(1) San Francisco ENR = 7925 (December 2004).
(2) Cost of polishing wetlands on Parcels A/B (30 wet acres) add to either option-wetlands or DAF.
(3) Includes project allowance (engineering, legal, administration and construction contingencies) of 35 percent. Does not include cost of land acquisition.
(4) Includes mechanical equipment replacement and wetlands maintenance costs.
(5) Based on annualizing project cost for 25-year life at 6 percent interest.
(6) Based on annualizing project cost for 50-year life at 6 percent interest.

9.0 TERTIARY FILTRATION FACILITIES

Two tertiary treatment technologies, continuous backwash filtration and microfiltration, were initially reviewed for tertiary treatment for reuse. Continuous backwash filtration (CBW) is the recommended tertiary treatment alternative for the City of Petaluma WRF, based on lower costs and proven technology.

In most cases, secondary effluent will be filtered for reuse. During those periods when secondary effluent flows are insufficient to meet reuse demands, stored pond effluent may be filtered and CBW has more experience with algae-laden water. CBW filtration pretreatment includes flash mix and flocculation with alum and either a cationic or anionic polymer to agglomerate the solids prior to filtration.

Phased construction of the tertiary facilities was evaluated based on current estimates of urban recycled water demand, included in TM No. 9B, Recycled Water Storage and Pumping Facilities. Initially, it was envisioned that demand for tertiary recycled water, upon construction of the WRF, would be approximately 8 mgd. Recent estimates indicate that tertiary recycled water demands, upon construction of the WRF, will be between 2 to 4 mgd. Therefore, an initial phase of three, 1.3-mgd filter cells is recommended. This will save initial capital costs and lower annual O&M costs. The filters will be located in the Pond No.

1 area to minimize the foundation costs and eliminate the need for pile type foundations. As the demand for tertiary recycled water increases in the future, the tertiary filtration facilities can be expanded to meet the demand.

10.0 DISINFECTION FACILITIES

Disinfection system configuration alternatives for both reuse and river discharge were reviewed for the WRF. Two disinfection technologies were considered: the existing sodium hypochlorite/bisulfite system and ultraviolet light (UV) disinfection.

A combination system is recommended for the Petaluma WRF disinfection facilities. Use of the existing hypochlorite system for disinfection during river discharge is recommended. In addition, the existing hypochlorite system is recommended for disinfection of agricultural reuse water, while a UV disinfection system is recommended for urban reuse. The UV system provides better pathogen reduction, and does not add sodium or chloride to the RW. This allows the WRF to benefit from the advantages of both UV and chlorine while maintaining lower capital and annual costs than a complete UV system sized for river discharge and/or complete reuse. The new UV system will be integrated with tertiary filters to minimize regrowth/flocculation prior to disinfection. The economic and non-economic comparisons of UV and hypochlorite is located in TM No. 6, Disinfection Facilities.

Three UV manufacturers were identified for consideration during final design: Ondeo, Trojan and Wedeco. In all cases, the UV systems are considered developing technology and will need to be reviewed on an on-going basis. None of the UV systems are certified under the new Title 22 requirements but are currently conducting pilot testing and bioassays to gain certification.

To prepare for final design, water quality testing needs to be conducted on filtered and unfiltered pond effluent. Percent UV transmittance, turbidity, and particle size distribution measurements should be taken by daily grab samples. Collimated beam testing of the undisinfected pond effluent is also needed to determine required UV doses for reuse and river discharge.

11.0 SLUDGE TREATMENT FACILITIES

The sludge treatment facilities for handling and treatment of waste activated sludge (WAS) was reviewed for the WRF. The Project Report (November 2000) identified aerobic digestion as the preferred treatment process. The goal of the sludge process was to produce a sludge that meets the Class B sludge requirements. Class B sludge is suitable for landfill or restricted land application. Class A sludge would be suitable for unrestricted biosolids reuse, and can be added in the future, if required. The recommendations to achieve Class B are outlined below and shown on Figure ES.5.

The first recommendation is to pre-thicken the WAS. This will reduce the size of the aerobic digester and improve the process stability. Therefore, a single 1-meter gravity belt thickener is proposed to achieve 2 to 3 percent solids prior to aerobic digestion. The second recommendation is to provide a phased aerobic digestion system consisting of three-aerobic digesters operated in series. The first phase digester will be designed to provide a 10 day solids detention time at design flow and the majority of the volatile solids reduction should be achieved in the first stage. This digester would be configured as a circular tank with a diffused air system. Blowers would be provided for aeration air supply. The tank will be designed for a future cover, if required for odor control. The subsequent two stages will be designed for 15 days solids detention time each at design flow and will provide further volatile solids reduction and pathogen reduction. The total detention time for the system, 40 days, should be sufficient to achieve a Class B sludge. The second and third stages will be configured as lagoon type digesters with surface aerators for aeration and mixing. The digesters will be located in the Pond No. 4 area.

Centrifuge dewatering is recommended for the aerobically digested WAS prior to land disposal. Two 150 gpm centrifuges are recommended, 1 duty and 1 standby. Centrifuge dewatering is recommended based on the performance and experience in dewatering aerobically digested sludge, higher solids, smaller footprint, reduced odors and ease in startup and shutdown. The centrifuges will be located in a new building, sited in Pond No. 4. The gravity belt thickener can also be located in the same building.

12.0 RECYCLED WATER STORAGE AND PUMPING FACILITIES

The recommended Recycled Water (RW) storage and pumping facility consists of a new storage reservoir and pumping system to meet the urban RW demands. The existing pump station will be used to meet agricultural reuse demands. The City of Petaluma is currently preparing a recycled water master plan in support of the General Plan. This plan will establish the foundation for the long-term development of the City's RW system. It is estimated that the urban reuse demand will range from 1 mgd to 4 mgd after the WRF is constructed. A water balance for the design flows found that the current amount of reuse, average of 4.5 mgd, with a daily range of 1 to 6 mgd is required for water management and to meet the City's NPDES permit, which prohibits river discharge from May 1 through October 20. Therefore, the agriculture reuse program will need to continue until the urban reuse program can take all the water.

13.0 PRELIMINARY HYDRAULIC PROFILE CONSTRAINTS

A preliminary hydraulic analysis of the proposed treatment facilities was completed to identify hydraulic control points and constraints. The major hydraulic constraints are summarized below:

- River elevation at discharge: The high-high water elevation of 3.6 feet allows the design discharge of 16 mgd from the existing chlorine contact basin. The flood

elevation of 7.5 feet restricts the flow to approximately 12 mgd. Review of the existing outfall found that the outfall “wye” section needed to be replaced.

- The pond operating elevations were control points for the plant hydraulics. The maximum Pond No. 2 water surface is set at an elevation of 16.5 which controls the hydraulic profile for the preliminary and secondary treatment processes. The maximum Pond No. 7 water surface is set at an elevation of 12.25 feet, which controls the inlet water surface to the algae removal facilities.

- PIPS Discharge: PIPS is expected to provide a hydraulic grade elevation of 24-26.5 feet at approximately 36 mgd. The pump station capacity will be confirmed with G.S. Dodson in final design.

14.0 ADMINISTRATIVE FACILITIES

New facilities for the WRF will be provided in a new building including operations, maintenance, and laboratory areas. Administrative staff will be housed in a separate administrative building. These buildings will be located in the northeastern portion of Pond No. 1. A layout and further description of these facilities located in TM No. 11, Administrative Facilities.

These buildings will be designed incorporating “green building” concepts, including:

- Use of recycled building materials.
- Use of day-lighting.
- Alternative ventilation systems to improve indoor air quality.
- Use of renewable energy, using photovoltaic energy.
- Use of green roof.

These concepts are reviewed in TM No. 8, Sustainable Design Concepts.

15.0 ELECTRICAL POWER AND DISTRIBUTION

The power distribution requirements for the proposed WRF, including future expansion, were evaluated including an analysis of alternatives for the proposed distribution network, estimation of the load associated with proposed facilities and identification of the load distribution. The estimated plant operating load is 5,000 kilo-volt ampere (kVA). The main recommendations are:

- Main utility service for the proposed facilities will be at 12 kilovolt level.
- The proposed 12 kV power distribution system will be a simple radial system using indoor metal clad type switchgear and underground concrete encased ductbanks.
- The proposed 480-volt power distribution system will use single ended substations.

- The standby power system will consist of multiple 480-volt diesel engine generators connected and synchronized via separate 480-volt substations.
- Empty ductbanks can be provided near open spaces for future processes.
- The motor control centers will include selector switches and control push buttons for manual control of equipment and interface with remote PLC controls.
- The distribution switchgear, motor control centers and generators will be connected to the plant SCADA system for the purpose of monitoring energy consumption and to monitor status of equipment.
- Use Pacific Gas and Electric Company's "Energy Design Success" services for project energy conservation guidance.
- Utilize photovoltaic roofing systems for some buildings to supply renewable energy during daylight hours.

16.0 INSTRUMENTATION

The plant control system options were reviewed including hardwired control panels, distributed control system, specialty SCADA systems and personal computer/programmable logic controllers (PC/PLC). The PC/PLC was recommended for the following reasons:

- Provides multiple integrator and service company support.
- If limited to major brands, good support for operation.
- Cost effective.
- Main stream technology.
- Less likely to be obsolete.

The collection system pump stations and the PIPS at Hopper Street will be connected to the new SCADA system.

17.0 CONSTRUCTION COST ESTIMATE

The construction cost estimate of the individual project areas is presented in Table ES.4 for the preferred wetlands alternative including the polishing wetlands on Parcels A/B. A detailed breakdown on the project and annualized costs are provided in Table ES.5. Cost estimates for all alternatives evaluated are presented in TM No. 19, Construction Cost Estimates.

18.0 SCHEDULE

An updated project schedule is shown on Figure ES.6. The project schedule is based on starting final design beginning in February 2002 and construction bidding in the second quarter of 2003.

Table ES.4 Construction Cost Estimate – Wetlands Blended Flow Scenario
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

Element	Project Report [1] Estimate ENR7800	Predesign Estimate ENR7925
Preliminary Treatment Facilities	$2,956,000	$3,350,000
Biofilter – Headworks	$472,000	$450,000
Extended Air Activated Sludge	$2,992,000	$4,040,000
Secondary Clarifiers	$5,573,000	$5,790,000
RAS/WAS Pump Station	$3,742,000	$1,750,000
Blower Building and Aeration System	$3,941,000	$1,710,000
Oxidation Pond Improvements	$1,539,000	$750,000
Wetlands Pump Station	$736,000	$0
Wetlands (Ponds 9 and 10 only)	$7,878,000	$2,700,000
Secondary Effluent Pump Station	$0	$650,000
Filters / Flocculators/ Rapid Mix	$8,501,000	$3,170,000
Filter Support	---	$1,470,000
UV System / Contact Channel	$4,639,000	$2,980,000
Hypochlorite / Bisulfite System Modifications	$708,000	$450,000
Aerobic Digesters	$1,957,000	$4,780,000
Dewatering Facilities	$8,879,000	$6,650,000
Dewatered Sludge Storage / Truck Loading Facilities	---	$500,000
Biofilter – Dewatering Building	---	$450,000
Recycled Water Storage Reservoir	$1,046,000	$950,000
Recycled Water Pumping and Piping System Modifications	$1,135,000	$1,040,000
Sitework	$3,093,000	$3,750,000
Yard Piping	--- [2]	$5,830,000
Hydraulic Structures	$969,000	$1,000,000
Administration Building/Operations Building	$3,000,000	$4,000,000
Outfall Maintenance Improvements	---	$250,000
Electrical Improvements	--- [2]	--- [2]
Instrumentation Improvements	--- [2]	--- [2]
Polishing Wetlands (optional)	$0	$4,500,000
Construction Cost Estimate	**$63,756,000**	**$63,000,000**

(1) November 2000.
(2) Included in each element.

Table ES.5 Project and Annualized Costs for Wetlands Blended Flow Scenario Lakeville Highway Water Recycling Facility Project City of Petaluma, California	
	Costs (in millions)[1]
Construction Cost[2]	$63.0
ELAC[3]	$22.1
Total Project Costs	$85.1
Annualized Project Cost[4]	$6.7
Annual Operation & Maintenance Cost[5]	$4.9
Total Annualized Cost[6]	$11.6

(1) Costs include polishing wetlands on Parcels A/B.
(2) Construction costs are based on December 2004 dollars (mid-pt. of construction) using a San Francisco ENRCCI of 7925. This ENR was determined using a 2 percent per year escalation rate over the current (Aug 2001) ENR of 7409.
(3) ELAC costs include engineering, legal, administration, and construction contingency. Costs do not include Hopper Street Plant demolition, land acquisition, easements, or right of way.
(4) Project costs annualized over 25 years at 6% interest rate.
(5) Includes equipment replacement, chemical use, power, labor, solids handling, and wetlands maintenance based on December 2004 dollars.
(6) Annualized total project costs + annual O&M cost.

Figure ES.1
EXISTING LAKEVILLE HIGHWAY WRF
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Pet302f2-6069.cdr

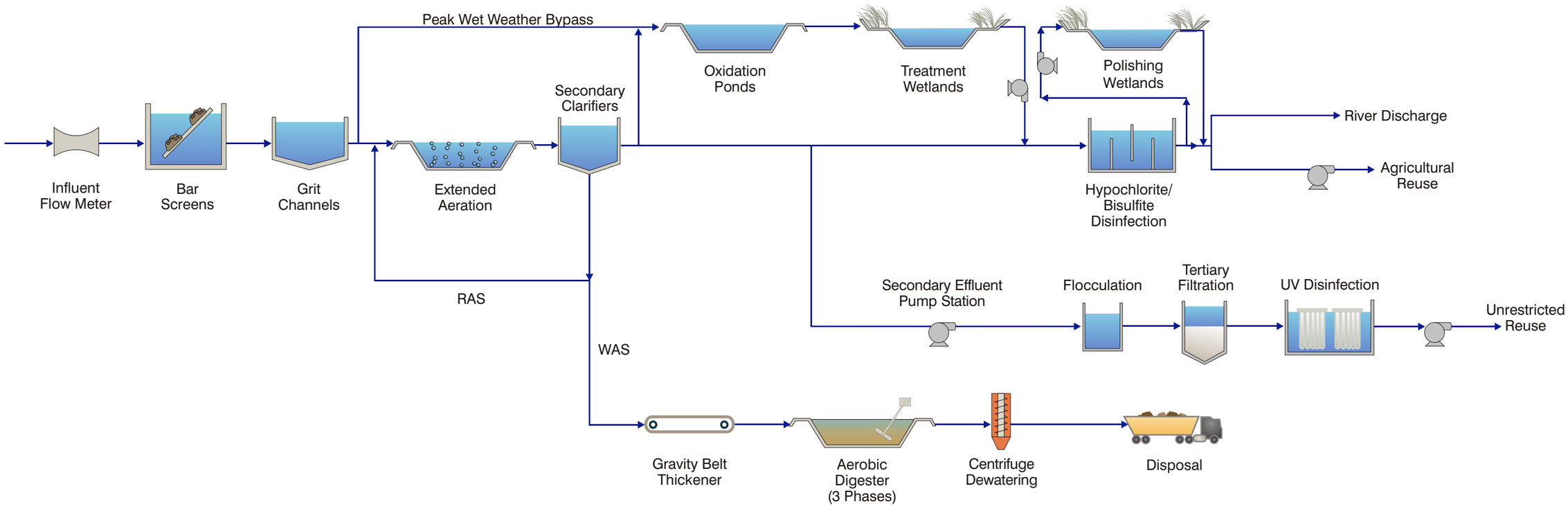

Figure ES.2
OVERALL FLOW SCHEMATIC
FOR PREFERRED ALTERNATIVE
WATER RECYCLING FACILITY PREDESIGN
CITY OF PETALUMA, CALIFORNIA

Pet202f8-6069.cdr

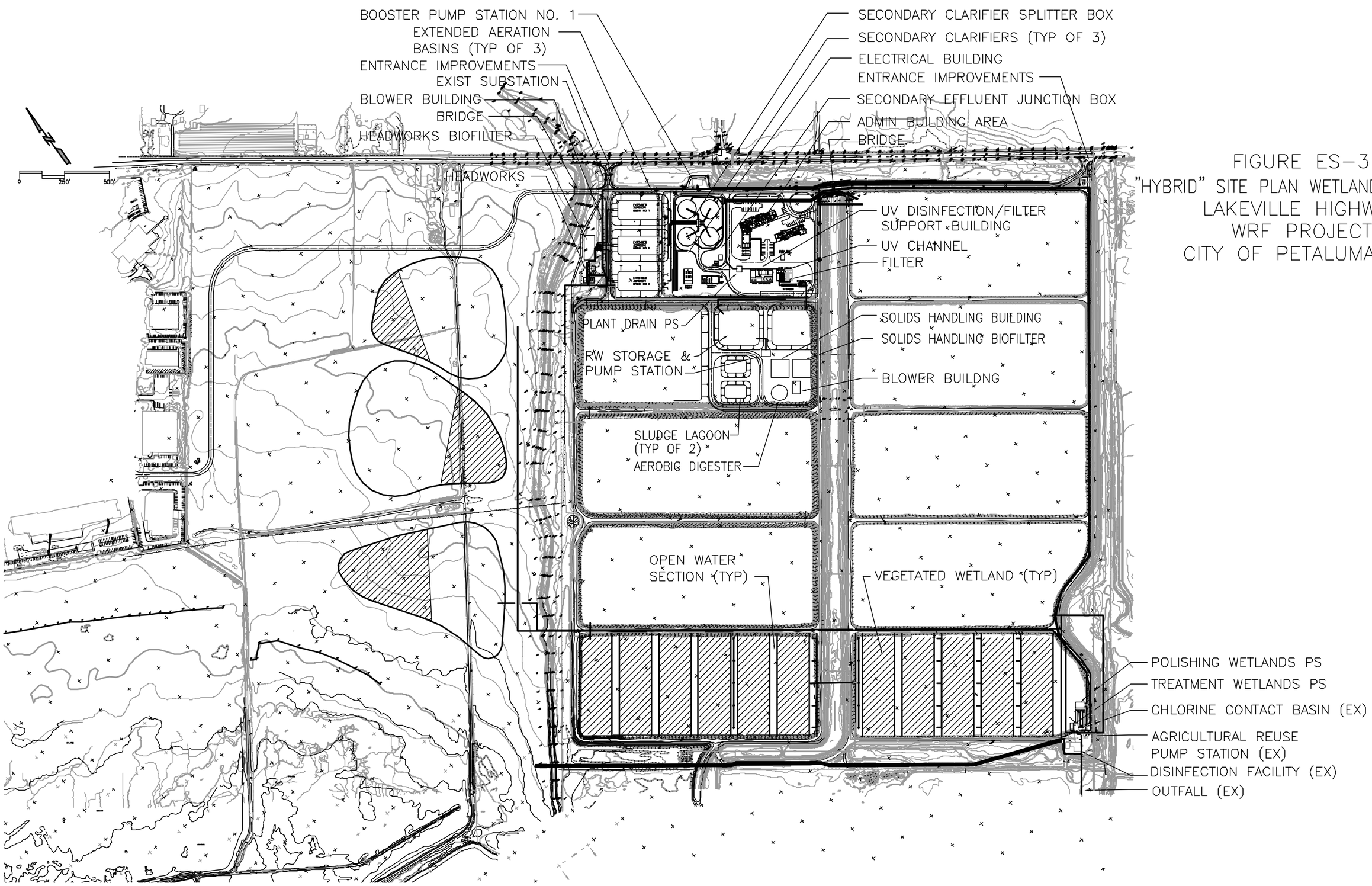

FIGURE ES-3
"HYBRID" SITE PLAN WETLANDS OPTION
LAKEVILLE HIGHWAY
WRF PROJECT
CITY OF PETALUMA, CA

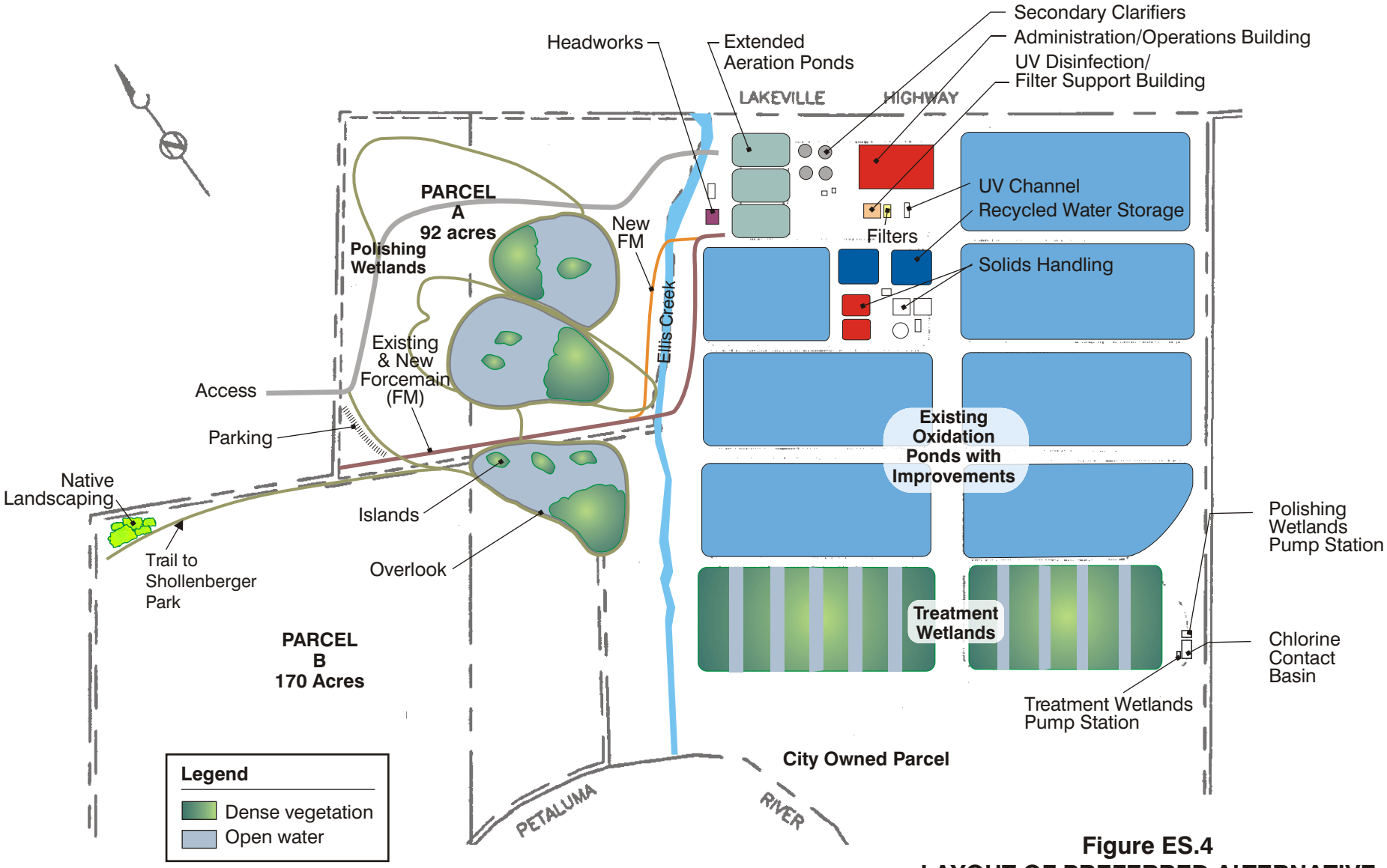

Figure ES.4
LAYOUT OF PREFERRED ALTERNATIVE
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Pet302f1-6069.cdr

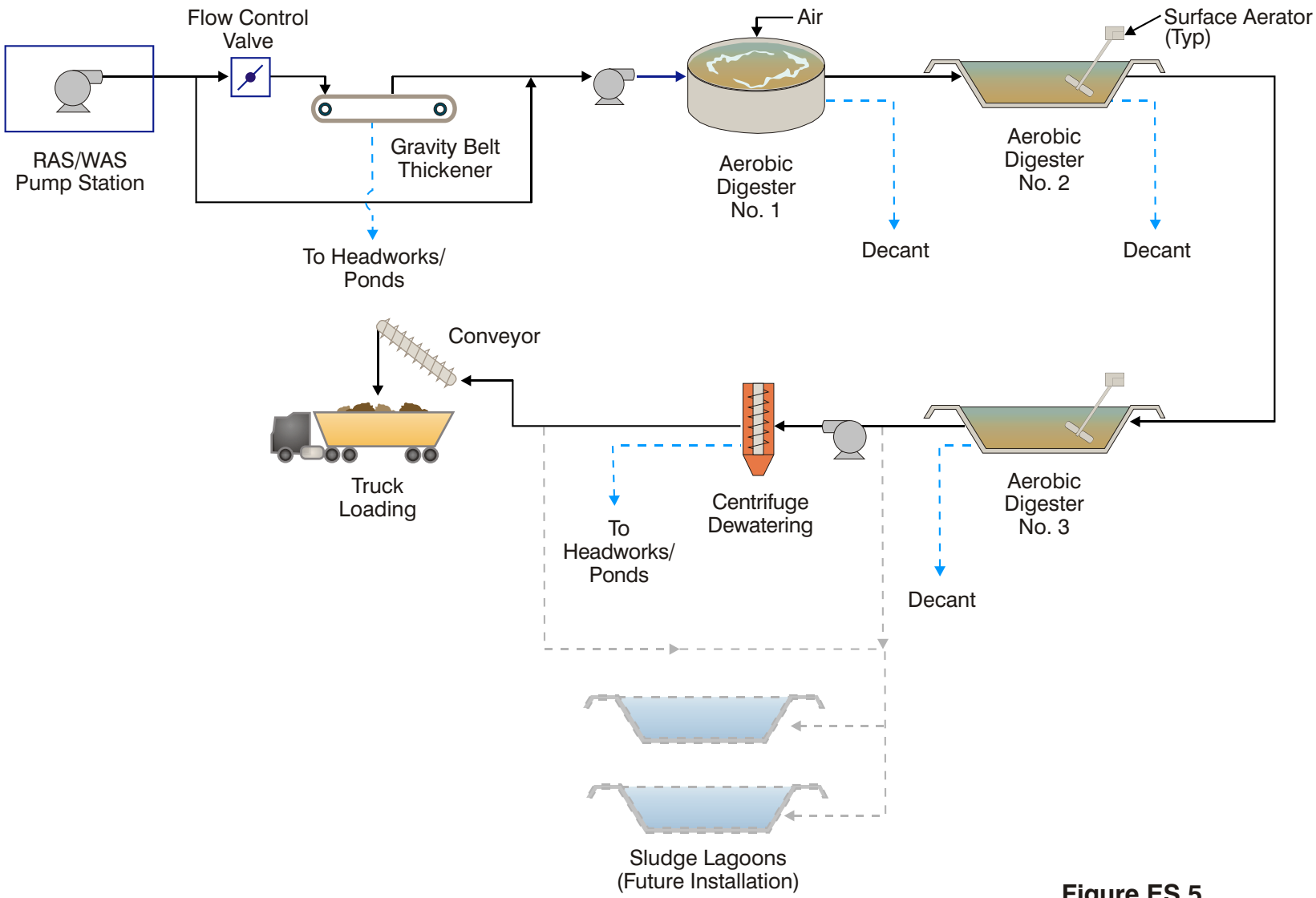

Figure ES.5
SLUDGE TREATMENT SCHEMATIC
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

pet202f5-6069.cdr

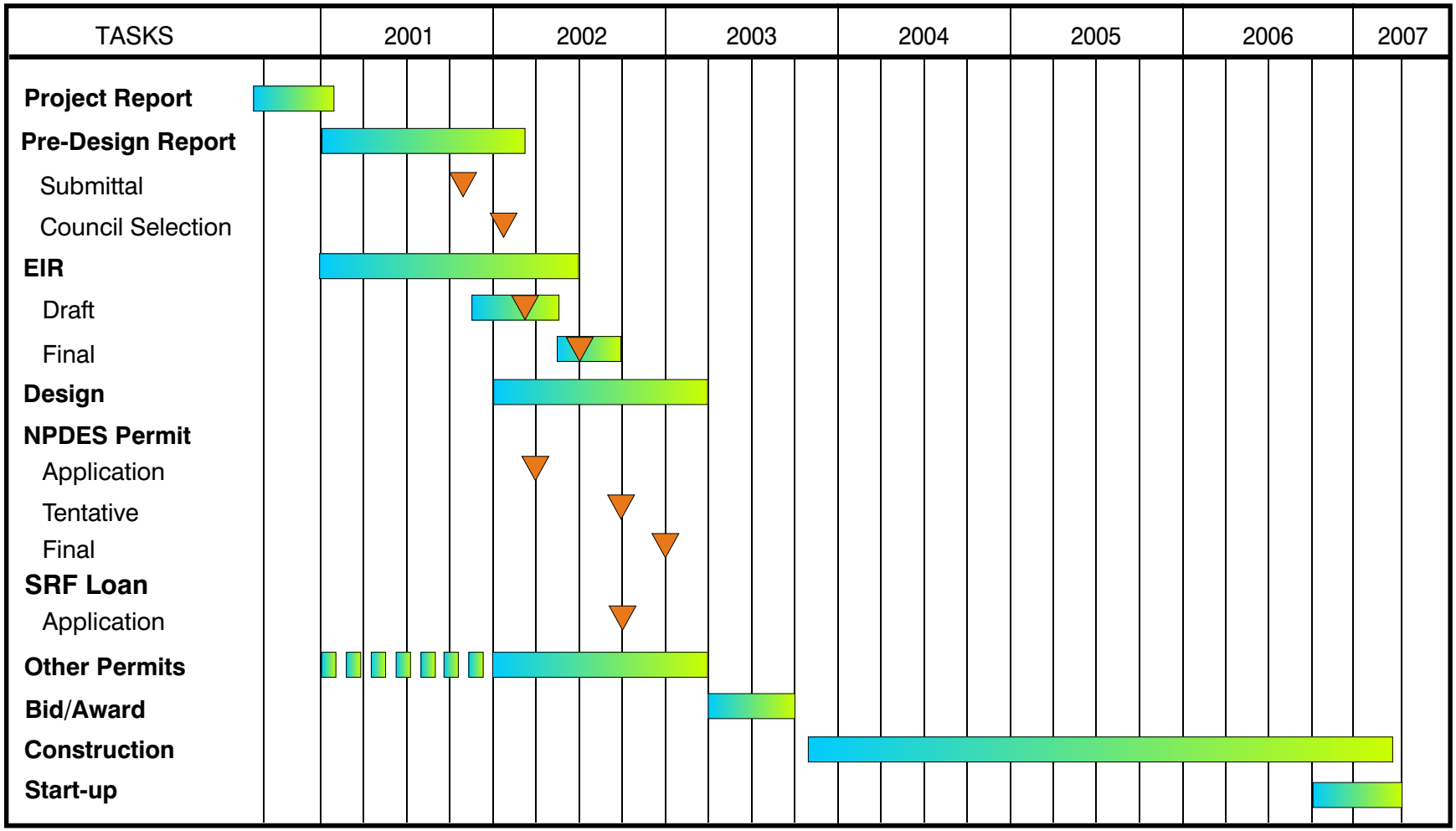

Figure ES.6
PROJECT SCHEDULE
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Pet202s1-6069.cdr

ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS AND DEFINITIONS

AA	Average Annual.
ABAG	Association of Bay Area Governments.
ac-ft	acre feet.
Activated Sludge	Suspended growth biological treatment of wastewater used for the removal of carbonaceous matter. Can also be designed to remove ammonia.
ADMM	Average Day Maximum Month.
ADMMF	Average Day Maximum Month Flow.
AFP (Advanced Facultative Pond)	A pond providing biological wastewater treatment, differing from other pond systems by the existence of a fermentation pit at the bottom of the pond. Solids are captured in the pit. Treatment is provided by the combination of anaerobic (deep, no oxygen) zones and aerobic (oxygenated) zones. Additional oxygen/air is provided by surface aeration.
ADW	Average Dry Weather.
ADWF	Average Dry Weather Flow.
Aerated Lagoon or Pond	A pond providing biological wastewater treatment, differing from other pond systems by the addition of surface aerators. Aeration provides oxygen/air for treatment and allows for a smaller pond footprint than pond treatment without aeration.
Aeration	Process of supplying oxygen for wastewater treatment.
Aerobic	Referring to biological processes that take place in the presence of oxygen. Dependent on micro- organisms that require oxygen.
Alum	Aluminum Sulfate - Chemical added to water to help flocculate solids.
Ammonia (NH_3-N)	Constituent in wastewater which can result in toxicity to fish and reduce river dissolved oxygen.
Anaerobic	Referring to biological processes that take place at low oxygen concentrations or at the absence of oxygen. Dependant on micro-organisms that require the absence of oxygen. Methane gas is a byproduct of anaerobic processes.
ATAD	Auto Thermal Aerobic Digestion.
BOD_5	Biochemical oxygen demand (5-day). The measurement of dissolved oxygen used by micro-organisms in the biochemical oxidation of organic matter.
CBW	Continuous Backwash Filtration.

CEQA	California Environmental Quality Act.
CF	Cubic Feet.
CF/MG	Cubic Feet per Million Gallons.
cfm	Cubic Feet per Minute.
CFR	Code of Federal Regulations.
Cl_2	Chlorine.
CO_2	Carbon Dioxide.
Cogeneration	The recovery and reuse of the methane gas produced in the digesters. Methane gas is used as a fuel in an engine that drives a generator to produce power. Heat is recovered and used to heat the digesters.
Constructed Wetlands	Wetlands that are created for the purpose of treating secondary effluent. Wetlands act as a polishing step and as proposed in this project remove algae from the effluent.
CY	cubic yards.
Digesters	Concrete tanks used to stabilize biological solids and organic material. In the anaerobic digestion process, the solids are converted to methane and carbon dioxide.
Disinfection	Chlorination, ozone or ultraviolet light added to the end of the treatment process to kill pathogens.
DAF (Dissolved Air Flotation Thickener)	Mechanical removal of solids (in this case, algae) through bubbling air through water in a tank, encouraging solids to float to the top of the tank. Chemicals are added to enhance removal.
DHS	Department of Health Services.
DSOD	Division of Safety of Dams.
EIR	Environmental Impact Report.
EL or Elev.	Elevation.
ENR–CCI	Engineering News Record construction cost index which is used to adjust construction costs based on geographic region and time frame.
EPA	Environmental Protection Agency.
Extended Aeration	Extended aeration is a biological, activated sludge process with a long detention time (up to 24 hours). Mechanical aeration is provided. Typically followed by secondary clarifiers which remove the solids. A portion of the solids are returned to the front of the process to help with treatment. Extended aeration produces a high quality, nitrified secondary effluent. Ponds or concrete tanks may be used for this process.

Filters	Beds of sand used to remove fine particles.
Filter Backwash	Periodic filter cleansing process to remove filtered material.
FM	Force main.
F/M or F:M	food to microorganism ratio. A term used in the activated sludge process to determine the ratio of food (or BOD) per mass of microorganisms available in the tank to degrade the BOD.
ft	foot.
fps	feet per second.
gal	gallon.
GBT	Gravity Belt Thickener.
gpcd	gallons per capita per day.
gpd/sf	Gallons per day per square foot.
gph	gallons per hour.
gpm	gallons per minute (a measurement of flow).
gpm/sf	gallons per minute per square foot.
GWI	Groundwater Infiltration.
Headworks	First step in the treatment process which includes screening of large debris, flow measurement, and grit and sand removal.
hp	horsepower.
hr	hour.
HRT	Hydraulic retention time.
HVAC	Heating, Ventilation, and Cooling.
H_2S	Hydrogen Sulfide.
I/I	Inflow and Infiltration.
in	inches.
kcf/d	thousand cubic feet per day.
kV	kilovolts.
kVA	kilovolts amperes.
kW	kilowatts.
lb	pound.
lb/ac-d	pounds per acre per day.
lb/kcf-d	pounds per thousand cubic feet per day.

LEED™	Leadership in Energy and Environmental Design.
LP/HO	low pressure, high output.
LP/LO	low pressure, low output.
m	meter.
M	million.
mcc	motor control center.
MF (microfiltration)	Membrane used to remove fine particles.
MG	million gallons.
mgd	million gallons per day (a measurement of flow).
mg/L	milligrams per liter (a measurement of concentration of a substance in liquid).
min	minute.
mixed liquor	The effluent from the extended aeration process is referred to as mixed liquor.
mL	milliliters.
mm	millimeters.
MP	medium pressure.
MPN (Most Probable Number)	a measurement of number of coliform present in a sample.
μg/L	micrograms per liter.
μm	micrometers.
NFPA	National Fire Protection Agency.
Nitrification	Advanced treatment process of converting ammonia to nitrates which are less toxic to aquatic life.
NH_4-N	ammonia nitrogen.
NO_3-N	nitrate nitrogen.
NOAA	National Oceanic and Atmospheric Administration.
NPDES	National Pollutant Discharge Elimination System – a permit issued for discharge of treated wastewater effluent into a waterbody of the United States.
NPSH	net positive suction head.
NRF	Nitrifying Rock Filter.
NTR	National Toxics Rule.

NTU	Nephelometric turbidity unit. A measurement of turbidity in water.
Nutrient Removal	Treatment process which removes nitrogen and/or phosphorus from wastewater.
NWRI	National Water Research Institute.
nm	nanometers.
O&M	Operation and maintenance.
O_2	oxygen.
OPE	Oxidation Pond Effluent.
Oxidation Pond	A pond providing biological wastewater treatment. Mechanical aeration is typically not provided. Oxygen is supplied primarily from algae. Oxidation ponds require a larger pond footprint than ponds that are aerated.
PAD	Phased Aerobic Digestion.
PC (Primary Clarifiers)	Concrete tanks used as a first step to settle out suspended solids from the wastewater.
PC/PLC	personal computer / programmable logic controller.
pH	A numerical measurement of the acidity or alkalinity of a chemical solution. pH = 7 is neutral pH. pH <7 is acidic. pH>7 is alkaline or basic.
Photoreactivation	Refers to a process by which the DNA in pathogens that have been damaged by exposure to ultraviolet light disinfection can sometimes repair after exposure to sunlight.
PHWWF	Peak Hour Wet Weather Flow.
PIPS	Pond influent pump station. Existing pump station at the Hopper Street WWTP.
PLC	programmable logic controller.
ppd	pounds per day.
ppm	parts per million.
Preliminary Treatment	Physical treatment to remove large articles such as rags and plastics which can clog pumps and subsequent treatment processes. Processes include screening and grit removal.
Primary Treatment	Physical treatment to remove solids, generally provided through settling in clarifiers.
PS	Pump Station.
psi	pounds per square inch.
psig	pounds per square inch gauge.

PVC	polyvinyl chloride.
RAS	return activated sludge – that portion of biological solids from the activated sludge process returned to the head of the processes.
RDII	Rainfall Dependant Inflow and Infiltration.
RS or RSG	Raw Sewage.
RW (Recycled Water)	Water treated to a level suitable for reuse by groundwater recharge, agricultural irrigation or industrial use. Should meet Title 22 requirements.
RWQCB	Regional Water Quality Control Board – the agency responsible for protecting waters of the Sate and issuing NPDES permits.
SCADA	Supervisory Control and Data Acquisition.
scfm	standard cubic foot per minute.
SCWA	Sonoma County Water Agency
Secondary Clarifiers	Final settling process for TSS removal.
Secondary Treatment	Biological treatment to reduce the organic content of the wastewater, typically to a 30 mg/L BOD/TSS level.
sf	square foot.
Sludge Lagoon	A lined lagoon used to store and further stabilize sludge prior to dewatering.
Solids Dewatering	Removing water from waste solids stream.
SOTE	Standard Oxygen Transfer Efficiency.
SRF	State Revolving Fund Loan.
SRT	Solids retention time.
tbd	to be determined.
Tertiary Treatment	Physical/chemical treatment generally consisting of filtration to remove any solids and organics remaining after secondary treatment.
Title 22	California Administrative Code citation which defines recycled water treatment requirements.
TKN	Total Kjeldahl Nitrogen. Lab analysis to determine the total of ammonia and organic nitrogen.
TM	Technical Memorandum.
Toxicity	Measure of harm to aquatic life based upon test of fish mortality.
TS	Total Solids.
TSS	Total Suspended Solids. A measure of solids in wastewater.

Turbidity	Measure of the clarity of water in Nephelometric Turbidity Units (NTU).
Typ	Typical.
USGBC	United States Green Building Council.
UV	Ultraviolet light. Ultraviolet light disinfection used to inactivate coliform organisms.
VE	Value Engineering
VFD	Variable Frequency Drive.
VSS	Volatile Suspended Solids.
WAS	Waste activated sludge – byproduct of activated sludge processes which must be wasted from the system, thickened and further stabilized in digesters.
WRF	Water recycling facility.
WWTP	wastewater treatment plant.
Yr	Year.

city of
Petaluma, California

water recycling

FACILITY AND RIVER ACCESS IMPROVEMENTS

Volume 2 Appendices

DRAFT

Environmental Impact Report

State Clearing House #2001052089

April 2002

carollo engineers

PET402R2-6069.PSD

CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND RIVER ACCESS IMPROVEMENTS DRAFT ENVIRONMENTAL IMPACT REPORT

VOLUME 2

April 12, 2002

Prepared by Parsons

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APPENDIX A

Executive Summary
Predesign Report
Water Recycling Facility Project
City of Petaluma, California,
by Carollo Engineers

February 2002

City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

EXECUTIVE SUMMARY
PREDESIGN REPORT

FINAL
February 2002

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City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

EXECUTIVE SUMMARY

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City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

EXECUTIVE SUMMARY

LIST OF TECHNICAL MEMORANDA

TM NO.	NAME
1	Preliminary Treatment Facilities
2	Secondary Treatment Facilities
3	Oxidation Pond Improvements
4	Algae Removal Facilities
5	Tertiary Treatment Facilities
6	Disinfection Facilities
7	Sludge Treatment and Disposal Facilities
8	Sustainable Design
9A	Water Balance
9B	Recycled Water Storage and Pumping Facilities
10	Site Master Plan/Improvements
11	Administrative Facilities
12	Architectural and Aesthetic Facilities
13	Landscaping
14	Structural Design Criteria
15	Electrical Power and Distribution
16	Instrumentation and Control
17	Project Delivery Analysis
18	Hydraulic Profile/Design Criteria
19	Preliminary Construction Cost Estimate
20	Staffing Evaluation

1.0 INTRODUCTION

This summary report presents the major findings and recommendations of the Predesign Report for the Lakeville Highway Water Recycling Facility (WRF). The summary report is a compilation of the findings and recommendations from a series of twenty technical memoranda (TM), which detail the basis for the final design.

2.0 PROJECT OBJECTIVES

The City of Petaluma, California proposes to construct a WRF to meet the following objectives:

- To develop an economically and ecologically sustainable WRF to accommodate growth and development anticipated by the City's General Plan. The buildout population for Petaluma and Penngrove is estimated to be 70,650, requiring treatment of 6.7 mgd during average dry weather flow (ADWF).

- To comply with Federal, State and regional air and water quality regulations through appropriate design and operation of the WRF. Reliability and redundancy features will be included to be able to meet applicable regulations consistently.

- To replace or upgrade the existing wastewater treatment facility that is operating near its capacity and the end of its useful life.

- To protect the water quality of the Petaluma River and the San Francisco Bay by continuing to conduct wastewater treatment in an environmentally sensitive manner. The WRF will include the additional step of ammonia removal in the process to reduce the risk of ammonia toxicity in the river. The WRF will also include polishing wetlands to provide additional treatment of metals, organics and nutrient removal.

- To stabilize and treat the biosolids generated in the wastewater treatment process to EPA's Class B standards for beneficial reuse of the biosolids.

- To produce tertiary recycled water in accordance with California Title 22 regulations so water can be recycled to irrigation users throughout the City.

- To provide storage in the oxidation ponds during river discharge prohibitions from May 1 to October 20 and to balance the recycled water program during this non-discharge period.

- To develop a facility that serves as an amenity to the community by providing educational and recreational opportunities.

3.0 PROJECT OVERVIEW

A Project Report was completed for the City of Petaluma, California in November 2000, which evaluated five treatment alternatives. These five treatment alternatives were selected in the May 2000 project workshop and were discussed in the Value Engineering Workshop Technical Memorandum (August 2000). In no particular order, the alternatives were:

- Alternative 1 – Advanced Facultative Ponds: Advanced Facultative Ponds • Oxidation Ponds • Wetlands (or Dissolved Air Flotation [DAF] units).
- Alternative 2 – Aerated Lagoons: Aerated Lagoons • Oxidation Ponds • Wetlands (or DAF).
- Alternative 3 – Primary Clarifiers/Ponds: Primary Clarifiers (with Anaerobic Digesters and Cogeneration) • Oxidation Ponds • and Wetlands (or DAF).
- Alternative 4 – Hopper Street: Primary Clarifiers (with Anaerobic Digesters and Co-generation) • Activated Sludge at Hopper Street • Oxidation Ponds • and Wetlands (or DAF) at Lakeville Highway.
- Alternative 5 – Extended Aeration: Extended Aeration • Oxidation Ponds • Wetlands (or DAF)

Sub-alternatives to each of these alternatives include using DAF thickeners instead of wetlands for algae solids removal and using either chlorination/dechlorination or ultraviolet light for disinfection.

Comparisons of costs, sustainability, and land use for the alternatives were presented in the Project Report. Alternative 5 – Extended Aeration was the recommended project. It had comparable costs to the other alternatives and the lowest ecological footprint. In December 2000, the City decided to proceed with predesign of Alternative 5 – Extended Aeration. For the algae removal process, both options, wetlands and DAF, were carried into the predesign process for further development.

The draft Predesign report was reviewed during a Value Engineering (VE) workshop on October 8 through 12, 2001. The VE review was conducted by a six person team and team facilitator selected by the City of Petaluma. The results of the VE review workshop were presented in a draft report dated October 12, 2001. These results focused on cost reductions and process improvements. The VE recommendations were reviewed and where applicable, incorporated into this Predesign Report. A separate response was published entitled Final Report Review of Value Engineering, dated February 2002.

3.1 Basis of Design

The WRF is designed to provide wastewater treatment for the projected flows and loads estimated in the Project Report, which were based on build-out projections from the City's adopted General Plan (1987-2005). The Basis of Design is summarized in Table ES.1.

Table ES.1 Basis of Design
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

	Value
Flow	
Average Dry Weather, mgd	6.7
Annual Average, mgd	8.0
Secondary Effluent Quality (River Discharge)	
BOD, mg/L	30
TSS, mg/L	30
Recycled Water (RW) Quality	
Urban – Turbidity	2 NTU
Urban – Coliform	2.2 MPN/mL
Agriculture - Coliform	23 MPN/mL

3.2 Existing NPDES Requirements

The City's NPDES permit (No. CA 0037810) was adopted on July 15, 1998 by the San Francisco Bay Regional Water Quality Control Board. The existing wastewater treatment plant (WWTP) effluent must meet the NPDES permit requirements when discharging into the Petaluma River, October 21 to April 30. The WRF is being designed to provide secondary treatment that meets current permit requirements. The existing permit requirements are shown in Table ES.2, and the NPDES permit is included in the Appendix.

From May 1 to October 20, the City is prohibited from discharging treated effluent into the Petaluma River. During this period, the City must store and recycle all the effluent. The City provides secondary treated, disinfected water for irrigation of approximately 800 acres of agricultural lands and 60 acres of Adobe Golf Course.

3.3 Water Reuse (Title 22)

Recycled water regulations are contained in the California Code of Regulations, Title 22, Division 4, Chapter 3, Section 60301 through 60355 (Title 22). Title 22 specifies treatment requirements depending on the ultimate use of the water. Three treatment levels are defined by the regulations: disinfected secondary-23, disinfected secondary-2.2, and disinfected tertiary.

Table ES.2 Existing WWTP NPDES Requirements
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

Effluent Limitations	Units	Monthly Average	Weekly Average	Daily Maximum	Daily Average	Instantaneous Maximum
BOD_5	mg/L	30	45	60	---	---
TSS	mg/L	45	65	70	---	---
Seattleable Matter	mL/l-hr	0.1	---	---	---	0.2
Oil and Grease	mg/L	10	---	20	---	---
Chlorine residual	mg/L	---	---	---	---	0.0
Total Coliform	MPN/100 mL	---	23(1)	---	---	240(2)
Acute Toxicity Bioassay	% Survival	90%(3)	---	70%(4)	---	---
Metals						
Cadmium	μg/L	---	---	---	2.0	---
Chromium(VI)	μg/L	---	---	---	11.0	---
Copper	μg/L	---	---	---	14(5)	---
Lead	μg/L	---	---	---	5.6	---
Mercury	μg/L	0.07(6)	---	---	---	---
Nickel	μg/L	---	---	---	7.1	---
Lindane	μg/L	0.16	---	---	---	---
PAHs	μg/L	0.049	---	---	---	---
Cyanide	μg/L				14(7)	
Receiving Water Limitations	**Units**	**Annual Median**				**Maximum**
Unionized Ammonia	mg/L	0.025	---	---	---	0.16

(1) Median of 7 samples.
(2) No sample shall exceed 240-MPN/100 mL.
(3) 90% survival on 11 sample median.
(4) Must show better than 70% survival in 90% of samples.
(5) Interim limit, final limit - effective 7/2005 is 4.9 μg/L.
(6) Interim limit, final limit - effective 7/2005 is 0.012 μg/L.
(7) Interim limit.

Disinfected tertiary recycled water is commonly referred to as ‘unrestricted use’. The City’s goal is to provide unrestricted use water for urban reuse, which is the highest quality of water specified with the greatest number of uses allowed. Recycled tertiary water uses include recreational impoundments with full body contact, spray irrigation of all food crops and irrigation of landscapes with unlimited access by the public, such as parks and schools. Unrestricted use, Title 22 water must be secondary treated, coagulated, filtered and

disinfected to effluent total coliform less than 2.2 MPN/100 mL and an effluent turbidity of a daily average of 2 NTU.

Currently, the WRF provides disinfected secondary effluent to agricultural users. The effluent is disinfected to a less restrictive coliform standard of 23 MPN/100 mL.

3.4 Metals

Receiving water metals concentrations are established by several regulations, including the San Francisco Basin Plan and the National and California Toxics Rule. The City's existing NPDES permit contains requirements for metals concentrations in the final effluent. Those requirements are listed in Table ES.2. There are also mass limits and mass triggers for mercury (see the NPDES permit in the Appendix for details).

3.5 Ammonia and Effluent Toxicity

The San Francisco Bay Basin Plan and the City's existing NPDES permit require an annual median unionized ammonia concentration of 0.025 milligrams per liter (mg/L) in the receiving water. Historically, the existing WWTP has not experienced violations of this receiving water limitation. However, since the Petaluma River does not provide significant dilution for the City's discharge during certain times of the year, the effluent ammonia would need to be reduced to a level of approximately 8 mg/L, depending on pH, to meet an end-of-pipe unionized ammonia limit of 0.025 mg/L. Ammonia in the effluent also affects the plant's ability to pass the effluent toxicity tests. Current plant effluent chronic toxicity testing with fathead minnow larvae indicate sensitivity and decreased survival at ammonia levels above 8 mg/L.

4.0 SITE MASTER PLAN

The existing facilities at the Lakeville Highway pond site consist of an aerated lagoon, oxidation ponds built in 1972 and disinfection facilities built in 1972 and 1982 and upgraded in 1999. The layout of the existing facilities at Lakeville Highway is shown in Figure ES.1 (at the end of the text). A flow schematic of the new facilities is shown on Figure ES.2. The layout of the proposed facilities for the preferred wetlands option is shown on Figure ES.3. As discussed in subsequent sections, this is the layout adopted by the City Council in their January 7, 2002 resolution. This section describes the existing site layout and then identifies the site planning constraints including site access, site geology including groundwater, and master planning for future capacity expansion.

The site layout is based on master planning the site to accommodate a future plant treatment capacity increase of 25 percent. Therefore, the site plans include a preliminary layout that shows future treatment units. These future units are not required under the current project but are shown to address the potential for future expansion.

4.1 Existing Pond Site Layout

Wastewater from the Pond Influent Pump Station (PIPS) at the Hopper Street treatment plant is pumped through a 14,100-foot force main to the aerated lagoon and Pond No. 1. Approximately 60 percent of the flow goes directly to the aerated lagoon, while the other 40 percent goes to Pond No. 1. The aerated lagoon is approximately 3 acres in area and 16 feet deep. Three 15 horsepower (hp) vertical surface aerators provide aeration in the aerated lagoon. The first oxidation pond (Pond No. 1) also has surface aeration provided by four 15 hp vertical aerators and three 10 hp horizontal aerators. Pond No.1 is approximately 10 acres and 8 feet deep. The remaining Pond Nos. 2 through 10 provide further treatment and storage. Each pond is approximately 15 acres and the depths vary from 5 to 11 feet. Approximately 1,300 acre-feet of volume is provided in Pond Nos. 2 though 10. Pond Nos. 2, 3, 6, and 7 are normally used for treatment. The full depth of the ponds cannot be used for active storage due to the location of the water transfer structures. The usable volume in Pond Nos. 4, 5, 8, 9, and 10 provides storage from April through October when no discharge to the Petaluma River is allowed. The storage is also used to balance the needs of the water recycling program during the summer months.

The original disinfection facilities were constructed in 1972 and 1982 and consisted of a chlorine contact basin and gaseous chlorine and sulfur dioxide facilities. The City completed construction of liquid sodium hypochlorite and sodium bisulfite facilities in 1999 to replace the gaseous chlorine. The chlorine contact basin has a volume of 0.36 million gallons (MG) and will provide a contact time of 90 minutes at 8 million gallons per day (mgd).

4.2 Site Access

Site access is an issue that is under review. There are two entrances into the Lakeville site from Lakeville Highway (State Route 116), east gate and west gate. Due to the speed and volume of traffic on the highway, alternative access and highway improvements are under consideration. These are summarized below.

- Business Park Access. The preferred access option is to have a new access road enter the site from the adjacent Oakmead/Northbay Business Park. The road would run across Parcels A and B. This would primarily be for staff and public. Chemical deliveries and sludge hauling trucks would still enter the site through the existing East gate entrance. The new access road will require a bridge across Ellis Creek. The site for the crossing is under review which will consider environmental impacts and other issues.

- Lakeville Highway Improvements. The existing East gate entrance into the site will be improved to handle truck access. A right turn lane could be added, for east bound right turns into the site, and an acceleration lane could be added for right turns out of the site, for east bound traffic. A left turn bay could be added for left turns into the site at the East gate.

- In-Plant Road Improvements. Two in-plant roadways will be improved for the project. The east road will be widened and the road section increased to handle truck traffic. The north road will be widened and the road section improved to provide a safer road way for daily use. The north road improvements will also include a bridge across the drainage swale to connect the west and east sides of the plant.

4.3 Site Geotechnical Issues

The entire site has issues related to the underlying geology. First, groundwater is fairly shallow, ranging from 10 feet below existing grade on the northern portion of the site to 5 feet below grade on the southern portion of the site. Second, the site can be divided into two areas with respect to foundation requirements. The northern 2/3 of the site is underlain by silty gravel which provides sufficient support for new structures. A layer of bay mud underlies the southern 1/3 of the site, including Pond No.10. Facilities located in the Pond No. 10 area will require additional support including piles for heavy structures.

4.4 Site Buffer

An important site master planning criteria is the maintenance of a site buffer area. In general, a site buffer provides separation between the treatment processes and the nearest neighbors. Separation will lower the risk of complaints especially with respect to odors, noise, and night time lighting. Treatment facilities in growing areas have found that a minimum buffer to reduce neighbor impact is 1,000 feet. The options to create buffer are limited, and it is recommended that the city purchase the land to the west of the plant site (Parcels A/B) to provide a site buffer. In the future, the City should consider purchasing the land east of the site (Parcel C).

5.0 PRELIMINARY TREATMENT FACILITIES

Preliminary treatment facilities for the WRF include influent flow metering, screening, screening compaction / dewatering, influent sampling, vortex grit removal, grit pumps, grit classifier and washer and septage receiving station. The preliminary treatment facilities will be located on the west side of the plant in the area adjacent to the existing aerated lagoon. The existing raw sewage (RS) force main enters the ponds in this area and can be connected to the new headworks with a minimum of modifications. Screenings and grit will be removed from the wastewater flow and stored in containers for landfill disposal. The headworks will be designed for a peak hour hydraulic flow of 36 mgd.

Influent flows will be metered through a flow meter. Influent sampling will occur downstream of the barscreens. Recycle and sidestream flows are collected in a sump and pumped through a recycle flowmeter downstream of the influent sampling and metering location.

Climber screens are proposed for the WRF. Two screens will be provided with a capacity of 18 mgd each. A manual bypass / overflow screen will also be provided for reliability. Screenings will be washed, compacted, and stored in removable storage hoppers for landfill disposal.

Vortex grit removal is recommended over aerated grit removal because it uses less power and is, therefore, the more sustainable alternative. A simple vortex grit chamber will be provided. Grit will be pumped from the grit chambers, classified, washed and stored in removable storage hoppers for landfill disposal.

6.0 SECONDARY TREATMENT FACILITIES

The secondary treatment facilities proposed for the WRF include extended aeration basins, secondary clarifiers, blower building, return activated sludge (RAS) pumps and waste activated sludge (WAS) pumps. The secondary process will be designed for a peak hydraulic flow of 24 mgd. These facilities will be located in the aerated lagoon area and Pond No. 1 area, as shown on Figure ES.3.

Effluent from preliminary treatment will be conveyed to the aeration basin flow split structure. The flows will be split over weirs to the three extended aeration basins. Return activated sludge will be split hydraulically to the three aeration basins and mixed with the influent flow to each basin.

The extended aeration basin design will be based on a floating aeration lateral system. Three 4.5 MG extended aeration basins will be provided for biochemical oxygen demand (BOD_5) removal, nitrification, and partial denitrification. The basins will be constructed in the area of the existing aerated lagoons, using a flexible membrane liner over compacted soil. A selector compartment will be provided for filamentous organism control.

Mixed liquor is conveyed from the aeration basins to a mixed liquor flow split structure and divided between three 105-foot diameter secondary clarifiers. The clarifiers have individual scum sumps with dedicated submersible pumps.

Effluent from the secondary process will be conveyed by gravity to the disinfection facilities and then to the outfall during river discharge. Up to 6 mgd of secondary effluent can be conveyed by gravity to the ponds for additional treatment and/or storage, as needed.

During summer reuse, secondary effluent will be conveyed to the tertiary facilities for Title 22 treatment and urban reuse. A combination of secondary effluent and pond effluent will be disinfected to 23 MPN/mL for agricultural reuse. If influent flows exceed reuse during the river discharge prohibition, then secondary effluent will be conveyed by gravity to the existing oxidation pond system for storage.

Aeration air will be provided from centrifugal blowers. The blowers will be housed in a separate blower building located east of the existing aerated lagoon area. The blower system will be designed to minimize energy use, while providing sufficient aeration air.

Individual RAS pumps will be provided for each clarifier with a common spare. WAS will be pumped to the sludge treatment facilities.

7.0 OXIDATION POND SYSTEM

The existing oxidation ponds provide secondary treatment (for a blend of raw, primary and secondary wastewater), metals reduction, seasonal ammonia reduction and storage during the non-discharge season. While the ponds currently provide many treatment benefits, they also produce algae which increases effluent suspended solids during river discharge. After construction of the new facilities, secondary treatment and ammonia reduction will be provided upstream of the ponds. The existing oxidation pond system, including Pond Nos. 2 through 8 will be used for storage and polishing of secondary effluent. The ponds are shown on Figure ES.1. Although the ponds will serve mainly as storage, algae will still grow in the ponds so algae removal facilities must be provided. The ponds also provide metals reduction. Flexibility will be retained in the design to use the ponds for metals polishing.

The original concept for the new facilities assumed all treated wastewater would pass through the ponds for metals reduction prior to river discharge, as historically the ponds have played a key role in meeting effluent metals requirements. With all flow passing through the ponds, facilities for algae removal would be necessary for the full flow. In addition, nitrogen in the secondary effluent could be converted to ammonia in the ponds, and therefore, ammonia reducing facilities downstream of the ponds would be necessary. The two alternatives considered were: 1) wetlands sized for both algae removal (with densely vegetated sections) and ammonia reduction (with open water sections) and 2) DAF for algae removal followed by nitrifying rock filters for ammonia reduction.

Limited data collected in the fall of 2001 from the existing secondary system indicate that the secondary effluent blended with some pond effluent should be able to meet the metals limits for river discharge. For the secondary effluent and pond effluent blend scenario, the ponds are still required for storage during non-discharge periods (May 1 through October 20) due to the seasonal variation in the water demand for irrigation. The water stored in the ponds during non-discharge periods would be blended with the secondary effluent for river discharge during the discharge period (October 21 through April 30). The pond effluent would still contain algae and ammonia; however, blending pond effluent with secondary effluent allows the facilities downstream of the ponds to be downsized for less than the full flow resulting in significant cost savings. Effluent from the oxidation ponds can be conveyed to the algae removal facilities prior to disinfection for the river discharge or agricultural reuse scenarios.

During wet weather, peak hour flows over 24 mgd will bypass the secondary treatment facilities and will be conveyed by gravity to the ponds for treatment. Pond No. 2 will include surface aeration equipment for treatment during the construction period and will provide additional treatment during wet weather flows.

8.0 ALGAE REMOVAL FACILITIES

Wetlands and DAF/Nitrifying Rock Filters (NRF) treatment options for removal of algae from the oxidation pond effluent were considered in the predesign study. A wetland is a natural system requiring low operational energy and offering many public and wildlife benefits. DAF is a mechanical process alternative that offers operational control and stability. Both treatment alternatives were developed in detail and are summarized below.

Two scenarios for pond operation and downstream algae removal facility sizing were reviewed in the predesign report:

- All flow (12-mgd maximum month flow) through the ponds and downstream algae removal and ammonia reduction facilities.
- Blend of secondary and pond effluent which allows downsizing of algae removal and ammonia reduction facilities downstream of the ponds.

Only the blended flow scenario for wetlands and DAF is summarized here as this pond operational scenario was recommended.

8.1 Blended Flow Scenario

Blending secondary effluent with pond effluent for river discharge allows a significant reduction in the algae removal facility capacity. Ponds are still needed for storage during non-discharge periods, particularly during low reuse such as early spring and fall. The water stored in the ponds during the non-discharge period must be discharged during the river discharge periods to make room for storage the following reuse season. A worst case scenario assumes fifty percent of the river discharge would be pond effluent blended with secondary effluent, although in most cases the pond water could be managed to be less than 20 to 30 percent of the total discharge. At a fifty percent blend or less, the effluent ammonia will meet the desired 8 mg/L without ammonia reducing facilities downstream of the ponds. Therefore, ammonia reduction facilities are not required. The pond effluent and algae removal facilities would be sized for a maximum flow of 6 mgd for river discharge. These facilities could also be used for agricultural reuse.

8.1.1 Wetlands for Algae Removal

If the wetlands are to be used only for algae removal and not ammonia reduction, open water sections are not required. The densely vegetated wetlands in Pond Nos. 9 and 10 would provide adequate detention time for algae removal for 6 mgd of flow. This eliminates the need for treatment wetlands on Parcels A/B. However, in addition to ammonia reduction, open water wetlands provide nutrient reduction, metals polishing, recreation and wildlife habitat opportunities. By using densely vegetated wetlands in Pond Nos. 9 and 10 only, the habitat and public benefits are greatly reduced.

8.1.2 DAF for Algae Removal

With only 6 mgd of pond effluent used for discharge, only one - 50 foot diameter DAF unit is needed. The DAF unit would be located in the Pond No.10 area. Support facilities would include an air supply system, pressurization pumps, polymer storage and feed system, and thickened float collection and pumping. Thickened float would be returned to the pond system, or to the sludge treatment facilities. Nitrifying rock filters would not be required as the blend of secondary, nitrified effluent and pond effluent would meet an effluent ammonia of 8 mg/L.

8.1.3 Comparison of Algae Removal Alternatives

The advantages and disadvantages for the wetlands and DAF alternatives are discussed in detail in TM No. 4. The addition of the optional polishing wetlands component to either wetlands or DAF alternatives results in the following benefits/issues:

- Habitat benefit of wetlands is greatly increased.
- Public education/recreation benefit of wetlands is created.
- CEQA impact for wetlands on Parcel A/B is significant due to loss of ag land.

Capital and O&M costs for both alternatives are presented in Table ES.3. Cost savings for the blended flow scenario range from $4.6 to $5.9 million for the DAF and wetland alternative, respectively. The wetlands alternative has lower project and O&M costs.

8.1.4 Optional Polishing Wetlands

An optional component for both treatment alternatives is the development of polishing wetlands on Parcels A and B. Figure ES.4 shows approximately 30 wet acres of polishing wetlands. The polishing wetlands would provide wildlife habitat and public benefits as well as additional polishing of fully treated wastewater for metals, organics and nutrients. Creating polishing wetlands with disinfected water would likely allow greater public access opportunities than the treatment wetlands on Parcel A/B with undisinfected water, which would likely require restricted access. This polishing wetlands concept is recommended for either DAF or wetlands alternative.

8.2 Recommended Alternative

Based on the significant cost savings of the blend of secondary effluent with pond effluent, it was recommended that the algae removal facilities be sized for 6 mgd. The wetlands alternative for the 6-mgd facilities has a slightly lower project cost. The use of wetlands for algae removal has advantages over the DAF alternative, including creation of habitat, additional effluent polishing and lower operational costs, particularly due to low energy use. Therefore, it was recommended that wetlands be used for algae removal.

On January 7, 2002, the Petaluma City Council adopted a resolution to move ahead with final design of the project including a 6-mgd wetlands for algae removal and a 30 “wet” acre polishing wetlands on Parcels A/B.

Table ES.3 Algae Removal Costs – Blended Effluent
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

Costs in Millions[1]	Wetlands Ponds 9 and 10	DAF	Polishing[2] Wetlands
Construction Costs, $[1]	2.70	2.95	4.50
Project Costs, $[3]	3.60	4.00	6.10
Operation and Maintenance Costs, $/yr[4]	0.07	0.16	0.20
Total Annual Cost, $[5]/25 yr.	0.35	0.47	0.68
Total Annual Cost, $[6]/50 yr.	0.30	0.41	0.59

(1) San Francisco ENR = 7925 (December 2004).
(2) Cost of polishing wetlands on Parcels A/B (30 wet acres) add to either option-wetlands or DAF.
(3) Includes project allowance (engineering, legal, administration and construction contingencies) of 35 percent. Does not include cost of land acquisition.
(4) Includes mechanical equipment replacement and wetlands maintenance costs.
(5) Based on annualizing project cost for 25-year life at 6 percent interest.
(6) Based on annualizing project cost for 50-year life at 6 percent interest.

9.0 TERTIARY FILTRATION FACILITIES

Two tertiary treatment technologies, continuous backwash filtration and microfiltration, were initially reviewed for tertiary treatment for reuse. Continuous backwash filtration (CBW) is the recommended tertiary treatment alternative for the City of Petaluma WRF, based on lower costs and proven technology.

In most cases, secondary effluent will be filtered for reuse. During those periods when secondary effluent flows are insufficient to meet reuse demands, stored pond effluent may be filtered and CBW has more experience with algae-laden water. CBW filtration pretreatment includes flash mix and flocculation with alum and either a cationic or anionic polymer to agglomerate the solids prior to filtration.

Phased construction of the tertiary facilities was evaluated based on current estimates of urban recycled water demand, included in TM No. 9B, Recycled Water Storage and Pumping Facilities. Initially, it was envisioned that demand for tertiary recycled water, upon construction of the WRF, would be approximately 8 mgd. Recent estimates indicate that tertiary recycled water demands, upon construction of the WRF, will be between 2 to 4 mgd. Therefore, an initial phase of three, 1.3-mgd filter cells is recommended. This will save initial capital costs and lower annual O&M costs. The filters will be located in the Pond No.

1 area to minimize the foundation costs and eliminate the need for pile type foundations. As the demand for tertiary recycled water increases in the future, the tertiary filtration facilities can be expanded to meet the demand.

10.0 DISINFECTION FACILITIES

Disinfection system configuration alternatives for both reuse and river discharge were reviewed for the WRF. Two disinfection technologies were considered: the existing sodium hypochlorite/bisulfite system and ultraviolet light (UV) disinfection.

A combination system is recommended for the Petaluma WRF disinfection facilities. Use of the existing hypochlorite system for disinfection during river discharge is recommended. In addition, the existing hypochlorite system is recommended for disinfection of agricultural reuse water, while a UV disinfection system is recommended for urban reuse. The UV system provides better pathogen reduction, and does not add sodium or chloride to the RW. This allows the WRF to benefit from the advantages of both UV and chlorine while maintaining lower capital and annual costs than a complete UV system sized for river discharge and/or complete reuse. The new UV system will be integrated with tertiary filters to minimize regrowth/flocculation prior to disinfection. The economic and non-economic comparisons of UV and hypochlorite is located in TM No. 6, Disinfection Facilities.

Three UV manufacturers were identified for consideration during final design: Ondeo, Trojan and Wedeco. In all cases, the UV systems are considered developing technology and will need to be reviewed on an on-going basis. None of the UV systems are certified under the new Title 22 requirements but are currently conducting pilot testing and bioassays to gain certification.

To prepare for final design, water quality testing needs to be conducted on filtered and unfiltered pond effluent. Percent UV transmittance, turbidity, and particle size distribution measurements should be taken by daily grab samples. Collimated beam testing of the undisinfected pond effluent is also needed to determine required UV doses for reuse and river discharge.

11.0 SLUDGE TREATMENT FACILITIES

The sludge treatment facilities for handling and treatment of waste activated sludge (WAS) was reviewed for the WRF. The Project Report (November 2000) identified aerobic digestion as the preferred treatment process. The goal of the sludge process was to produce a sludge that meets the Class B sludge requirements. Class B sludge is suitable for landfill or restricted land application. Class A sludge would be suitable for unrestricted biosolids reuse, and can be added in the future, if required. The recommendations to achieve Class B are outlined below and shown on Figure ES.5.

The first recommendation is to pre-thicken the WAS. This will reduce the size of the aerobic digester and improve the process stability. Therefore, a single 1-meter gravity belt thickener is proposed to achieve 2 to 3 percent solids prior to aerobic digestion. The second recommendation is to provide a phased aerobic digestion system consisting of three-aerobic digesters operated in series. The first phase digester will be designed to provide a 10 day solids detention time at design flow and the majority of the volatile solids reduction should be achieved in the first stage. This digester would be configured as a circular tank with a diffused air system. Blowers would be provided for aeration air supply. The tank will be designed for a future cover, if required for odor control. The subsequent two stages will be designed for 15 days solids detention time each at design flow and will provide further volatile solids reduction and pathogen reduction. The total detention time for the system, 40 days, should be sufficient to achieve a Class B sludge. The second and third stages will be configured as lagoon type digesters with surface aerators for aeration and mixing. The digesters will be located in the Pond No. 4 area.

Centrifuge dewatering is recommended for the aerobically digested WAS prior to land disposal. Two 150 gpm centrifuges are recommended, 1 duty and 1 standby. Centrifuge dewatering is recommended based on the performance and experience in dewatering aerobically digested sludge, higher solids, smaller footprint, reduced odors and ease in startup and shutdown. The centrifuges will be located in a new building, sited in Pond No. 4. The gravity belt thickener can also be located in the same building.

12.0 RECYCLED WATER STORAGE AND PUMPING FACILITIES

The recommended Recycled Water (RW) storage and pumping facility consists of a new storage reservoir and pumping system to meet the urban RW demands. The existing pump station will be used to meet agricultural reuse demands. The City of Petaluma is currently preparing a recycled water master plan in support of the General Plan. This plan will establish the foundation for the long-term development of the City's RW system. It is estimated that the urban reuse demand will range from 1 mgd to 4 mgd after the WRF is constructed. A water balance for the design flows found that the current amount of reuse, average of 4.5 mgd, with a daily range of 1 to 6 mgd is required for water management and to meet the City's NPDES permit, which prohibits river discharge from May 1 through October 20. Therefore, the agriculture reuse program will need to continue until the urban reuse program can take all the water.

13.0 PRELIMINARY HYDRAULIC PROFILE CONSTRAINTS

A preliminary hydraulic analysis of the proposed treatment facilities was completed to identify hydraulic control points and constraints. The major hydraulic constraints are summarized below:

- River elevation at discharge: The high-high water elevation of 3.6 feet allows the design discharge of 16 mgd from the existing chlorine contact basin. The flood

elevation of 7.5 feet restricts the flow to approximately 12 mgd. Review of the existing outfall found that the outfall “wye” section needed to be replaced.

- The pond operating elevations were control points for the plant hydraulics. The maximum Pond No. 2 water surface is set at an elevation of 16.5 which controls the hydraulic profile for the preliminary and secondary treatment processes. The maximum Pond No. 7 water surface is set at an elevation of 12.25 feet, which controls the inlet water surface to the algae removal facilities.

- PIPS Discharge: PIPS is expected to provide a hydraulic grade elevation of 24-26.5 feet at approximately 36 mgd. The pump station capacity will be confirmed with G.S. Dodson in final design.

14.0 ADMINISTRATIVE FACILITIES

New facilities for the WRF will be provided in a new building including operations, maintenance, and laboratory areas. Administrative staff will be housed in a separate administrative building. These buildings will be located in the northeastern portion of Pond No. 1. A layout and further description of these facilities located in TM No. 11, Administrative Facilities.

These buildings will be designed incorporating “green building” concepts, including:

- Use of recycled building materials.
- Use of day-lighting.
- Alternative ventilation systems to improve indoor air quality.
- Use of renewable energy, using photovoltaic energy.
- Use of green roof.

These concepts are reviewed in TM No. 8, Sustainable Design Concepts.

15.0 ELECTRICAL POWER AND DISTRIBUTION

The power distribution requirements for the proposed WRF, including future expansion, were evaluated including an analysis of alternatives for the proposed distribution network, estimation of the load associated with proposed facilities and identification of the load distribution. The estimated plant operating load is 5,000 kilo-volt ampere (kVA). The main recommendations are:

- Main utility service for the proposed facilities will be at 12 kilovolt level.
- The proposed 12 kV power distribution system will be a simple radial system using indoor metal clad type switchgear and underground concrete encased ductbanks.
- The proposed 480-volt power distribution system will use single ended substations.

- The standby power system will consist of multiple 480-volt diesel engine generators connected and synchronized via separate 480-volt substations.
- Empty ductbanks can be provided near open spaces for future processes.
- The motor control centers will include selector switches and control push buttons for manual control of equipment and interface with remote PLC controls.
- The distribution switchgear, motor control centers and generators will be connected to the plant SCADA system for the purpose of monitoring energy consumption and to monitor status of equipment.
- Use Pacific Gas and Electric Company's "Energy Design Success" services for project energy conservation guidance.
- Utilize photovoltaic roofing systems for some buildings to supply renewable energy during daylight hours.

16.0 INSTRUMENTATION

The plant control system options were reviewed including hardwired control panels, distributed control system, specialty SCADA systems and personal computer/programmable logic controllers (PC/PLC). The PC/PLC was recommended for the following reasons:

- Provides multiple integrator and service company support.
- If limited to major brands, good support for operation.
- Cost effective.
- Main stream technology.
- Less likely to be obsolete.

The collection system pump stations and the PIPS at Hopper Street will be connected to the new SCADA system.

17.0 CONSTRUCTION COST ESTIMATE

The construction cost estimate of the individual project areas is presented in Table ES.4 for the preferred wetlands alternative including the polishing wetlands on Parcels A/B. A detailed breakdown on the project and annualized costs are provided in Table ES.5. Cost estimates for all alternatives evaluated are presented in TM No. 19, Construction Cost Estimates.

18.0 SCHEDULE

An updated project schedule is shown on Figure ES.6. The project schedule is based on starting final design beginning in February 2002 and construction bidding in the second quarter of 2003.

Table ES.4 Construction Cost Estimate – Wetlands Blended Flow Scenario
Lakeville Highway Water Recycling Facility Project
City of Petaluma, California

Element	Project Report [1] Estimate ENR7800	Predesign Estimate ENR7925
Preliminary Treatment Facilities	$2,956,000	$3,350,000
Biofilter – Headworks	$472,000	$450,000
Extended Air Activated Sludge	$2,992,000	$4,040,000
Secondary Clarifiers	$5,573,000	$5,790,000
RAS/WAS Pump Station	$3,742,000	$1,750,000
Blower Building and Aeration System	$3,941,000	$1,710,000
Oxidation Pond Improvements	$1,539,000	$750,000
Wetlands Pump Station	$736,000	$0
Wetlands (Ponds 9 and 10 only)	$7,878,000	$2,700,000
Secondary Effluent Pump Station	$0	$650,000
Filters / Flocculators/ Rapid Mix	$8,501,000	$3,170,000
Filter Support	---	$1,470,000
UV System / Contact Channel	$4,639,000	$2,980,000
Hypochlorite / Bisulfite System Modifications	$708,000	$450,000
Aerobic Digesters	$1,957,000	$4,780,000
Dewatering Facilities	$8,879,000	$6,650,000
Dewatered Sludge Storage / Truck Loading Facilities	---	$500,000
Biofilter – Dewatering Building	---	$450,000
Recycled Water Storage Reservoir	$1,046,000	$950,000
Recycled Water Pumping and Piping System Modifications	$1,135,000	$1,040,000
Sitework	$3,093,000	$3,750,000
Yard Piping	--- [2]	$5,830,000
Hydraulic Structures	$969,000	$1,000,000
Administration Building/Operations Building	$3,000,000	$4,000,000
Outfall Maintenance Improvements	---	$250,000
Electrical Improvements	--- [2]	--- [2]
Instrumentation Improvements	--- [2]	--- [2]
Polishing Wetlands (optional)	$0	$4,500,000
Construction Cost Estimate	**$63,756,000**	**$63,000,000**

(1) November 2000.
(2) Included in each element.

Table ES.5 Project and Annualized Costs for Wetlands Blended Flow Scenario Lakeville Highway Water Recycling Facility Project City of Petaluma, California	
	Costs (in millions)[1]
Construction Cost[2]	$63.0
ELAC[3]	$22.1
Total Project Costs	$85.1
Annualized Project Cost[4]	$6.7
Annual Operation & Maintenance Cost[5]	$4.9
Total Annualized Cost[6]	$11.6

(1) Costs include polishing wetlands on Parcels A/B.
(2) Construction costs are based on December 2004 dollars (mid-pt. of construction) using a San Francisco ENRCCI of 7925. This ENR was determined using a 2 percent per year escalation rate over the current (Aug 2001) ENR of 7409.
(3) ELAC costs include engineering, legal, administration, and construction contingency. Costs do not include Hopper Street Plant demolition, land acquisition, easements, or right of way.
(4) Project costs annualized over 25 years at 6% interest rate.
(5) Includes equipment replacement, chemical use, power, labor, solids handling, and wetlands maintenance based on December 2004 dollars.
(6) Annualized total project costs + annual O&M cost.

Figure ES.1
EXISTING LAKEVILLE HIGHWAY WRF
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Pet302f2-6069.cdr

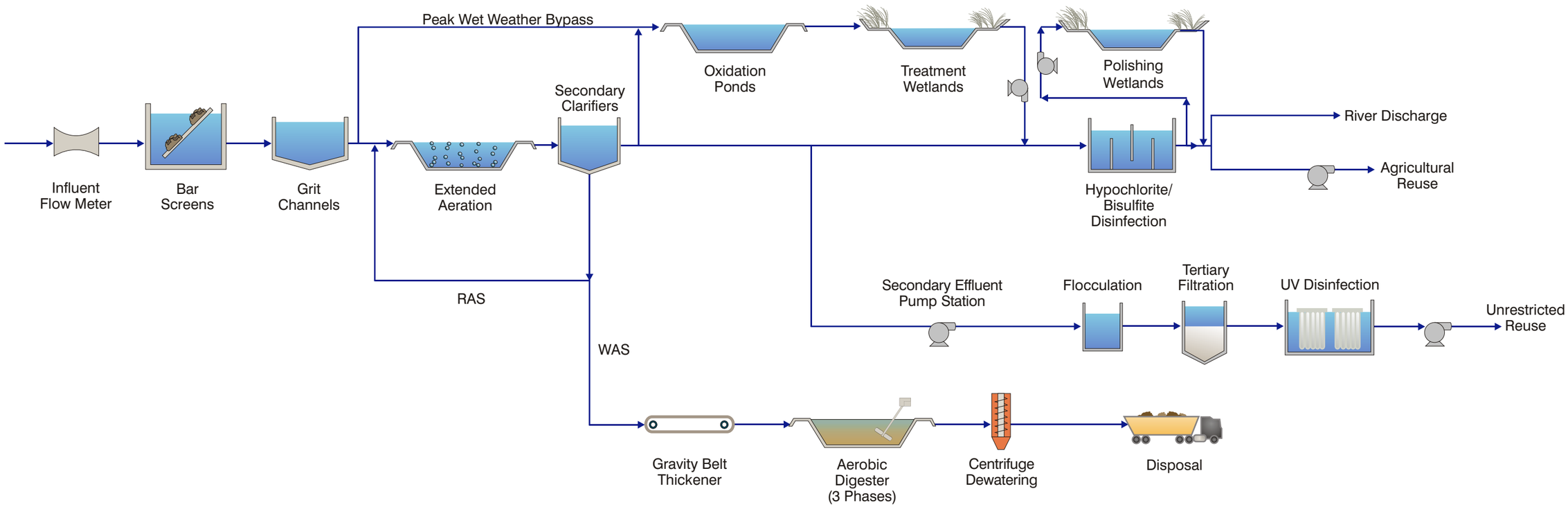

Figure ES.2
OVERALL FLOW SCHEMATIC
FOR PREFERRED ALTERNATIVE
WATER RECYCLING FACILITY PREDESIGN
CITY OF PETALUMA, CALIFORNIA

Pet202f8-6069.cdr

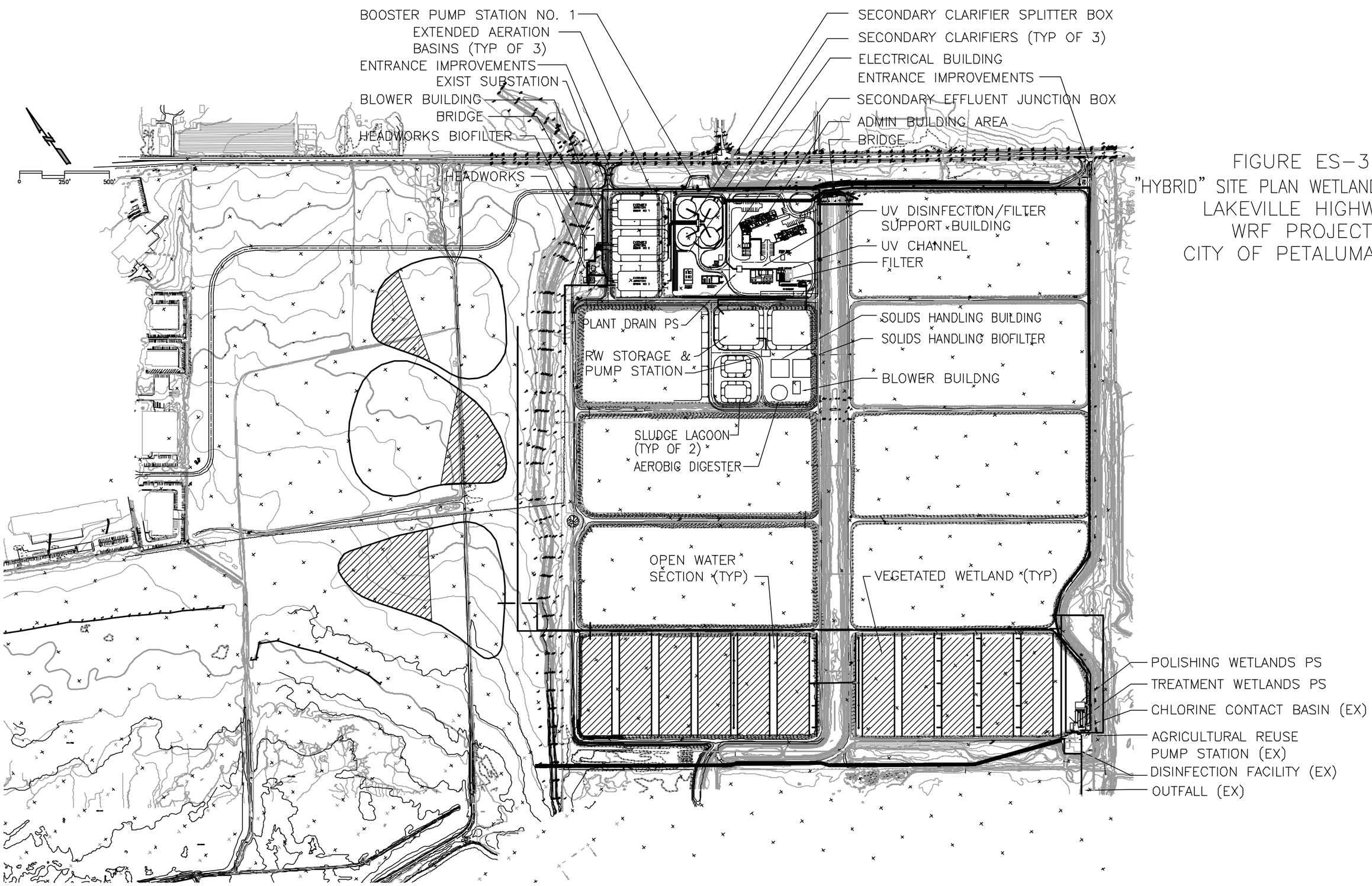

FIGURE ES-3
"HYBRID" SITE PLAN WETLANDS OPTION
LAKEVILLE HIGHWAY
WRF PROJECT
CITY OF PETALUMA, CA

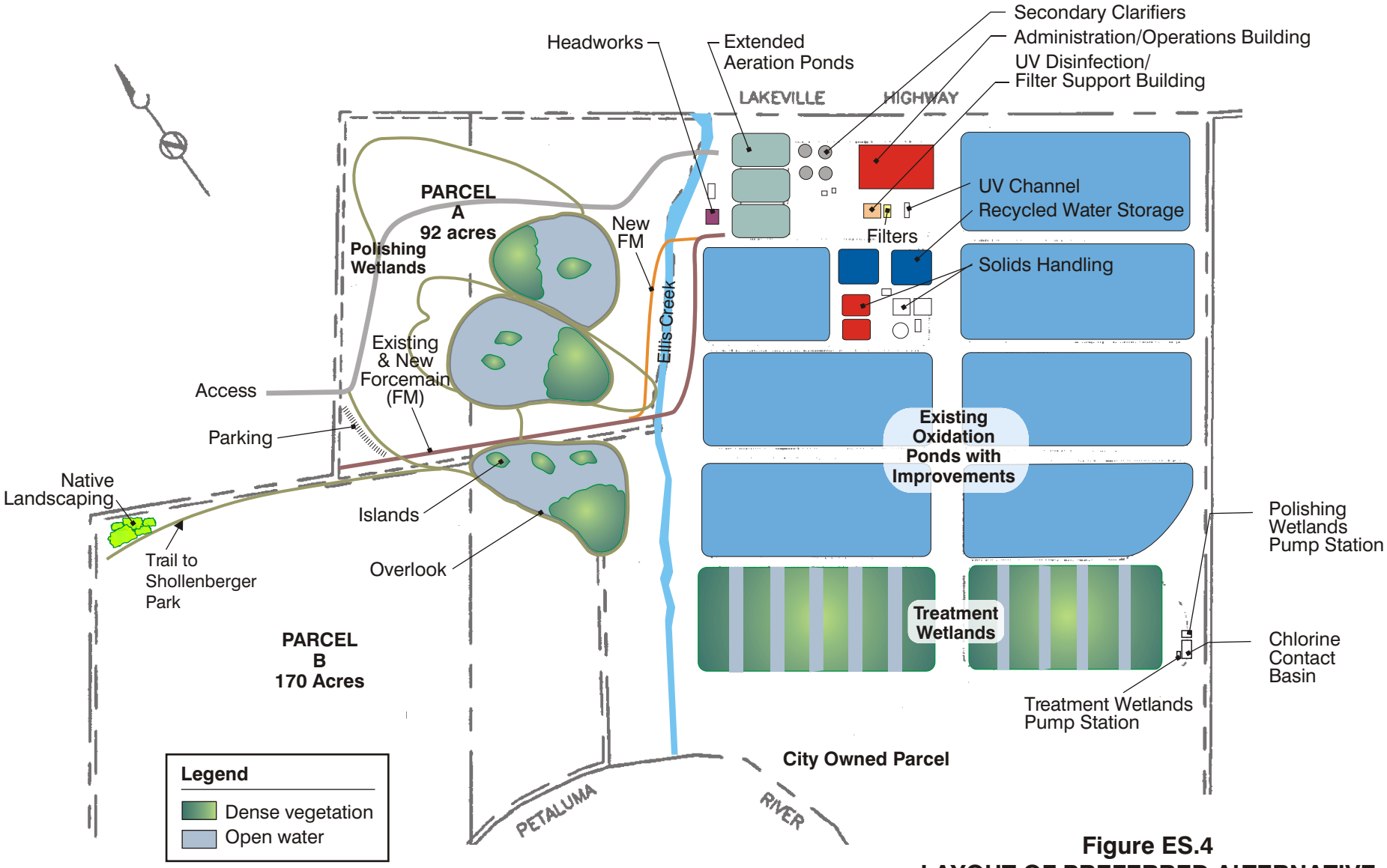

Figure ES.4
LAYOUT OF PREFERRED ALTERNATIVE
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Pet302f1-6069.cdr

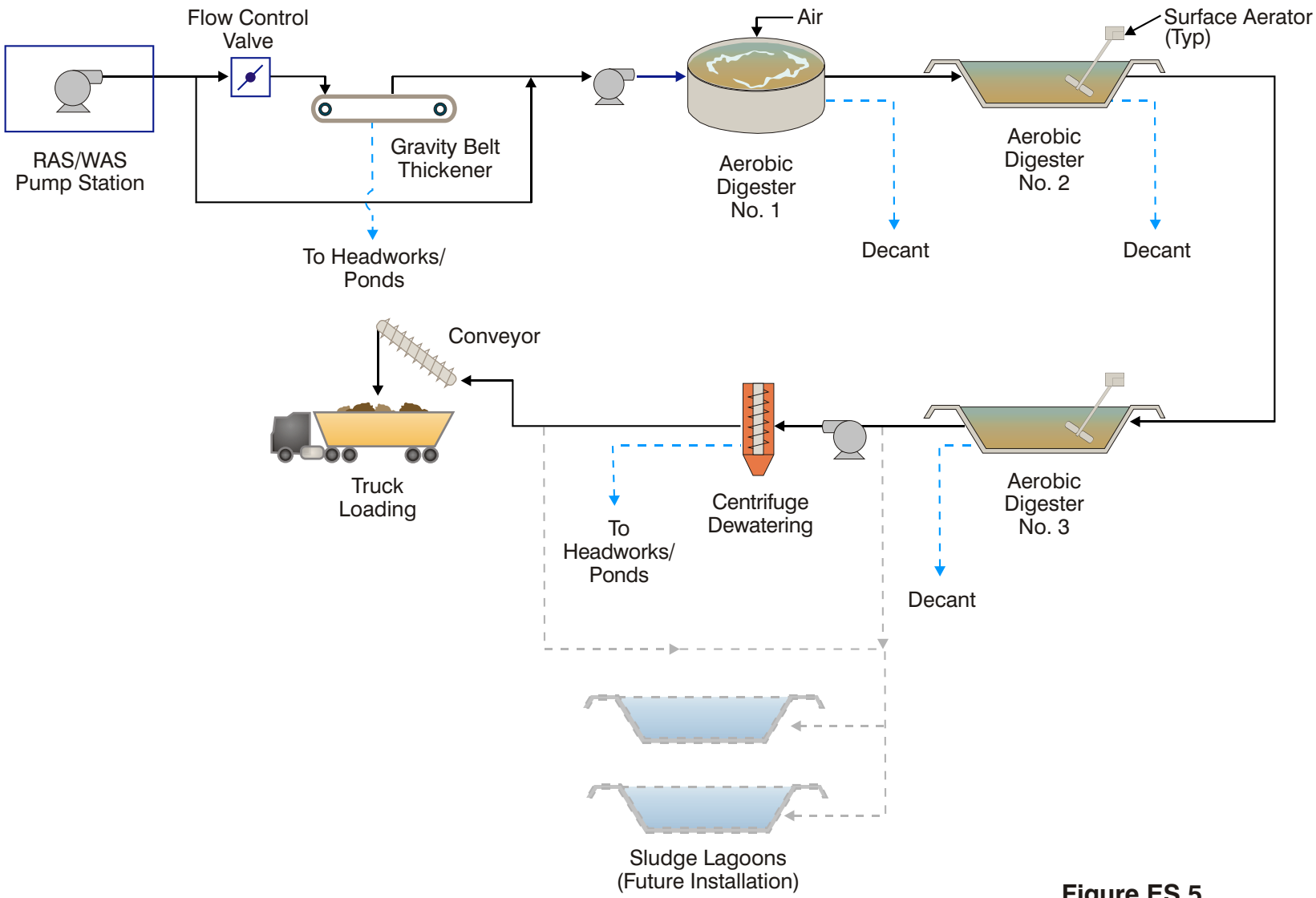

Figure ES.5
SLUDGE TREATMENT SCHEMATIC
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

pet202f5-6069.cdr

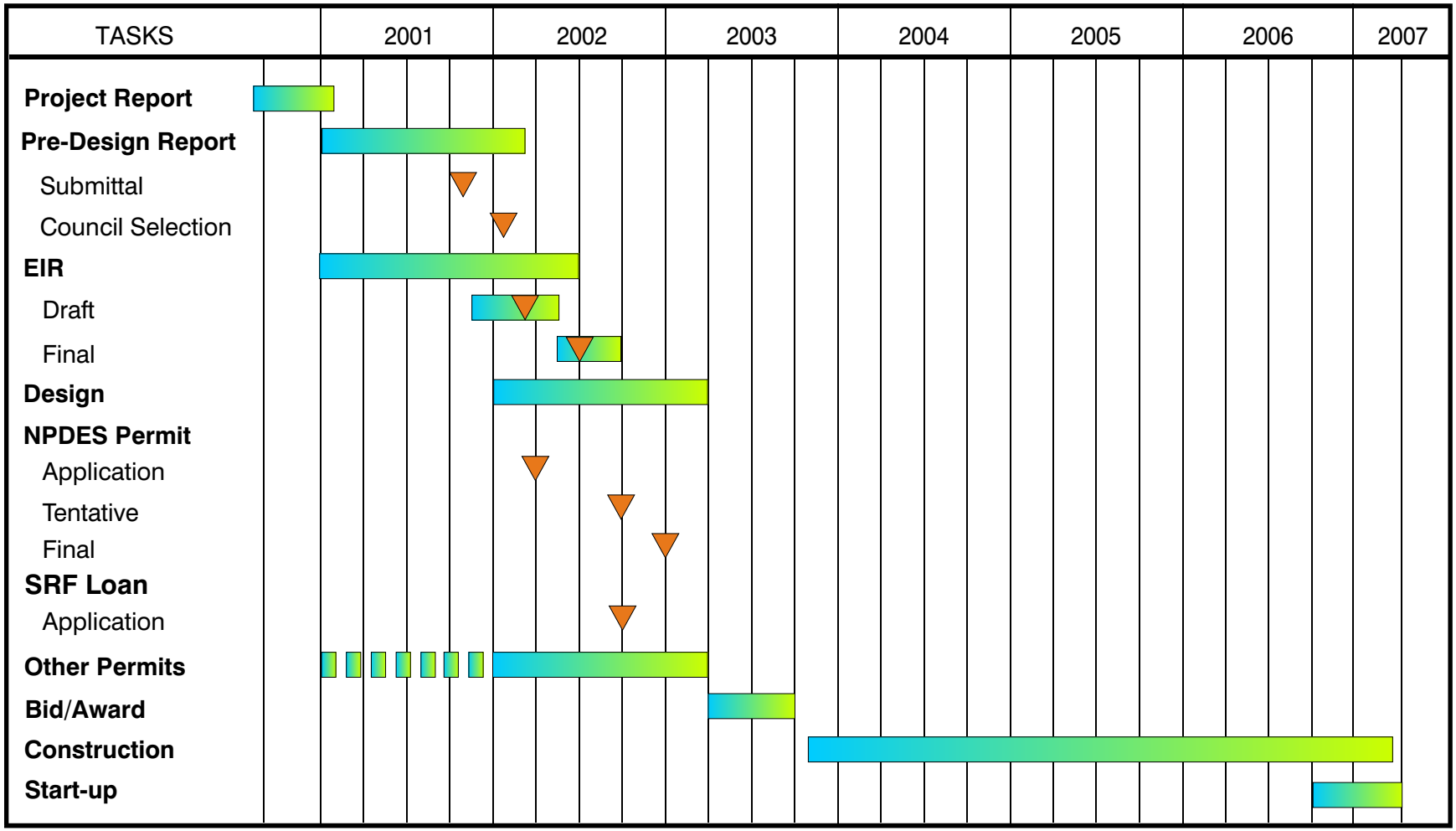

Figure ES.6
PROJECT SCHEDULE
WATER RECYCLING FACILITY PROJECT
CITY OF PETALUMA, CALIFORNIA

Pet202s1-6069.cdr

ABBREVIATIONS AND DEFINITIONS

ABBREVIATIONS AND DEFINITIONS

AA	Average Annual.
ABAG	Association of Bay Area Governments.
ac-ft	acre feet.
Activated Sludge	Suspended growth biological treatment of wastewater used for the removal of carbonaceous matter. Can also be designed to remove ammonia.
ADMM	Average Day Maximum Month.
ADMMF	Average Day Maximum Month Flow.
AFP (Advanced Facultative Pond)	A pond providing biological wastewater treatment, differing from other pond systems by the existence of a fermentation pit at the bottom of the pond. Solids are captured in the pit. Treatment is provided by the combination of anaerobic (deep, no oxygen) zones and aerobic (oxygenated) zones. Additional oxygen/air is provided by surface aeration.
ADW	Average Dry Weather.
ADWF	Average Dry Weather Flow.
Aerated Lagoon or Pond	A pond providing biological wastewater treatment, differing from other pond systems by the addition of surface aerators. Aeration provides oxygen/air for treatment and allows for a smaller pond footprint than pond treatment without aeration.
Aeration	Process of supplying oxygen for wastewater treatment.
Aerobic	Referring to biological processes that take place in the presence of oxygen. Dependent on micro- organisms that require oxygen.
Alum	Aluminum Sulfate - Chemical added to water to help flocculate solids.
Ammonia (NH_3-N)	Constituent in wastewater which can result in toxicity to fish and reduce river dissolved oxygen.
Anaerobic	Referring to biological processes that take place at low oxygen concentrations or at the absence of oxygen. Dependant on micro-organisms that require the absence of oxygen. Methane gas is a byproduct of anaerobic processes.
ATAD	Auto Thermal Aerobic Digestion.
BOD_5	Biochemical oxygen demand (5-day). The measurement of dissolved oxygen used by micro-organisms in the biochemical oxidation of organic matter.
CBW	Continuous Backwash Filtration.

CEQA	California Environmental Quality Act.
CF	Cubic Feet.
CF/MG	Cubic Feet per Million Gallons.
cfm	Cubic Feet per Minute.
CFR	Code of Federal Regulations.
Cl_2	Chlorine.
CO_2	Carbon Dioxide.
Cogeneration	The recovery and reuse of the methane gas produced in the digesters. Methane gas is used as a fuel in an engine that drives a generator to produce power. Heat is recovered and used to heat the digesters.
Constructed Wetlands	Wetlands that are created for the purpose of treating secondary effluent. Wetlands act as a polishing step and as proposed in this project remove algae from the effluent.
CY	cubic yards.
Digesters	Concrete tanks used to stabilize biological solids and organic material. In the anaerobic digestion process, the solids are converted to methane and carbon dioxide.
Disinfection	Chlorination, ozone or ultraviolet light added to the end of the treatment process to kill pathogens.
DAF (Dissolved Air Flotation Thickener)	Mechanical removal of solids (in this case, algae) through bubbling air through water in a tank, encouraging solids to float to the top of the tank. Chemicals are added to enhance removal.
DHS	Department of Health Services.
DSOD	Division of Safety of Dams.
EIR	Environmental Impact Report.
EL or Elev.	Elevation.
ENR–CCI	Engineering News Record construction cost index which is used to adjust construction costs based on geographic region and time frame.
EPA	Environmental Protection Agency.
Extended Aeration	Extended aeration is a biological, activated sludge process with a long detention time (up to 24 hours). Mechanical aeration is provided. Typically followed by secondary clarifiers which remove the solids. A portion of the solids are returned to the front of the process to help with treatment. Extended aeration produces a high quality, nitrified secondary effluent. Ponds or concrete tanks may be used for this process.

Filters	Beds of sand used to remove fine particles.
Filter Backwash	Periodic filter cleansing process to remove filtered material.
FM	Force main.
F/M or F:M	food to microorganism ratio. A term used in the activated sludge process to determine the ratio of food (or BOD) per mass of microorganisms available in the tank to degrade the BOD.
ft	foot.
fps	feet per second.
gal	gallon.
GBT	Gravity Belt Thickener.
gpcd	gallons per capita per day.
gpd/sf	Gallons per day per square foot.
gph	gallons per hour.
gpm	gallons per minute (a measurement of flow).
gpm/sf	gallons per minute per square foot.
GWI	Groundwater Infiltration.
Headworks	First step in the treatment process which includes screening of large debris, flow measurement, and grit and sand removal.
hp	horsepower.
hr	hour.
HRT	Hydraulic retention time.
HVAC	Heating, Ventilation, and Cooling.
H_2S	Hydrogen Sulfide.
I/I	Inflow and Infiltration.
in	inches.
kcf/d	thousand cubic feet per day.
kV	kilovolts.
kVA	kilovolts amperes.
kW	kilowatts.
lb	pound.
lb/ac-d	pounds per acre per day.
lb/kcf-d	pounds per thousand cubic feet per day.

LEED™	Leadership in Energy and Environmental Design.
LP/HO	low pressure, high output.
LP/LO	low pressure, low output.
m	meter.
M	million.
mcc	motor control center.
MF (microfiltration)	Membrane used to remove fine particles.
MG	million gallons.
mgd	million gallons per day (a measurement of flow).
mg/L	milligrams per liter (a measurement of concentration of a substance in liquid).
min	minute.
mixed liquor	The effluent from the extended aeration process is referred to as mixed liquor.
mL	milliliters.
mm	millimeters.
MP	medium pressure.
MPN (Most Probable Number)	a measurement of number of coliform present in a sample.
μg/L	micrograms per liter.
μm	micrometers.
NFPA	National Fire Protection Agency.
Nitrification	Advanced treatment process of converting ammonia to nitrates which are less toxic to aquatic life.
NH_4-N	ammonia nitrogen.
NO_3-N	nitrate nitrogen.
NOAA	National Oceanic and Atmospheric Administration.
NPDES	National Pollutant Discharge Elimination System – a permit issued for discharge of treated wastewater effluent into a waterbody of the United States.
NPSH	net positive suction head.
NRF	Nitrifying Rock Filter.
NTR	National Toxics Rule.

NTU	Nephelometric turbidity unit. A measurement of turbidity in water.
Nutrient Removal	Treatment process which removes nitrogen and/or phosphorus from wastewater.
NWRI	National Water Research Institute.
nm	nanometers.
O&M	Operation and maintenance.
O_2	oxygen.
OPE	Oxidation Pond Effluent.
Oxidation Pond	A pond providing biological wastewater treatment. Mechanical aeration is typically not provided. Oxygen is supplied primarily from algae. Oxidation ponds require a larger pond footprint than ponds that are aerated.
PAD	Phased Aerobic Digestion.
PC (Primary Clarifiers)	Concrete tanks used as a first step to settle out suspended solids from the wastewater.
PC/PLC	personal computer / programmable logic controller.
pH	A numerical measurement of the acidity or alkalinity of a chemical solution. pH = 7 is neutral pH. pH <7 is acidic. pH>7 is alkaline or basic.
Photoreactivation	Refers to a process by which the DNA in pathogens that have been damaged by exposure to ultraviolet light disinfection can sometimes repair after exposure to sunlight.
PHWWF	Peak Hour Wet Weather Flow.
PIPS	Pond influent pump station. Existing pump station at the Hopper Street WWTP.
PLC	programmable logic controller.
ppd	pounds per day.
ppm	parts per million.
Preliminary Treatment	Physical treatment to remove large articles such as rags and plastics which can clog pumps and subsequent treatment processes. Processes include screening and grit removal.
Primary Treatment	Physical treatment to remove solids, generally provided through settling in clarifiers.
PS	Pump Station.
psi	pounds per square inch.
psig	pounds per square inch gauge.

PVC	polyvinyl chloride.
RAS	return activated sludge – that portion of biological solids from the activated sludge process returned to the head of the processes.
RDII	Rainfall Dependant Inflow and Infiltration.
RS or RSG	Raw Sewage.
RW (Recycled Water)	Water treated to a level suitable for reuse by groundwater recharge, agricultural irrigation or industrial use. Should meet Title 22 requirements.
RWQCB	Regional Water Quality Control Board – the agency responsible for protecting waters of the Sate and issuing NPDES permits.
SCADA	Supervisory Control and Data Acquisition.
scfm	standard cubic foot per minute.
SCWA	Sonoma County Water Agency
Secondary Clarifiers	Final settling process for TSS removal.
Secondary Treatment	Biological treatment to reduce the organic content of the wastewater, typically to a 30 mg/L BOD/TSS level.
sf	square foot.
Sludge Lagoon	A lined lagoon used to store and further stabilize sludge prior to dewatering.
Solids Dewatering	Removing water from waste solids stream.
SOTE	Standard Oxygen Transfer Efficiency.
SRF	State Revolving Fund Loan.
SRT	Solids retention time.
tbd	to be determined.
Tertiary Treatment	Physical/chemical treatment generally consisting of filtration to remove any solids and organics remaining after secondary treatment.
Title 22	California Administrative Code citation which defines recycled water treatment requirements.
TKN	Total Kjeldahl Nitrogen. Lab analysis to determine the total of ammonia and organic nitrogen.
TM	Technical Memorandum.
Toxicity	Measure of harm to aquatic life based upon test of fish mortality.
TS	Total Solids.
TSS	Total Suspended Solids. A measure of solids in wastewater.

Turbidity	Measure of the clarity of water in Nephelometric Turbidity Units (NTU).
Typ	Typical.
USGBC	United States Green Building Council.
UV	Ultraviolet light. Ultraviolet light disinfection used to inactivate coliform organisms.
VE	Value Engineering
VFD	Variable Frequency Drive.
VSS	Volatile Suspended Solids.
WAS	Waste activated sludge – byproduct of activated sludge processes which must be wasted from the system, thickened and further stabilized in digesters.
WRF	Water recycling facility.
WWTP	wastewater treatment plant.
Yr	Year.

APPENDIX– CITY OF PETALUMA, CA NPDES PERMIT

Cal/EPA State of California - Pete Wilson, Governor

San Francisco Bay Regional Water Quality Control Board
2101 Webster Street, Suite 500, Oakland, CA 94612 (510) 286-1255 Fax: 286-1380

File 6210-10.20.16

AUG 20 1998

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Thomas Hargis, P.E.
City of Petaluma
Water Pollution Control Plant
22 Bassett Street
Petaluma, CA 94952-4304

Subject: Transmittal of Final Order for City of Petaluma Water Pollution Control Plant, Sonoma County

Dear Mr. Hargis:

Please find enclosed Order No. 98-076, adopted by the Regional Board on July 15, 1998, reissuing Waste Discharge Requirements for the City of Petaluma's Water Pollution Control Plant. The requirements of Order No. 98-076 supersede those contained in Order No. 90-153.

Should you have any questions regarding this matter, please contact Ms. Tobi Tyler of my staff at (510) 622-2431. Please note that the Regional Board's new address is 1515 Clay Street, Suite 1400, Oakland, CA 94612. The main phone number is (510) 622-2300 and the fax number is (510) 622-2460.

Sincerely,

for Loretta Barsamian
Executive Officer

Enclosure
cc: Mailing List

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER No. 98-076
NPDES PERMIT NO. CA0037810

REISSUING WASTE DISCHARGE REQUIREMENTS FOR:

CITY OF PETALUMA WATER POLLUTION CONTROL PLANT, SONOMA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. The City of Petaluma, hereinafter referred to as the discharger, applied to the California Regional Water Quality Control Board, San Francisco Bay Region, for reissuance of waste discharge requirements and permit to discharge wastewater to waters of the State and the United States under the National Pollutant Discharge Elimination System (NPDES).

FACILITY DESCRIPTION

2. The discharger owns the municipal wastewater treatment plant located at 950 Hopper Street in Petaluma, Sonoma County, and presently contracts with U.S. Filter/EOS (formerly Wheelabrator EOS) to operate the facility. The plant provides secondary level treatment for combined domestic, commercial and industrial wastewater collected in the City of Petaluma, the nearby community of Penngrove, and unincorporated areas in the vicinity of Petaluma. The discharger's service area currently has a population of approximately 49,800 people.

3. The U.S. Environmental Protection Agency (USEPA) and the Board have classified this discharger as a major discharger.

PURPOSE OF ORDER

4. This NPDES permit regulates the discharge of treated wastewater to the Petaluma River, waters of the State and the United States. This discharge was previously governed by Waste Discharge Requirements in Order No. 90-153, adopted by the Board on December 12, 1990.

DISCHARGE DESCRIPTION

5. The treatment plant has an average dry weather flow design capacity of 5.2 million gallons per day (mgd). The plant presently discharges an average dry weather flow of 4.45 mgd and annual average flow of about 5.16 mgd. The average maximum daily flow during the five year period from 1993 through 1997 was 14.44 mgd. During about 6 months of the year, the plant discharges an average effluent flow of 5.25 mgd to the Petaluma River; during the other 6 months the plant reclaims an average flow of 2.96 mgd (effluent, 1997). A map showing the location of the facility is included as Attachment A.

6. During the period from October 21 through April 30, treated wastewater is discharged into the Petaluma River through a submerged diffuser located approximately 100 feet offshore and is 8.6 feet

below MLLW level. The location of the outfall is approximately Latitude: 38° 12' 33" and Longitude: 122° 34' 22".

7. From May 1 through October 20, treated wastewater is reused for agricultural irrigation. Discharge to the river does not occur during this period except as authorized by this permit, and only after a request, which may be submitted over the telephone, is made to the Executive Officer and the Executive Officer approves it. This report must fully explain the need for discharges during this period (e.g., high flows related to late spring or early fall storm events, when reclamation is not feasible). Discharges of treated wastewater to land are regulated by Wastewater Reclamation Requirements in Order No. 88-036, adopted by the Board on March 16, 1988. In addition to agricultural irrigation, treated wastewater is applied to a golf course located at Frates Road and Ely Road on a year round basis. A General Permit for water reuse in the San Francisco Bay area, issued January 17, 1996, is also applicable to the reclamation project.

TREATMENT PROCESS DESCRIPTION

8. The treatment facility is divided between the main plant located at 950 Hopper Street in Petaluma and the oxidation ponds located approximately 2.5 miles southeast of the plant, along Lakeville Highway. The treatment process consists of rag and grit removal, pre-aeration, primary sedimentation, biological treatment (either biofiltration or activated sludge), secondary clarification, oxidation lagoon treatment, followed by chlorination/dechlorination. The lagoon / oxidation pond treatment system consists of aeration and oxidation in a 162 acre pond system. Sludge is treated by anaerobic and aerobic digestion , dewatered by either centrifuge or belt filter press, and disposed of to a landfill. A treatment process schematic diagram is included as part of this Order.

9. At the headworks of the treatment plant on Hopper Street, wastewater is screened prior to being pumped to the aerated grit removal chamber. Grit is augered to a dumpster for disposal at a landfill. Following grit removal, wastewater flows to a primary clarifier.

10. Flows greater than 4.0 mgd are sent directly from the primary clarifiers to the pond system. Flows less than 4.0 mgd are split between two secondary treatment processes. Up to 2.2 mgd is treated in a biofiltration system consisting of three trickling filters in series, and up to 1.8 mgd is treated in an activated sludge process. Flows from the trickling filters and the activated sludge process are directed to secondary clarifiers and then pumped to the oxidation pond system.

11. *Wet Weather Flow Handling.* Daily flows in excess of 6.0 mgd are pumped directly from the Pond Influent Pump Station, after rag removal in a screening unit, to the oxidation pond system for treatment.

12. *Oxidation ponds.* The oxidation pond system consists of an aerated lagoon followed by an aerated pond and nine oxidation ponds. In order to optimize the pond system to achieve the highest quality of effluent, the number of ponds used for treatment at any given time may vary, depending on the time of year, flows, and weather conditions. The aerated lagoon has 3 aerators and pond #1 is equipped with 7 aerators. Effluent from these ponds is disinfected by chlorination.

13. In order to enhance the reliability of the existing treatment plant, the discharger has recently added additional aerators to the oxidation ponds as well as finer screening at the headworks and bar screens at the Pond Influent Pump Station.

14. *Sludge Handling and Disposal.* Wastewater solids removed during the treatment process are directed to either anaerobic or aerobic reactors for digestion. Waste activated sludge from the activated sludge process goes to the aerobic digester, while sludge from the biofiltration system and primary clarifier go to the anaerobic digester. The sludge is then dewatered by either a belt filter press or centrifuge. Stabilized, dewatered biosolids are hauled away for off-site disposal to a landfill.

15. *Effluent Flow and Monitoring.* From October 21 to April 30, effluent from the oxidation ponds is dechlorinated prior to discharge to the Petaluma River. From May 1 through October 21, treated wastewater is reclaimed for irrigation. Flows directed to the reclamation project are chlorinated, but generally not dechlorinated. Plant effluent flow is diverted either directly to the reclamation distribution system or to the outfall pipeline which extends 100 feet to the Petaluma River discharge point. Effluent is monitored just after entering the pipelines. Total plant effluent flow and flow to reclamation are measured separately.

16. General quality of the effluent discharged from the plant during 1995 through 1997, based on information provided in the application and self-monitoring reports, is as follows:

Constituents	Average
Biochemical Oxygen Demand, mg/L	14.74
Suspended Solids, mg/L	33.20
Settleable Matter, ml/L/hr	<0.1

COLLECTION SYSTEM DESCRIPTION

17. *Collection system and pump stations.* The discharger's existing sanitary sewer collection system comprises approximately 220 miles of public sewer pipelines ranging in diameter from 6 to 48 inches. The collection system also includes four primary sewage pump stations: C Street, Wilmington, Payran, and Copeland Street. These pump stations have alarms for notification in the event of system failure, and provision for emergency power.

18. Wastewater collection systems are subject to increased flows during wet weather due to rainfall induced infiltration and inflow. The Basin Plan states that, depending upon the levels of water quality protection required, collection systems should be evaluated to contain various recurrence interval stormflow. In a Sewer System Infiltration/Inflow Study, dated May 1996, overflow problems in the collection system were determined to be primarily a result of limitations in the pumping capacity at the Pond Influent Pump Station (PIPS), which conveys treated effluent from the wastewater treatment facility to the oxidation ponds. To meet current and future peak wet weather flows and avoid overflows in the sewer collection system, the discharger has instituted a Capital Improvement Program to upgrade the PIPS by expanding its pumping capacity. Completion of this plant upgrade is planned for the Fall of 2000.

19. The recent addition of weirs at the headworks and an automatic screening system at the PIPS have altered the plant influent flow by increasing influent loadings to the pond system, where additional aerators have also been recently added to improve the oxidation pond treatment. These alterations were designed to help protect the existing treatment facilities during high wet weather flows and improve treatment capability. The discharger also plans to replace a portion of the Lindberg Lane trunk sewer to increase capacity in the system. Other, smaller scale sewer maintenance and improvement projects are also underway. Implementation of these projects will improve the system's ability to handle peak flows.

FUTURE PLANNING

20. The current wastewater treatment facilities consist of a combination of facilities that were constructed at various stages of community development over the past 60 years. The trickling filter plant was constructed in 1938, and the activated sludge plant was built in 1966. The oxidation ponds were added in 1972. Many treatment units, along with other equipment at the site, have exceeded their design life. These units and other mechanical, electrical and structural components of the plant may be subject to future break down and may need costly upgrade and repairs. Also, flows at the plant are reaching the permitted capacity of the facility.

21. In order to address the above described concerns, in 1991, the discharger initiated a planning process for evaluation of the existing facilities, and development of a new plant. An Environmental Impact Report for the City of Petaluma's Wastewater Facilities Project and Long-Range Management Program were approved by the Petaluma City Council in June of 1996.

22. The discharger is currently in the process of evaluating design options for a new tertiary facility with an average dry weather flow of 6.7 mgd. The new facility will replace the existing facility. Once the new facility begins operating, the treatment structures at 950 Hopper Street will be demolished with the exception of the Pond Influent Pump Station. This permit will need to be amended to provide information on design and operation of the new facility.

APPLICABLE PLANS, POLICIES AND REGULATIONS

23. *Basin Plan.* The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21,1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board (SWRCB) and the Office of Administrative Law on July 20, 1995 and November 13, 1995, respectively. A summary of the regulatory provisions is contained in Title 23 of the California Code of Regulations, Section 3912. The Basin Plan identifies beneficial uses and water quality objectives for waters of the state in the Region, including surface waters and groundwaters. The Basin Plan also identifies effluent limitations and discharge prohibitions intended to protect beneficial uses. This Order implements the plans, policies and provisions of the Board's Basin Plan.

BENEFICIAL USES

24. The beneficial uses identified in the Basin Plan for the Petaluma River are:

- Cold Fresh Water habitat
- Marine Habitat*
- Fish Migration
- Navigation
- Preservation of Rare and Endangered Species
- Water Contact Recreation
- Noncontact Water Recreation
- Fish Spawning
- Warm Freshwater Habitat
- Wildlife Habitat

* The discharger may petition the Board to change this beneficial use to "estuarine" in the Basin Plan review process.

REGULATORY BASIS FOR EFFLUENT LIMITS AND DISCHARGE REQUIREMENTS

25. Effluent limitations in this permit are based on the plans, policies and water quality objectives and criteria of the 1995 Basin Plan, *Quality Criteria for Water* (EPA 440/5-86-001, 1986 and subsequent amendments "Gold Book"), applicable Federal Regulations (40 CFR Parts 122 and 131), National Toxics Rule (57 FR 60848, 22 December 1992; 40 CFR Part 131.36(b), "NTR"), National Toxics Rule Amendment (Federal Register Vol. 60, No. 86, 4 May 1995 pg. 22229-22237), and best professional judgment as defined in the Basin Plan. Where numeric effluent limitations have not been established in the Basin Plan, 40CFR122.44(d) specifies that water quality based effluent limits may be set based on USEPA criteria and supplemented where necessary by other relevant information to attain and maintain narrative water quality criteria to fully protect designated beneficial uses.

U.S. EPA guidance documents upon which best professional judgment (BPJ) was developed may include in part:

- Technical Support Document for Water Quality Based Toxics Control March 1991,
- Region 9 Guidance For NPDES Permit Issuance February 1994,
- Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria October 1, 1993,
- Whole Effluent Toxicity (WET) Control Policy July 1994,
- Draft National Guidance for the Permitting, Monitoring, and Enforcement of Water Quality-based Effluent Limitations set Below Analytical Detection/Quantitation Levels March 18, 1994,
- National Policy Regarding Whole Effluent Toxicity Enforcement, August 14, 1995,
- Clarifications Regarding Flexibility in 40 CFR Part 136 Whole Effluent Toxicity (WET) Test Methods, April 10, 1996,
- Interim Guidance for Performance - Based Reductions of NPDES Permit Monitoring Frequencies April 19, 1996,
- Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Programs Final May 31, 1996,
- Draft Whole Effluent Toxicity (WET) Implementation Strategy February 19, 1997.
- National Toxics Rule, 57 FR 60848, December 22, 1992 (NTR).

Basis for Existing Limits

26. *Technology Based Limits.* Permit effluent limits for conventional pollutants are technology based and are the same as in the prior permit. These constituents include: Biochemical Oxygen Demand (BOD), total suspended solids, settleable matter, oil and grease, and chlorine residual. Technology-based effluent limitations are based on secondary treatment or treatment equivalent to secondary for trickling filter and oxidation pond facilities meeting the requirements of 40 CFR Part 133.100-133.105.

27. *Marine and Fresh Water Quality Objectives and Limits.* The Petaluma River is tidally influenced in the vicinity of the outfall during most of the discharge season. However, monitoring data from the past several years indicates that there are periods of sustained fresh water flow during the rainy season in normal to wet years. The beneficial uses of the Petaluma River include both fresh and marine habitats. The Basin Plan states that freshwater effluent limitations shall apply to discharges

to receiving waters with salinities less than 5 parts per thousand (ppt) at least 75 percent of the time, while saltwater effluent limitations shall apply to discharges to receiving waters with salinities greater than 5 parts per thousand (ppt) at least 75 percent of the time in a normal water year. The Basin Plan further states that for discharges to waters with salinities in between these two categories or to tidally influenced freshwater that support estuarine beneficial uses, effluent limitations shall be the lower of the marine or freshwater effluent limitation, based on ambient hardness. The 1995 Basin Plan and 1992 NTR include formulas for calculating freshwater aquatic life objectives based on site specific hardness levels. The Petaluma River is tidally-influenced, but is not listed in the Basin Plan as supporting estuarine beneficial uses. The Discharger may perform a study to investigate beneficial uses of the Petaluma River in the vicinity of the discharge and the percentage of time for which salinities are greater or lesser than 5 ppt. However, this Order's effluent limitations are based on the lower of the marine and fresh water quality objectives based on the waters having salinities in between the two categories described above. Freshwater effluent limitations for applicable toxic constituents were evaluated using the formulas in Basin Plan Table 3-4 based on a conservatively derived assumed ambient hardness of 200 mg/L as $CaCO_3$ (not based on actual receiving water data).

28. *Shallow Water Discharge.* Discharge to the Petaluma River is into shallow water, with the diffuser located approximately 100 feet offshore and is 8.6 feet below MLLW level. The actual dilution received by the discharge in the Petaluma River has not been modeled or measured. Due to the tidal nature of the river, and limited upstream fresh water flows, the discharge is classified by the Board as a shallow water discharge. Therefore, effluent limitations are calculated assuming no dilution (D=0).

    The 1995 Basin Plan (p.4-12) states that shallow water dischargers may apply to the Regional Board for exceptions to the assigned dilution ratio of D=0 (and thus the shallow water effluent limitations) based on demonstration of compliance with water quality objectives in the receiving waters and implementation of an aggressive pretreatment and source control program. The cited Basin Plan Shallow Water Discharges section specifies the issues that must be addressed to support requests for the Board to consider granting limited dilution credit where needed to meet effluent limits in the form of revised effluent or mass loading limits.

Basis for Revised Effluent Limits

29. *Water Quality Based Effluent Limitations.* Toxic substances are regulated by water quality based effluent limitations derived from USEPA national water quality criteria listed in the Basin Plan Table 3-3 and 3-4, the National Toxics Rule, or USEPA Gold Book, and/or best professional judgment. Limits for cadmium, copper, mercury, Lindane, and cyanide are more stringent than in the prior permit. Further details about the effluent limitations are given in the associated Fact Sheet, which is incorporated as part of this Order.

30. *Alternative Limits.* The Basin Plan (page 4-8) provides that alternate effluent limitations can be considered by the Board where a site-specific water quality objective is being proposed and the Discharger is participating in source control programs. As stated below (Finding 33.h and 34.e), the Discharger is implementing well-developed source control programs for copper and mercury. It is consistent with this provision of the Basin Plan to use an interim effluent limitation for copper and mercury pending the development of the studies leading up to the Board's consideration of any site-specific recommendations to evolve from those analyses. In addition to interim limits, water quality based effluent limits (WQBEL) are included in this Order. Due to mercury contributing to the impairment of San Pablo Bay and its bioaccumulative effects, a mass limit, in addition to interim and

water quality based concentration limits, is included in this Order. Alternative limits have also been determined for cyanide provided that monitoring and source control programs are implemented. The bases for these alternate limits is presented in the Fact Sheet and Findings 39.

31. a. *Applicable Water Quality Objectives.* The Basin Plan (page 3-4) established a narrative objective for toxicity in order to protect beneficial uses: "All waters shall be maintained free of toxic substances in concentrations that are lethal to or produce other detrimental responses in aquatic organisms". The Basin Plan also directs that ambient conditions shall be maintained until site specific objectives are developed. Effluent limitations and provisions contained in this Order are designed to implement this objective, based on available information.

b. *San Pablo Bay Water Quality.* The draft Section 303(d) List of Impaired Water Bodies and Priorities for Development of Total Maximum Daily Loads for the San Francisco Bay Region, dated March 9, 1998, was approved by the State Board on May 27, 1998. Pollutants contributing to the impairment of San Pablo Bay include mercury, copper, exotic species, diazinon, PCBs, selenium, and nickel.

32. <u>Reasonable Potential Analysis</u>

As specified in 40 CFR 122.44(d) (1) (i), permits are required to include limits for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard." Using the method described in the "Proposed Policy for Implementation of Toxics Standards for Inland Surface Water, Enclosed Bays, and Estuaries in California" (Draft, September 1997), and USEPA guidance documents, Regional Board staff have analyzed the effluent data to determine if the discharges had reasonable potential to cause or contribute to an exceedance of a State water quality standard ("RP Analysis"). In the absence of state-adopted numeric water quality objectives, the RP analysis compares the effluent data with the USEPA's Quality Criteria for Water, 1986 (Gold Book), a limited Regional Board site-specific study for copper, and the Basin Plan objective for tributyltin. The RP analysis conservatively assumed that the effluent would receive no dilution. The results of the Reasonable Potential Analysis are described in this finding and in Section B: Effluent Limitations.

For all parameters that have "reasonable potential" to contribute to an exceedance of a water quality objective, numeric water quality-based effluent limitations (WQBELs) are established. For copper and mercury, WQBELs are established with compliance schedules. If WQBELs for copper and mercury are not revised at the end of 7 years from the date of this permit's reissuance, then the WQBELs, based on US EPA water quality criteria and the Basin Plan objectives, 4.9 and 0.012 µg/L, respectively, will become effective. While site-specific objectives and Total Maximum Daily Loads are being developed, the discharger will be held accountable for maintaining ambient conditions to the receiving water and San Pablo Bay by complying with interim performance based limits. For mercury, the interim numeric effluent limit is based on current treatment plant performance at the 99.7th percentile level.

Review of the 1995-1997 data showed that the toxic constituents present in the discharger's effluent at concentrations greater than the detection limit were arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, zinc, cyanide, and several organic compounds, including PAHs, lindane (γ-BHC), α-BHC, pesticides (Dieldrin and Aldrin), halomethanes, chloroform, toluene, and phenols. Of these constituents, only cadmium, chromium, copper, lead, mercury, nickel, PAHs and Lindane

have reasonable potential to cause or contribute to exceedance of water quality objectives based on the RP analyses. All of the other toxic constituents were found at levels well below the corresponding effluent limitations; i.e. based on continued consistent plant performance, arsenic, selenium, silver, zinc, halomethanes, chloroform, toluene, and phenols did not show reasonable potential to cause or contribute to exceedance of applicable water quality objectives. For cyanide, reasonable potential could not be determined due to possible analytical interferences. Therefore, an interim performance-based limit is established until more information is available to perform a justifiable reasonable potential analysis. Also, for the toxic constituents, α-BHC, Dieldrin, and Aldrin, which have only been detected in the effluent one time each during 1995 through 1997, reasonable potential could not be conclusively determined due to data validation and detection level issues. Consequently, this Order requires increased monitoring for these constituents. Also, alternative analytical techniques shall be used as they become available.

The limit for PAHs, as defined by the Basin Plan, is the sum of about sixteen constituents measured in USEPA Method 610. The NTR, which is based on more updated data, list standards for just eleven of the PAHs measured in Method 610. The USEPA criteria for three of the eleven are higher than the other eight; these are anthracene (NTR objective at 110,000 ppb), fluorene (14,000 ppb), and pyrene (11,000 ppb). Therefore, the PAH objectives in the current permit are for the other eight PAHs that may be present in the discharge at concentrations which pose a reasonable potential to contribute to water quality impacts. The USEPA criteria for each of these eight PAHs are 0.049 ppb based on updated cancer potency factors (q*) from USEPA's Integrated Risk Information System (IRIS). However, since current detection levels are not able to measure these PAHs at this low level, these limits cannot be enforced. Therefore, the limit for these eight PAHs is set at the practical quantitation level (PQL), or five times the method detection level. The eight PAHs are listed in Provision 13 of this Order and in Footnote 7, Table 1A, of the SMP.

The water quality objectives (WQO) that had reasonable potential to be exceeded, and the projected maximum concentrations (PEQ) computed from the analyses are listed in the following table for each constituent analyzed. The PEQ was computed based on concentration data measured during discharge periods from 1995 through 1997. No dilution was used in the determination. If the projected maximum concentration is greater than the WQO, then there is reasonable potential for that constituent to cause or contribute to exceedance of the objective.

Constituent	PEQ (99%) (μg/L)	WQO (μg/L)	Reasonable Potential
Copper	24.7	4.9	yes
Mercury	0.82	0.012	yes
Lead	7.5	5.6	yes
Cadmium	2.5	2	yes
Chromium	11.4	11	yes
Nickel	17.6	7.1	yes
Lindane	0.94	0.16	yes
PAHs	61.6	0.049	yes
Arsenic	16.2	20	no
Silver	0.85	2.3	no
Zinc	33.6	58	no
Selenium	1	5	no

The Board cannot determine whether several organic constituents (PCBs, semi-volatile and volatile organics) have the reasonable potential to cause or contribute to exceedance of applicable water quality objectives because the historical effluent limitations were lower than current analytical techniques can measure. The Discharger will continue to monitor for these constituents and to implement new methodologies which lower the detection limits as they become available. If detection limits improve to the point where it is feasible to evaluate compliance with the water quality objectives, a new reasonable potential analysis would be conducted to determine whether there is need to add numeric effluent limits to the permit or to continue monitoring.

A reopener provision is included in this Order that allows numeric limits to be added to the permit for any constituent that in the future exhibits reasonable potential to cause or contribute to exceedance of applicable water quality objectives. This determination, based on monitoring results, will be made by the Board.

33. <u>Total Maximum Daily Load</u>

For pollutants, such as copper and mercury, that have interim performance-based limits based on the reasons stated above, the Board intends to establish different WQBELs after intensive literature review and data collection to determine appropriate local water quality objectives and cost-effective measures to achieve these objectives. Based on the final Water Quality-Limited Waterbodies (303(d)) list, the Board may adopt Total Maximum Daily Loads (TMDLs) which may result in revising the WQBELs established in this Order. The Board's plan for conducting these reviews, data collection and potentially developing TMDLs will be prioritized in the final 303(d) list and incorporated into the Watershed Management Initiative for implementation.

The following summarizes the Board's strategy to collect water quality data and general approaches to policy and TMDL development with associated time frames, and funding mechanism for this work:

- Data collection - The Board will require individual point and non-point discharger or dischargers collectively to develop analytical techniques capable of detecting these pollutants at levels of concern and to characterize loadings from their facilities into the water quality-limited waterbodies. The results will be used to (1) revise the 303(d) list (2) support the watershed-specific pollutant policy development.

- Policy and TMDL development - A draft region-wide Mercury TMDL has been prepared by the Board staff which will be distributed for public review and comment in summer 1998. Adoption of the Mercury TMDL will be considered by the Board as part of the Basin Plan triennial review in 1998. This process will refine the timing and mechanism for development of other pollutant-specific TMDLs.

- Funding mechanism - The Board anticipates receiving resources from federal agencies for development of any alternate water quality based limits. The Board intends to supplement these resources to ensure timely alternate limits by allocating development costs among all dischargers through Regional Monitoring Program (RMP) or other appropriate group funded mechanisms. The Discharger has shown a willingness to participate in such a Board-initiated group effort as long as criteria are established to allocate the costs among all dischargers in the watershed equitably.

34. Copper

a. *Copper Water Quality Objectives.* In 1984 the USEPA promulgated a national saltwater and freshwater copper criterion of 2.9 µg/L, measured as total recoverable copper. The Board developed a proposed Bay-wide site specific water quality objective for copper for San Francisco Bay of 4.9 µg/L in 1991. The site specific objective for copper employed the "water effect ratio" (WER) approach developed by the USEPA. This approach provides a measure of the binding capacity of natural waters (dependent on particulate matter) relative to the binding capacity of reference waters (filtered oceanic water). In the best professional judgment of the Board, from a technical standpoint, the Bay-wide site-specific objective was protective of the most sensitive designated beneficial use of San Francisco Bay water with respect to copper: habitat for aquatic organisms. The study and associated staff analysis are described in a September 25, 1992 Board staff report entitled "Revised Report on Proposed Amendment to Establish a Site Specific Objective for Copper for San Francisco Bay".

b. The Board amended the Basin Plan on October 21, 1992 to include the site specific water quality objective of 4.9 µg/L for copper for San Francisco Bay based on a Bay-wide WER of 1.7 and the criterion of 2.9 µg/L. On June 16, 1993, the Board amended the 1986 Basin Plan to incorporate a wasteload allocation for copper. On April 21, 1994 the State Water Resources Control Board remanded both of these Basin Plan amendments as a consequence of the court decision which invalidated the California Enclosed Bays and Estuaries Plan and Inland Surface Waters Plan. Therefore, neither the site specific water quality objective nor the wasteload allocation have been legally promulgated.

c. On October 1, 1993, in recognition that the dissolved fraction may be a better representation of the biologically active portion of the metal than is the total or total recoverable fraction, the USEPA Office of Water recommended that State water quality standards for the protection of aquatic life (with the exception of chronic mercury criterion) be based on dissolved metals. USEPA amended the NTR in 1995 to include factors to convert total metals to dissolved metals for both fresh and salt water objectives. USEPA published guidance in June 1996 on using metal translators, derived from site specific receiving water data, to calculate total recoverable effluent limits necessary to achieve dissolved receiving water criteria.

d. In 1996, the USEPA promulgated a revised national saltwater dissolved copper criteria of 3.1 µg/L. This revised criteria incorporates new scientific data generated during site specific studies of both New York Harbor and the San Francisco Bay. In order for the Board to consider application of the dissolved criteria to the discharge, an appropriate translator based on effluent and receiving water data must be developed. This Order requires the discharger to conduct a study to generate data that may be considered by the Board for translation of the dissolved criteria to a total recoverable effluent limit.

e. This Order establishes an interim performance-based effluent limitation for copper, as well as a water quality based effluent limit with the time schedule specified in Provision 3. When additional site specific information is available that would allow derivation of an appropriate limit that considers the binding capacity of the receiving waters, a different water quality based effluent limit may be established by the Board. This information may be developed by the discharger, the Regional Board, and/or other parties. The discharger is required to implement a testing program that could lead to development of a site specific objective for copper for the Petaluma River. The discharger shall also report mass emissions of copper each month on a

year-round basis from both their influent and effluent. This data shall be used to develop a mass-emission study as part of a region-wide TMDL effort for copper.

f. This Order establishes an interim performance based limit for copper applicable to the discharge. The interim performance based effluent limit for copper is based on the 99.7th percentile of plant performance during the period 1995 through 1997. The Board may revise or amend this permit to apply a new limit that reflects up-to-date performance. This interim limit will be solely for the purposes of this permit. A different water quality based effluent limitation, other than the 4.9 µg/L established in this Order, may be included in a subsequent permit revision after additional information on such factors as attainability, impacts on beneficial uses, and site specific limits is developed.

g. *Copper Effluent Concentrations.* Total recoverable copper concentrations measured in the discharger's effluent during the five year period from January 1992 through December 1996 have ranged from 1.2 to 15 µg/L. Effluent concentrations from years 1996 and 1997 ranged from 2 to 7 µg/L and 2 to 5 µg/L, respectively. This reduction is likely the result of copper corrosion control efforts implemented by the Sonoma County Water Agency.

h. *Copper Reduction Program.* The process for development of a revised water quality based limit for copper may result in the establishment of a limit that is lower than the plant is currently able to achieve. If the final water quality objective for copper is based on the national dissolved criteria, it will be important to also consider protection of beneficial uses that could be impacted by particulate copper. Due to the uncertainties about the quantities of copper that could be a stress to the ecosystem, particularly in mediums other than the water column (such as sediments, and/or organisms that take in particulate matter), the discharger is required to continue to participate in efforts to reduce influent copper concentrations. Continued implementation of the discharger's source control program will also provide information that can be used to assess the discharger's ability to comply with a new water quality based limit.

35. Mercury

a. *Mercury Water Quality Objectives.* For mercury, the national chronic criterion is based on protection of human health. The criterion is intended to limit the bioaccumulation of methyl-mercury in fish and shellfish to levels which are safe for human consumption. As described in the Gold Book, the fresh water criterion is based on the Final Residual Value of 0.012 µg/L derived from the bioconcentration factor of 81,700 for methyl mercury with the fathead minnow, which assumes that essentially all discharged mercury is methylmercury. The saltwater criterion of 0.025 µg/L was similarly derived using the bioconcentration factor of 40,000 obtained for methylmercury with the Eastern oyster. These criteria are below levels that have produced acute and chronic toxicity in both fresh and salt water aquatic species.

b. *Mercury Compliance.* Effluent mercury concentrations measured during 1997 ranged from 0.01 to 0.06 µg/L . Although these concentrations were in compliance with the effluent limitation of 1.0 µg/L, this limit is no longer considered to be protective of beneficial uses. Therefore, although the discharger has been out of violation only once (a data outlier due, possibly, to laboratory error), their effluent has exceeded the national fresh water criterion of 0.012 µg/L on 6 out of the 12 sampling occasions. During the five year period from January 1992 through December 1996, effluent concentrations were in excess of the objective on 22 out of 43 sampling occasions, with concentrations ranging from 0.01 to 1.6 µg/L. Detection limits were not low

enough, however, to determine actual effluent concentrations on 15 out of 43 occasions. Through improved (ultra-clean) sampling and analysis techniques, the detection limit for mercury has dropped below the 0.012 µg/L objective. Although recent sampling (1996 and 1997) indicates a decrease in the annual average concentration, data from the past several years is cause for concern about the discharger's ability to comply with an effluent limit based on the 0.012 µg/L national objective.

c. *Special Studies and Schedules.* Board staff are in the process of developing a plan to address mercury compliance for north bay shallow water dischargers, including the City of Petaluma. Review of recent data indicates that in the absence of dilution credit (as allowed for deep water dischargers) the discharge concentrations for these facilities are all generally higher than the objectives. There is uncertainty as to the discharger's ability to reduce mercury effluent concentrations through source control efforts. As such, it may be appropriate to apply a mass loading limit to these dischargers, and focus mercury reduction efforts on more significant and controllable sources. Although the municipal dischargers are generally not considered to be significant contributors to the bulk mercury loading to the San Francisco Bay, there does remain the possibility of localized impacts related to their discharges. As such, the discharger is required to maximize their control over influent mercury sources, with consideration of relative costs and benefits. The discharger is encouraged to continue working with other shallow water dischargers to optimize both source control efforts and assessment of alternatives for protecting beneficial uses of receiving waters.

d. *Mercury Limits.* This Order establishes an interim performance-based effluent limit for mercury as well as a water quality based effluent limit (WQBEL) with a compliance schedule. The interim effluent limitation for mercury is based on the 99.7th percentile of plant performance from February 1996 through December 1997. The reason for looking at only the last two years of data is due to the previously high detection limits, which ultra-clean sampling and analytical techniques have lowered. Also, the significantly high concentration measured in January 1996 (1.6 µg/L) was considered an outlier and was not included in the data set. This interim limit will be solely for the purposes of this permit. The WQBEL of 0.012 µg/L is established in this Order according to the compliance schedule specified in Provision 4. A different water quality based effluent limitation may be included in a subsequent permit revision after additional information on such factors as attainability, impacts on beneficial uses, and site specific limits is developed. In addition to the performance-based limit and WQBEL with a time schedule, a mass-based annual limit and a mass loading monthly maximum for mercury are established in this Order. The mass loading monthly maximum (or "trigger") initiates additional actions as specified in Provision 5 and was based on the highest calculated 12-month moving average load using discharge flows and concentrations from ultra-clean sampling and analysis techniques. The mass based annual limit was calculated from 12-month moving average flows during the entire year and concentrations from the last three years.

e. *Source Control.* This Order requires the discharger to develop and implement a source control program as necessary to comply with, or evaluate their ability to comply with a 0.012 µg/L limit, and to reduce any significant, controllable sources that may be contributing to mercury toxicity in the receiving waters. The Regional Board intends to work toward the derivation of mercury effluent limitations for the north bay dischargers, that will lead towards overall reduction of mercury mass loadings in the watershed. This permit will be revised after additional information on such factors as attainability, impacts on beneficial uses, mass loadings, and site specific limits is developed. This permit contains a time schedule for the mercury source control program. The

discharger will also participate in watershed based activities and studies, as directed by the Regional Board staff, that are aimed at mercury source identification and reduction. Based on these studies, the Board may amend this permit to specify a different limit for mercury.

36. Coliform

a. *Total and Fecal Coliform.* The Basin Plan specifies water quality objectives for both total and fecal coliform and, to date, the effluent limitation has been based on total coliform. The Basin Plan (Table 4-2, footnote "d") allows the Regional Board to substitute fecal coliform limits for total coliform limits, provided that it can be conclusively demonstrated through a program approved by the Regional Board that such a substitution will not result in unacceptable adverse impacts on the receiving waters. This Order specifies a total coliform limit (as in the previous permit), but allows the discharger to conduct a study to evaluate the feasibility of utilizing an effluent limit based on the fecal coliform objective. If the discharger can demonstrate, to the satisfaction of the Executive Officer, that the use of fecal coliform limits will not impair the beneficial uses of the receiving waters, then the fecal coliform limit specified as an alternative under the Effluent Limitations section shall apply to the discharge. If necessary, based on the results of the study, this permit may be amended to include a fecal coliform limit.

37. Chronic Toxicity

a. *Program History.* The Basin Plan contains a narrative toxicity objective stating that "All waters shall be maintained free of toxic substances in concentrations that are lethal to or produce other detrimental responses to aquatic organisms" and that "there shall be no chronic toxicity in ambient waters." The Board initiated the Effluent Toxicity Characterization Program (ETCP) in 1986 with the goal of developing and implementing toxicity limits for each discharger based on actual characteristics of both receiving waters and waste streams. Two rounds of effluent characterization were conducted by selected dischargers beginning in 1988 and 1991. A second round was completed in 1995, and the Board is evaluating the need for a third round. Board guidelines for conducting toxicity tests and analyzing results were published in 1988 and last updated in 1991.

Attempts have been made to include numeric chronic toxicity limits in NPDES permits. The Board adopted Order No. 92-104 in August 1992 amending the permits of eight dischargers to include numeric chronic toxicity limits, based on an eleven sample median value of 1 TUc and 90th percentile value of 2 TUc. However, due to the court decision which invalidated the California Enclosed Bays and Estuaries Plan and Inland Surface Waters Plan, on which Order No. 92-104 was based, the SWRCB stated, by letter dated November 8, 1993, that the Regional Board will have to reconsider the order. This letter also committed to providing the regional boards with guidance on issuing permits in the absence of the State Plans (*Guidance for NPDES Permit Issuance,* February 1994).

b. *SWRCB Toxicity Task Force Recommendations.* The Toxicity Task Force provided several consensus-based recommendations in their October 1995 report to the SWRCB for consideration in redrafting the State Plans. A key recommendation was that permits should include narrative rather than numeric limits. The numeric test values should then be used as toxicity "triggers" to first accelerate monitoring and then initiate Toxicity Reduction Evaluations (TREs).

c. *Regional Board Program Update.* The Board intends to reconsider Order No. 92-104 as directed by the SWRCB, and to update, as appropriate, the Board's Whole Effluent Toxicity (chronic and acute) program guidance and requirements. This will be done based on analysis of discharger routine monitoring and ETCP results, and in accordance with current USEPA and SWRCB guidance. In the interim, decisions regarding the need for and scope of chronic toxicity requirements for individual dischargers will continue to be made based on best professional judgment as indicated in the Basin Plan.

d. *Discharger Monitoring Results.* The discharger participated in the second round of ETCP screening and variability testing in 1992 and 1993. Of six species tested in the screening phase, the *Selenastrum capricornutum* (a freshwater algae) was found to be the most sensitive to the effluent. *Mysidopsis bahia* (a marine invertebrate) was also sensitive to the effluent with effects on fecundity at 100% effluent. During variability phase testing conducted with *Selenastrum capricornutum*, continued toxicity was observed. Efforts to identify the cause of the toxicity resulted in the conclusion that the hardness and/or conductivity in the effluent was the likely cause of toxicity. This problem was also encountered by other dischargers using this species for testing.

e. *Permit Requirements and Reopener.* In accordance with USEPA guidance, this Order includes the Basin Plan narrative toxicity objective as a chronic toxicity limit, implemented via monitoring. Numeric test values will be used as toxicity "triggers" to initiate accelerated monitoring and perform a chronic toxicity reduction evaluation (TRE). If significant non-artifactual toxicity is consistently detected and the discharger fails to aggressively implement all reasonable control measures included in the TRE workplan, the Board will consider amending the permit to include numeric toxicity limits. The Self-Monitoring Program identifies the species to be used for testing.

38. Total Suspended Solids

a. The physical and operational characteristics of the oxidation ponds may contribute to suspended solids in the final effluent, as clay particles from the pond base are suspended by wave action. Algae growth and daphnia also contributes to suspended solids. The Federal Secondary Treatment [40 CFR 133.103] regulations recognize the inability of waste stabilization ponds to consistently meet standard secondary treatment requirements, and therefore allow alternative limitations when they are consistent with proper operation and maintenance of the facility. According to the Federal Secondary Treatment regulations, these alternative limits may only be applied if (1) the BOD and TSS effluent concentrations, consistently achievable through proper operation and maintenance of the treatment works, exceed the minimum level of the effluent quality set forth in 133.102(a) and 133.102(b); and, (2) waste stabilization ponds or trickling filters are the principal process used for secondary treatment.

b. The secondary treatment processes include the trickling filters, activated sludge unit, and oxidation ponds. The trickling filters and oxidation ponds, together, treat over 50% of the wastewater. However, the BOD effluent quality is not compromised by the ponds or the trickling filters.

c. The effluent limits specified in this Order for total suspended solids are higher than those typically applied to discharge of secondary treated wastewater. These limits were established by the Board upon issuance of the discharger's permit in 1985, based on changes in pond operation

that resulted from initiation of the reclamation program. Altering pond levels to accommodate reclamation needs reduced particulate settling, thus increasing suspended solids levels.

d. During the three years from 1995 through 1997, suspended solids concentrations in the discharge ranged from 20.2 to 68.5 mg/L during the winter discharge season. The average of the monthly-averaged values over this period was 33.2 mg/L. Effluent TSS concentrations exceeded the monthly average limits 2 times during the discharge season of this 3-year period. Based on this data, the discharger would currently be unable to consistently comply with the standard secondary limits for total suspended solids. Although elevated suspended solids may result from suspension of clay particles from the pond bottoms, erosion of the pond levees, and/or algae growth (rather than inadequate wastewater treatment), the impacts of the discharge under the limits established in the earlier permit are uncertain.

e. *Permit Requirements.* This Order requires the discharger evaluate options for reducing suspended solids. Thus, the alternative limits specified in this Order are applicable based on performance of special studies under Provision 9. Although the alternative limits for effluent TSS concentrations apply in this Order, percent removal of TSS remains at 85% as in the previous permit. It is recognized, however, that during wet weather flows, 85% removal of TSS may be difficult to achieve all of the time.

39. Cyanide

The prior permit contains a daily average effluent limit for cyanide of 25 µg/L based on Basin Plan Table 4-3. The saltwater objective for cyanide is 1 µg/L as a 1-hour average. However, the detection limit for weak acid dissociable cyanide is generally 5 µg/L. Effluent cyanide concentrations during 1995-1997 averaged 4.3 µg/L, with a range from <3 µg/L to 10 µg/L. Since influent cyanide concentrations are generally below detection limits, effluent chlorination appears to be creating cyanide or compounds that are also detectable by cyanide analyses (positive interferences). The discharger will investigate potential analytical interferences, in-plant sources of cyanide and potential reduction measures as cited in the Provisions.

Uncertainty also exists as to the persistence of cyanide in the environment. The Basin Plan (page 4-70, Footnote f.) states that "the Regional Board will consider information on the persistence of cyanide in evaluating alternate limit proposals". Therefore, this Permit contains an interim performance-based effluent limitation for cyanide of 14 µg/L (daily average), based on 99.7% of 1995-1997 plant performance. This interim limit will be solely for the purposes of this permit. A final water quality based effluent limitation will be included in a subsequent permit revision after additional data is obtained. The discharger will investigate potential analytical interferences, in-plant sources of cyanide and potential reduction measures as cited in the Provisions.

40. Lindane

This permit establishes a water quality based effluent limit for Lindane (γ-BHC) of 0.16 µg/L. Lindane has been detected six times between 1993 and 1997; concentrations ranged from 0.02 to 0.23 µg/L, and averaged 0.12 µg/L. Due to the limited knowledge surrounding this constituent and the difficulty which the City's plant may have in complying with the current water quality objective, this provision requires implementation of a monitoring and source control program.

Source Control. This Order requires the discharger to develop and implement an effluent monitoring and source control program as necessary to comply with, or evaluate their ability to comply with a 0.16 µg/L monthly limit, and to reduce any significant, controllable sources that may be contributing to Lindane in the receiving waters. This permit may be revised after additional information on such factors as attainability, impacts on beneficial uses, mass loadings, and site specific limits is developed. This permit contains a time schedule for effluent monitoring and source control program.

BASIN PLAN DISCHARGE PROHIBITION

41. The Basin Plan prohibits the discharge of any wastewater which has particular characteristics of concern to beneficial uses at any point at which the wastewater does not receive an initial dilution of at least 10:1, or into any nontidal water, dead-end slough, similar confined waters, or any immediate tributaries thereof. Discharge of wastewater to the Petaluma River is contrary to this prohibition, due to the tidal nature of the Petaluma River, and the limited fresh water flows upstream of the outfall. The discharge is classified as a shallow water discharge; therefore, effluent limitations are calculated assuming no dilution.

42. The Basin Plan provides that exceptions to the above prohibition will be considered for discharges where: 1) an inordinate burden would be placed on the discharger relative to beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means such as an alternative discharge site, a higher level of treatment, and/or improved treatment reliability; or, 2) the discharge is approved as a part of a reclamation project; or, 3) it can be demonstrated that net environmental benefits will be derived as a result of the discharge.

43. In addition to the criteria stated above for exceptions, the Basin Plan requires that the Board consider the reliability of the discharger's system in preventing inadequately treated wastewater from being discharged to the receiving water, and the environmental consequences of such discharges.

44. The discharger currently reclaims treated wastewater for irrigation of agricultural lands used to grow fodder, fiber, or seed crops, and on lands used for pasture. The discharger also reclaims treated wastewater for irrigation of a golf course, a field located on property owned by the City of Petaluma, and land adjacent to the oxidation ponds where trees have been planted. The dry weather prohibition period is typically May 1 through October 20 of each year. From 1992 through 1996, the discharger reclaimed an average of 49% of its annual average dry weather flow.

45. The discharger's pond system, utilized for both treatment and storage of wastewater, affords the discharger a significant volume of storage capacity that can be used for containment of peak wet weather flows, or for emergency storage in the event of plant upset. The use of these ponds minimizes the possibility of discharge of untreated or partially treated wastewater to the Petaluma River.

46. The Board finds that the water reuse program implemented by the discharger complies with the exception provision of the Basin Plan. The Board hereby grants an exception to the discharge prohibition for wet weather discharges to the Petaluma River for a six month period each year. This exception is subject to the following conditions. The discharger shall:

    a. Continue to operate all treatment facilities to assure high reliability and redundancy;

b. Continue to implement a source control program for any regulated chemical constituents that are measured at levels in violation of permit effluent limitations;

c. Continue to implement measures to maintain, repair, and upgrade the existing wastewater facilities so as to ensure continued operation and treatment capability in conformance with permit requirements;

d. Continue progress towards construction of new or upgraded treatment facilities. These facilities are to be designed to ensure adequate capacity for community wastewater needs, and an adequate and reliable treatment process developed with sufficient flexibility and redundancy to provide for compliance with permit requirements as necessary to protect beneficial uses of the Petaluma River.

e. Continue to promote and encourage beneficial reuse of treated wastewater.

STORM WATER

47. Federal Regulations for stormwater discharges were promulgated by the USEPA on November 19, 1990. The regulations [40 Code of Federal Regulations (CFR) Parts 122, 123, and 124] require specific categories of industrial activity (industrial storm water) to obtain a NPDES permit and to implement Best Available Technology Economically Available (BAT) and Best Conventional Pollutant Control Technology (BCT) to control pollutants in industrial stormwater discharges.

48. The State Board adopted a statewide NPDES permit for stormwater discharges associated with industrial activities (NPDES General Permit CAS000001, adopted November 19, 1991, amended September 17, 1992). The General Permit is applicable to municipal wastewater treatment facilities. The discharger filed a Notice of Intent for coverage by the General Permit, and a Stormwater Pollution Prevention Plan has been developed and implemented at the site for storm water flows that are directed to the Petaluma River. All pump stations serving the plant are constructed such that rainfall and stormwater in contact with pump station equipment and/or sewage is self-contained, and flows to the treatment plant.

49. In order to consolidate permits for the facility, storm water flows from the site will henceforth be regulated by this Order, and coverage under the General Permit is terminated. These stormwater flows constitute all industrial storm water at this facility and consequently this Order regulates all industrial storm water discharges at this facility, through continued implementation of the Storm Water Pollution Prevention Plan.

PRETREATMENT PROGRAM

50. The discharger has implemented and is maintaining a USEPA approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR 403) and this Board's Order No. 95-015.

OPERATION AND MAINTENANCE

51. Operations and Maintenance procedures are maintained by the discharger for purposes of providing plant and regulatory personnel with a source of information describing all equipment, recommended operation strategies, process control monitoring, and maintenance activities. In order to remain

useful and relevant, the procedures shall be kept updated to reflect significant changes in treatment facility equipment and operation practices.

CEQA AND PUBLIC NOTICE OF ACTION

52. This Order serves as an NPDES Permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code. The certified EIR for the Wastewater Facility Project and Long Range Management Program was reviewed by the Board. This permit will be amended as the new wastewater facility is designed and built. Mitigation measures planned for future water quality impacts from this new facility are addressed in the EIR and do not pertain to this permit.

53. The discharger and interested agencies and persons have been notified of the Board's intent to reissue requirements for the existing discharge and have been provided an opportunity to submit their written views and recommendations.

54. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code and regulations adopted thereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, that the City of Petaluma shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. Discharge of wastewater at any point where it does not receive a minimum initial dilution of 10:1, or into dead-end slough and similar confined waters is prohibited, except as defined below. Based on Findings 41 through 46, an exception to this prohibition is granted for the discharge of treated effluent during the wet weather season, as described in Finding 6 of this Order. Discharge of treated wastewater at a location or in a manner different from that described in the findings of this Order is prohibited.

2. The bypass or overflow of untreated or partially treated wastewater to waters of the State, either at the treatment plant or from the collection system or pump stations tributary to the treatment plant, is prohibited.

3. The average dry weather flow discharge shall not exceed 5.2 mgd. The average dry weather flow shall be determined over three consecutive dry weather months each year.

4. Discharge to the Petaluma River is prohibited during the dry weather period each year, from May 1 through October 20, unless the discharger submits a request, which may be submitted over the telephone to the Executive Officer and the Executive Officer approves it. This report must fully explain the need for discharges during this period (e.g., high flows related to late spring or early fall storm events, when reclamation is not feasible).

5. Discharges of water, materials, or wastes other than storm water, which are not otherwise authorized by this NPDES permit, to a storm drain system or waters of the State are prohibited.

6. Storm water discharge from the facility grounds shall not cause pollution, contamination, or nuisance.

B. EFFLUENT LIMITATIONS

1. The term "effluent" in the following limitations means the fully treated wastewater effluent from the discharger's wastewater treatment facility, as discharged to the Petaluma River. The effluent discharged to the Petaluma River during the wet weather period shall not exceed the following limits:

Conventional Pollutants Effluent Limitations

Constituent	*Units*	*Monthly Average*	*Weekly Average*	*Daily Maximum*	*Instantaneous Maximum*
Biochemical Oxygen Demand (BOD_5, 20°C)	mg/L	30	45	60	--
Total Suspended Solids	mg/L	45	65	70	--
Settleable Matter	ml/L-hr	0.1	--	--	0.2
Oil & Grease	mg/L	10	--	20	--
Chlorine Residual[1]	mg/L	--	--	--	0.0

[1] Requirement defined as below the limit of detection in standard test methods defined in the latest edition of *Standard Methods for the Examination of Water and Wastewater*.

2. The pH of the discharge shall not exceed 8.5 nor be less than 6.5.

3. Coliform Bacteria: The treated wastewater, at some point in the treatment process prior to discharge, shall meet the following limits of bacteriological quality:

   a. The moving median value for the MPN of total coliform bacteria in any seven consecutive samples shall not exceed 23 MPN/100 mL; and

   b. Any single sample shall not exceed 240 MPN/100 mL.

   The discharger may use alternate limits of bacteriological quality instead of meeting 3.a and 3.b above (total coliform limits) if the discharger can establish to the satisfaction of the Board that the use of the fecal coliform limits will not result in unacceptable adverse impacts on the beneficial uses of the receiving water.

4. 85 Percent Removal, BOD and TSS: The arithmetic mean of the biochemical oxygen demand (Five-day, 20°C) and total suspended solids values, by weight, for effluent samples collected in each calendar month shall not exceed 15 percent of the arithmetic mean of the respective values, by weight, for influent samples collected at approximately the same times during the same period.

5. Acute Toxicity: Representative samples of the effluent shall meet the following limits for acute toxicity: (see Provisions of this Order for more information)

The survival of organisms in undiluted effluent from parallel 96-hour flow-through bioassays shall be an eleven (11) sample median value of not less than 90 percent survival, and an eleven (11) sample 90 percentile value of not less than 70 percent survival. The eleven sample median and 90th percentile effluent limitations are defined as follows:

11 sample median: Any bioassay test showing survival of 90 percent or greater is not a violation of this limit. A bioassay test showing survival of less than 90 percent represents a violation of this effluent limit, if five or more of the past ten or less bioassay tests show less than 90 percent survival.

90th percentile: A bioassay test showing survival of less than 70 percent represents a violation of this effluent limit if one or more of the past ten or less bioassay tests show less than 70 percent survival.

6. Chronic Toxicity: Compliance with the Basin Plan narrative toxicity objective shall be demonstrated according to the following tiered requirements based on results from representative samples of the treated effluent meeting test acceptability criteria and Provision 7:

   a. routine monitoring;
   b. accelerate monitoring after exceeding a three sample median value of 1 TUc(1) or a single sample maximum of 2 TUc;
   c. return to routine monitoring if accelerated monitoring does not exceed either "trigger" in "b";
   d. initiate approved TRE workplan and continue accelerated monitoring if monitoring confirms consistent toxicity above either "trigger" in "b";
   e. return to routine monitoring after appropriate elements of TRE workplan are implemented and toxicity drops below "trigger" levels in "b", or as directed by the Executive Officer.

   (1) A TUc equals 100 divided by the no observable effect level (NOEL). The NOEL is determined from IC, EC, or NOEC values. These terms, their usage, and other chronic toxicity monitoring program requirements are defined in more detail in Attachment A of the Self-Monitoring Program of this Order. Monitoring and TRE requirements may be modified by the Executive Officer in response to the degree of toxicity detected in the effluent or in ambient waters related to the discharge.

7.a. Toxic Substances Effluent Limitations: The discharge of effluent containing constituents in excess of the following limitations is prohibited [a]:

Constituent	Units	Daily Average [b]	Monthly Average [b]
Cadmium	µg/L	2 [f]	
Chromium (VI) [c]	µg/L	11.0	
Copper	µg/L	4.9	
Lead [e]	µg/L	5.6	
Mercury	µg/L		0.012
Nickel	µg/L	7.1	
Lindane	µg/L		0.16
PAHs	µg/L	0.049 [h]	

b. Interim Effluent Limitations: The following interim limits shall apply in lieu of the above limits until the date specified in the time schedule below and according to Provisions 3 and 4 for copper and mercury, respectively.

Constituent	Units	Daily Average [b]	Monthly Average [b]	Time Schedule
Copper	µg/L	14 [g]		July 15, 2005
Mercury	µg/L		0.07 [g]	July 15, 2005
Cyanide [d]	µg/L	14 [g]		July 15, 2003

Footnotes:

a. All analyses shall be performed using current USEPA Methods, as specified in USEPA Water/Wastewater Methods (EPA-600 Series), except that mercury analyses may be performed using USEPA Method 1631. Metal limits are expressed as total recoverable metals.
b. Limits apply to the average concentration of all samples collected during the averaging period (Daily - 24-hour period; Monthly - Calendar month).
c. The discharger may meet the limit for hexavalent chromium as total chromium.
d. The discharger may demonstrate compliance with this limitation by measurement of weak acid dissociable cyanide.
e. Effluent limitation may be met as a 4-day average. If compliance is to be determined based on a 4-day average, then concentrations of four 24-hour composite samples shall be reported, as well as the average of four.
f. Limit for cadmium is based on a fresh water objective that is hardness dependent. Limit shown is calculated for an assumed ambient hardness of 200 mg/L $CaCO_3$.
g. Limits are based on recent plant performance (1995-1997) at the 99.7th percentile and are solely for the purposes of this permit and only for the duration of the permit. The limit for cyanide shall apply until more definitive data is available to perform a reasonable potential analysis. The interim limits in 7.b shall apply for copper and mercury until either different WQBELs are established or the 7-year compliance schedule is over, at which time the limits specified in 7.a shall apply.
h. The water quality based effluent limit for PAHs refers to the limit for each of the eight PAHs listed in Provision 13. Compliance is based on the practical quantitation level (PQL), which is five times the method detection level, or 4.0 µg/L, for each PAH.

8. Until TMDL and WLA efforts for mercury provide enough information to establish a different WQBEL, the discharger shall demonstrate that the current mercury mass loading to the receiving water does not increase by complying with the following:

a) Mass limit: The 12-month moving average annual load for mercury shall not exceed **0.6 kg/year**. This limit was calculated from the highest of the moving average loads taken from moving average flows times the corresponding moving average mercury concentrations during the entire year. Compliance shall also be calculated using moving average flows and concentrations from the entire year (during both discharge and reclamation months).

b) Mass trigger: If the 12-month moving average monthly mass loading for mercury exceeds **0.015 kg/month**, the actions specified in Provision 5 shall be initiated. This load was calculated using the yearly moving average discharge flow (in mgd) times the corresponding moving average mercury concentration from data that only used "ultra-clean" analyses (1996 through 1997). The highest resulting moving average load, in kg per day, was used to calculate the 0.015

kg/month. Compliance shall also be determined based on moving average loads from flows and concentrations during the discharge season only.

These mass limit and "trigger" values will be superseded upon completion of Total Maximum Daily Load and Waste Load Allocation. According to the antibacksliding rule in the Clean Water Act, Section 402(o), the permit may be modified to include a less stringent requirement following completion of a TMDL and waste load allocation, if the bases for an exception to the rule are met.

The mass emission limit (or trigger) for mercury shall be calculated as follows:

Flow = Running average of last 12 months of effluent flow in mgd, measured at E-001-S, prior to reclamation or discharge to the Petaluma River (prior to discharge to the Petaluma River).

Hg Conc. = Running average of last 12 monthly mercury concentration measurements in µg/L corresponding to the above flows, measured at E-001.

Mass emission limit, in kg/year = Flow x Hg Conc. x 1.3815
Mass emission trigger, in kg/month = Flow x Hg Conc. x 0.1151

C. POND SPECIFICATIONS

1. A minimum freeboard of two feet shall be maintained in all ponds at all times. Exceptions to this requirement are allowed when an increase in pond storage capacity is needed just prior to, or during the reclamation season, providing there is no threat of overflow due to storm conditions or otherwise. During these periods when the storage capacity is needed, a freeboard of one foot shall be maintained, and the discharger shall ensure that the higher pond levels do not threaten the integrity of the pond levees.

2. All ponds shall be protected from erosion, washout, and flooding from the maximum flood having a predicted frequency of once in 100 years.

3. The waste shall not cause significant degradation of any ground water so as to impair beneficial uses.

D. RECEIVING WATER LIMITATIONS

1. The discharge of waste shall not cause the following conditions to exist in waters of the State at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam;

   b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;

   c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;

   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;

   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of

these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State any one place within one foot of the water surface:

   a. Dissolved Oxygen: 5.0 mg/L, minimum

      The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation. When natural factors cause concentrations less than that specified above, then the discharge shall not cause further reduction in ambient dissolved oxygen concentrations.

   b. Dissolved Sulfide: 0.1 mg/L, maximum

   c. pH: Variation from normal ambient pH by more than 0.5 pH units.

   d. Un-ionized Ammonia: 0.025 mg/L as N, annual median ~ 3 mg/L NH_3-N @ 20° for CMC
      0.16 mg/L as N, max.

   e. Nutrients: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

3. The discharge shall not cause a violation of any particular water quality standard for receiving waters adopted by the Board or the State Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board may revise and modify this Order in accordance with such more stringent standards.

4. Storm Water Discharge

   a. Storm water discharges shall not adversely impact human health or the environment.

   b. Storm water discharges shall not cause or contribute to a violation of any applicable water quality objective for receiving waters contained in the Basin Plan.

E. SLUDGE MANAGEMENT PRACTICES

1. All sludge generated by the discharger must be disposed of in a municipal solid waste landfill, reused by land application, or disposed of in a sludge-only landfill in accordance with 40 CFR Part 503. If the discharger desires to dispose of sludge by a different method, a request for permit modification must be submitted to the USEPA 180 days before start-up of the alternative disposal practice. All the requirements in 40 CFR 503 are enforceable by USEPA whether or not they are stated in an NPDES permit or other permit issued to the discharger.

2. Sludge treatment, storage, and reuse shall not create a nuisance, such as objectionable odors or flies, or result in groundwater contamination.

3. Duty to mitigate: The discharger shall take all reasonable steps to prevent or minimize any sludge use or disposal which has a likelihood of adversely affecting human health or the environment.

4. The discharge of sewage sludge shall not cause waste material to be in a position where it is, or can be carried from the sludge treatment and storage site and deposited in the waters of the State.

5. The sludge treatment and storage site shall have facilities adequate to divert surface runoff from adjacent areas, to protect boundaries of the site from erosion, and to prevent any conditions that would cause drainage from the materials in the temporary storage site. Adequate protection is defined as protection from at least a 100-year storm and protection from the highest possible tidal stage that may occur.

6. For sludge that is applied to the land, placed on a surface disposal site, or fired in a sewage sludge incinerator as defined in 40 CFR 503, the discharger shall submit an annual report to the USEPA and the Board containing monitoring results and pathogen and vector attraction reduction requirements as specified by 40 CFR 503, postmarked February 15 of each year, for the period covering the previous calendar year.

7. Sludge that is disposed of in a municipal solid waste landfill must meet the requirements of 40 CFR 258. In the annual self-monitoring report, the discharger shall include the amount of sludge disposed of, and the landfill(s) to which it was sent.

8. Permanent on-site sludge storage or disposal activities are not authorized by this permit. A report of Waste Discharge shall be filed and the site brought into compliance with all applicable regulations prior to commencement of any such activity by the discharger.

9. Sludge Monitoring and Reporting Provisions of this Board's "Standard Provisions and Reporting Requirements", dated August 1993, apply to sludge handling, disposal and reporting practices.

F. PROVISIONS

1. Permit Compliance

The Discharger shall comply with the limitations, prohibitions, and other provisions of this Order immediately upon adoption by the board. The board may reopen this permit to add numeric limits for any constituent that in the future exhibits reasonable potential to cause or contribute to exceedance of applicable water quality objectives. Requirements prescribed by this Order supersede the requirements prescribed by Order No. 90-153. Order No. 90-153 is hereby rescinded.

2. Copper Reduction Study and Schedule

The discharger shall continue to participate in any further efforts to reduce copper corrosion in the water supply system. The discharger shall document current copper reduction and control activities, evaluate the feasibility of potential enhancements to those activities, and develop and implement a source identification and reduction plan for sources of copper other than the water supply system. This program shall be aimed at taking all reasonable and economical steps to reduce influent copper concentrations and shall be developed and implemented in accordance with the following time schedule. The discharger shall also determine and report mass loading of copper during both the river discharge and reclamation periods. This data shall be determined from both the influent and

effluent and reported in the monthly and annual self-monitoring reports. All reports submitted shall be acceptable to the Executive Officer.

Tasks	Compliance Date
a. The discharger shall submit a report, acceptable to the Executive Officer, documenting efforts made to reduce influent copper concentrations, including, but not limited to, details of past measures taken by the local water agencies to reduce corrosion in the supply system. The feasibility of further optimization of corrosion control shall be discussed. This report may be prepared and submitted in conjunction with other wastewater facilities served by the same water purveyors.	November 1, 1998
b. The discharger shall submit a report, acceptable to the Executive Officer, documenting efforts to identify any other significant copper sources in the community. Assessment of options for source reduction shall be provided for any identified sources. Time schedules for anticipated actions associated with implementing a source reduction plan shall be included.	June 1,1999

3. **Copper Translator Study and Schedule**

In order to develop information that may be used to establish a water quality based effluent limit based on dissolved copper criteria, the discharger shall implement a sampling plan to collect data for development of a dissolved to total copper translator.. This work shall be performed in accordance with the following time schedule:

Tasks	Compliance Date
a. The discharger shall submit a study plan, acceptable to the Executive Officer, for collection of data that can be used for establishment of a dissolved to total copper translator, as discussed in the Findings. Within 30 days after Executive Officer approval, the discharger shall begin implementation of the study plan. The plan shall provide for consideration of anything that can change the character of the receiving waters, that could affect the relative concentrations of dissolved and total copper. The study must take into account metals partitioning in the receiving waters that may be season specific.	April 1, 1999
b. The discharger shall submit a report, acceptable to the Executive Officer, documenting the results of the copper translator study, which may also include any other site specific information that the discharger would like the Board to consider in development of a water quality based effluent limitation for copper.	October 1, 2001

The Board intends to hold a hearing to consider the results of this study, and any other site specific studies the discharger chooses to conduct, and to determine whether adequate information exists upon which to adopt a different WQBEL from the 4.9 µg/L established in this Order. This permit establishes a water quality based effluent limit of 4.9 µg/L for which compliance will be required within seven years of the effective date of this permit. This limit may be revised in response to site specific objective and TMDL studies to be conducted prior to the final compliance date. If the

TMDL efforts are delayed by either the USEPA, the State Board or the Regional Board, then this seven-year time schedule will be revised and extended up to an additional three years.

4. Mercury Reduction Study and Schedule

The discharger shall use methods which are capable of achieving detection limits as low or lower than 0.01µg/L for total mercury. The discharger shall assess the feasibility of attaining the US EPA national freshwater mercury criterion of 0.012 µg/L as described in the Findings. This evaluation shall consider reductions in mercury effluent concentrations achieved through source control and economically feasible optimization of treatment plant removal efficiency (for both the existing, and proposed new facility). If necessary, alternative control strategies shall be investigated, through participation with the Regional Board and other North Bay shallow water dischargers in identifying cross media watershed-wide sources of mercury impacting the receiving water, and potential control measures. The mercury reduction program shall be developed and implemented in accordance with the following time schedule.

Tasks	Compliance Date
a. Submit a proposed program, acceptable to the Executive Officer, to investigate mercury sources, which shall include 1) quantifying mercury levels at critical locations in the collection system over a period of at least one year, at regular intervals, 2) investigating means of optimizing mercury removal by treatment plant processes, 3) evaluating industrial contributions to mercury loadings, 4) evaluating possible means by which these sources can be reduced, and 5) evaluating alternative analytical methods to provide improved data reporting limits. Discharge from any industries and/or commercial establishments that are likely to contain mercury shall be characterized. This submittal shall include a proposed plan and time schedule for evaluation of source reduction measures.	December 1, 1998
b. Following approval by the Executive Officer or within 60 days of submission of the Study Plan to the Executive Officer, commence work in accordance with the study plan and time schedule submitted pursuant to Task 4.a. All possible sources shall be identified. Any sources of significance shall be evaluated for possible reduction.	February 1, 1999
c. Submit an interim report, acceptable to the Executive Officer, documenting the initial findings of source reduction options, and efforts made to encourage minimization of mercury discharges to the collection system.	October 1, 1999
d. Submit a final report, acceptable to the Executive Officer, documenting the findings of source reduction work and efforts made to minimize mercury in the collection system and treated effluent.	February 1, 2001
e. Develop a pollution prevention plan and time schedule, acceptable to the Executive Officer, based on the results of the report submitted pursuant to Task 4.d.	July 1, 2001

This permit establishes a water quality based effluent limit of 0.012 µg/L for which compliance will be required within seven years of the effective date of this permit. This limit may be revised in response to site specific objective and TMDL studies to be conducted prior to the final compliance date. The Board intends to hold a hearing to consider the results of these studies, and determine

whether adequate information exists upon which to adopt a final concentration or mass based mercury limit. The Board may adopt a revised interim limit, and/or schedules to require the discharger to conduct and/or participate in additional studies necessary to support development of a different limit. (Note: If mercury effluent concentrations are consistently maintained below 0.012 μg/L, these source control tasks are not required.) If the TMDL efforts are delayed by either the USEPA, the State Board or the Regional Board, then this seven-year time schedule will be revised and extended up to an additional three years.

5. **Mercury Mass Loading Reduction**

If mass loading for Hg exceeds the trigger level specified in B.8 of this Order, then the following actions shall be initiated and subsequent reports shall include but not be limited to the following:

I. Notification: Any exceedance of the trigger specified in Effluent Limitation B.8 shall be reported to the Regional Board in accordance with Section E.6.b. in the Standard Provisions and Reporting Requirements (August, 1993).
II. Identification of the problem: Resample to verify the increase in loading. If resampling confirms that the mass loading trigger has been exceeded, determine whether the exceedance is flow or concentration-related. If the exceedance is flow related, identify whether it related to changes in reclamation, increase in the number of sewer connections, increases in infiltration and inflow (I/I), wet weather conditions, or unknown sources. If the exceedance is concentration-related, identify whether it is related to industrial, commercial, residential, or unknown sources.
III. Investigation of corrective action: Investigate the feasibility of the following actions: • Improving public education and outreach • Reducing inflow and infiltration (I/I) • Increasing reclamation Develop a plan and time schedule, acceptable to the Executive Officer to implement all reasonable actions to maintain mercury mass loadings at or below the mass loading trigger contained in Effluent Limitation B.8.
IV. Investigation of additional prevention measures: In the event the exceedance is related to growth and the plan required under III is not expected to keep mercury loads below the mass load trigger, work with the local planning department to investigate the feasibility and potential benefits of requiring water conservation, reclamation, and dual plumbing for new development.

6. **Compliance with Acute Toxicity Effluent Limitation**

Compliance with Effluent Limitation B.5 (Acute Toxicity) of this Order shall be evaluated by measuring survival of test fish exposed to undiluted effluent for 96 hours in flow-through bioassays. The species to be used is identified in the Self-Monitoring Program.

The discharger shall conduct a special study to measure survival of rainbow trout exposed to undiluted combined effluent. These tests can be conducted using either flow-through or static renewal bioassays. The survival of three-spine stickleback, fathead minnow, and rainbow trout should be measured concurrently, by conducting one test per month for four months during the discharge period. The discharger shall submit test data acceptable to the Executive Officer, within 1 year after adoption of this Order. The Executive Officer shall specify the fish to be used for testing, depending upon the outcome of the screening tests.

All bioassays shall be performed according to protocols approved by the USEPA or State Board, or published by the American Society for Testing and Materials (ASTM) or American Public Health Association. The discharger is allowed to continue using the current test protocols until further guidance is provided by SWRCB or Board staff on conducting the new tests and interpreting the compliance results compared to current test results.

7. **TRE for Chronic Toxicity**

If there is a consistent exceedance of either of the chronic toxicity monitoring triggers, the discharger shall implement a TRE in accordance with a TRE work plan acceptable to the Executive Officer. The TRE shall be initiated within 15 days of the date that consistent exceedance is found to exist. TREs need to be site specific but should follow USEPA guidance and be conducted in a step-wise fashion. Tier I includes basic data collection, followed by Tier 2 which evaluates optimization of the treatment system operation, facility housekeeping, and the selection and use of in-plant process chemicals.

If unsuccessful in reducing toxicity, Tier 3, a Toxicity Identification Evaluation (TIE) should be initiated and all reasonable efforts using currently available TIE methodologies employed. Assuming successful identification or characterization of the toxicant(s), Tier 4 is to evaluate final effluent treatment options and Tier 5 is to evaluate within plant treatment options. Tier 6 consists of follow-up and confirmation once the toxicity control method has been selected and implemented.

Many recommended TRE elements parallel source control, pollution prevention, and storm water control program best management practices (BMPs). To prevent duplication of effort, evidence of complying with those requirements may be sufficient to comply with TRE requirements if the pollutants targeted by those programs are suspected to be the cause of the chronic toxicity. Support for this may include results of a Phase I TIE or other data as acceptable to the Executive Officer. By requiring the first steps of a TRE to be accelerated testing and review of the facility's TRE workplan, a TRE may be ended in its early stages.

Monitoring for chronic toxicity is required in three separate stages: routine, accelerated for confirmation, and monitoring under TRE. The monitoring under TRE will be specified in the TRE workplan.

The Board recognizes that identification of causes of chronic toxicity may not be successful in all cases. Consideration of enforcement action by the Board will be based in part on the discharger's actions in identifying and reducing sources of consistent toxicity.

8. **Screening Phase for Chronic Toxicity**

The discharger shall conduct screening phase compliance monitoring as described in the Self-Monitoring Program under either of these two conditions:

a. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to pretreatment, source control, and waste minimization efforts; or

b. Prior to Permit reissuance, except when the discharger is conducting a TRE/TIE. Screening phase

monitoring data shall be included in the application for Permit reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within five years before the Permit expiration date.

The discharger shall conduct screening phase compliance monitoring in accordance with a proposal submitted to, and acceptable to, the Executive Officer. The proposal shall contain, at a minimum, the elements specified in Part B of the Self-Monitoring Program of this Order, or alternatives as approved by the Executive Officer. The purpose of the screening is to determine the most sensitive test species for subsequent routine compliance monitoring for chronic toxicity.

9. Total Suspended Solids and Schedule

The discharger shall evaluate options for reducing suspended solids concentrations in their effluent. A report documenting the results of this evaluation shall be acceptable to the Executive Officer, and shall include a proposed methodology for suspended solids reduction.

Tasks	Compliance Date
a. The discharger shall submit a report, acceptable to the Executive Officer, documenting efforts made to reduce suspended solids concentrations in their effluent. This may include actions implemented based on recommendations made in the March 1988 pond study. The feasibility of further reduction shall also be discussed.	September 1, 2000
b. The discharger shall evaluate options for further reducing suspended solids concentrations in their effluent. A report, acceptable to the Executive Officer, documenting the results of this evaluation , proposing a methodology for suspended solids reduction.	April 1, 2001

10. Cyanide Reduction Study and Schedule

The discharger shall conduct a study to evaluate cyanide removals, possible generation within its treatment process, and possible analytical interferences per the findings, and in accordance with the following tasks and time schedule:

Tasks	Compliance Date
a. Submit a study plan, acceptable to the Executive Officer, for investigation source control options and treatment options to reduce cyanide concentrations in the treated effluent. The study plan shall include, but not be limited to, a technical analysis of cyanide removals across the Plant, and its potential for generating cyanide, as well as an evaluation of feasible source control measures to reduce influent cyanide concentrations, alternative treatment measures to reduce cyanide in treated effluent and alternate analytical methods to eliminate artificial results.	June 1, 1999
b. Following approval by the Executive Officer commence work in accordance with the study plan and time schedule submitted pursuant to Task 10.a.	60 days after EO approval
c. Submit a final report documenting the results of the study described in Task 10.a. The report shall include recommendations and an implementation time schedule on feasible source control measures to reduce	December 1, 2000

influent cyanide concentrations, alternate treatment measures to reduce cyanide in treated effluent, and alternate analytical methods to eliminate artifactual results. Influent and effluent concentration data shall be reported in both the monthly and annual self-monitoring reports.	

11. Lindane Reduction Study and Schedule

The discharger shall assess the feasibility of attaining the US EPA national criterion of 0.16 µg/L as described in the Findings. This evaluation shall consider reductions in Lindane effluent concentrations achieved through source control and economically feasible optimization of treatment plant removal efficiency. The discharger shall conduct a study, based on increased monitoring, to more accurately determine when and at what concentrations Lindane is present in the effluent.

Tasks	Compliance Date
a. The discharger shall submit a report, acceptable to the Executive Officer, documenting the results of increased monitoring for Lindane in the effluent. The feasibility of reducing Lindane concentrations in the effluent from either source control or treatment plant removal shall also be discussed.	November 1, 1999
b. Based on the results of Task 11.a, the discharger shall investigate and evaluate options for further reducing Lindane concentrations in their effluent. A report, acceptable to the Executive Officer, documenting the results of this evaluation and submitting a proposal of methods that could be used to further reduce Lindane concentrations.	November 1, 2000

12. Status Reports on New or Upgraded Facility

The discharger shall submit annual status reports on October 31 of each year. These reports shall be submitted at least annually until the new or upgraded facility is fully operational, and this permit amended to incorporate new information relevant to the plant. These status reports shall provide detailed discussion of progress made towards finalization of design, construction, and permitting of the new or upgraded facility, along with projected time schedules for future actions.

13. PAH and Other Organic Compounds Detection Limits

If the analytical methods for PAHs, or other organic compounds are improved or new methods developed which lower the analytical quantification limit below that specified in the Self-Monitoring Program, and the discharger, using the new or improved methods, finds these constituents consistently present at levels above their respective water quality objectives, the discharger shall notify the Executive Officer. The discharger shall also accelerate monitoring for these constituents to characterize the discharge, and, within 90 days develop and initiate a source identification and reduction investigation acceptable to the Executive Officer. During this time, compliance shall be determined at the former analytical quantification limit specified in the Self-Monitoring Program. "Consistently" as stated above is defined as present at levels above the respective objective in more than two consecutive monitoring events.

The discharger shall participate in a regional study to determine if alternative analytical methods with lower detection levels for PAHs and other organic compounds are currently available through

commercial laboratories. To the extent that non-EPA approved (40CFR136) methods are used, the results will not be used for compliance purposes.

Furthermore, if one of the following eight PAHs is found at levels equal to or greater than the practicable quantitation limit (PQL), then the discharger shall accelerate monitoring to one sample per month for each of the eight PAHs. The PQL shall be five times the method detection limit, which is presently 0.8 µg/L. If any of the eight PAHs is detected consistently for three consecutive months at or above the PQL, then the discharger shall notify the Executive Officer, accelerate monitoring, and initiate a source identification and reduction investigation. This program will include an investigation and evaluation of the collection system and pretreatment program.

Constituent	Unit	Detection Level	Monthly Average Effluent Limit
1,2-Benzanthracene	µg/L	0.8	0.049
3,4-Benzofluoranthene	µg/L	0.8	0.049
Benzo[k]fluoranthene	µg/L	0.8	0.049
1,12-Benzoperylene	µg/L	0.8	0.049
Benzo[a]pyrene	µg/L	0.8	0.049
Chrysene	µg/L	0.8	0.049
Dibenzo[a,h]anthracene	µg/L	0.8	0.049
Indeno[1,2,3-cd]pyrene	µg/L	0.8	0.049

14. Storm Water Pollution Prevention Plan

The discharger shall continue to implement their Storm Water Pollution Prevention Plan (SWPP) in accordance with the attached "Standard Storm Water Provisions". The SWPP plan shall be reviewed and updated as appropriate by October 1, every year. Full compliance with the "Standard Storm Water Provisions" shall be an enforceable requirement of this permit. The SWPP shall include a stormwater monitoring program, designed to meet the following objectives:

a. To monitor the quality of storm water discharges relative to Discharge Prohibitions, Effluent Limitations, and Receiving Water Limitations.

b. To aid in the implementation of the Storm Water Pollution Prevention Plan.

c. To measure the effectiveness of control measures and management practices in removing pollutants in storm water discharge.

15. Pretreatment Program

The discharger shall implement and enforce its approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR Part 403), pretreatment standards promulgated under Sections 307(b), 307(c) and 307(d) of the Clean Water Act, and this Board's Order No. 95-015 with all amendments and revisions thereafter. The discharger's responsibilities include but are not limited to:

a. Enforcement of National Pretreatment Standards of 40 CFR 403.5 and 403.6;

b. Implementation of its pretreatment program in accordance with legal authorities, policies, procedures, and financial provisions described in the General Pretreatment regulations (40 CFR Part 403) and its approved pretreatment program;

c. Submission of annual and semi-annual reports to USEPA and the State as described in Board Order No. 95-015 and its amendments or revisions thereafter.

The discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this permit. If the discharger fails to perform the pretreatment functions, the Regional Water Quality Control Board (RWQCB), the State Water Resources Control Board (SWRCB) or U.S. Environmental Protection Agency (USEPA) may take enforcement actions against the discharger as authorized by the Clean Water Act.

16. **Pollution Prevention Program**

The discharger shall continue to participate in the Pollution Prevention Program, and shall continue to implement and expand its existing Pollution Prevention Program in order to reduce the loadings of targeted constituents to the treatment plant and, subsequently, to the receiving waters.

The discharger shall continue to submit annual reports by January 15th and progress reports by July 15th of each year that are acceptable to the Executive Officer. The reports should include (1) documentation of its efforts and progress, (2) evaluation of the program's accomplishments, and (3) identification of specific tasks and time schedules for future efforts. Duplicate copies of the reports shall be provided: one to the Board's NPDES Permit Case Handler and one to the Board's Pollution Prevention Coordinator.

17. **Operations and Maintenance Procedures**

The discharger shall review, and update as necessary, its Operations and Maintenance Procedures, annually, or within a reasonable time period after completion of any significant facility or process changes. The report describing the results of the review process including an estimated time schedule for completion of any revisions determined necessary, and a description or copy of any completed revisions, shall be submitted to the Board as part of the Annual Report, as described in Section F.5, Part A, of the attached Self-Monitoring Program.

18. **Contingency Plan**

Annually, the discharger shall review and update as necessary, its Contingency Plan as required by Board Resolution 74-10. The discharge of pollutants in violation of this Order where the discharger has failed to develop and/or adequately implement a contingency plan will be the basis for considering such discharge a willful and negligent violation of this Order pursuant to Section 13387 of the California Water Code. Plan revisions, or a letter stating that no changes are needed, shall be submitted to the Board as a part of the Annual Report, as described in Section F.5, Part A, of the attached Self-Monitoring Program.

19. Wastewater Facilities Management

The discharger shall regularly review and evaluate its wastewater collection, treatment and disposal facilities in order to ensure that all facilities are adequately staffed, supervised financed, operated,

maintained, repaired, and upgraded as necessary, in order to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the discharger's service responsibilities.

20. Self-Monitoring Program

The discharger shall comply with the Self-Monitoring Program for this order, as adopted by the Board and as may be amended by the Executive Officer.

21. Standard Provisions

The discharger shall comply with all applicable items of the attached "Standard Provisions and Reporting Requirements" dated August 1993, or any amendments thereafter, including Section A.12 concerning bypasses.

22. Change in Control or Ownership

In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation of this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. (Refer to Standard Provisions, referenced above). The request must contain the requesting entity's full legal name, the address and telephone number of the persons responsible for contact with the Board and a statement. The statement shall comply with the signatory paragraph described in Standard Provisions and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.

23. Reopener

The Board may modify, or revoke and reissue, this Order and Permit if present or future investigations demonstrate that the discharge(s) governed by this Order will cause, have the potential to cause, or will contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters.

24. Order Expiration

This Order expires on July 15, 2003. The discharger must file a Report of Waste Discharge in accordance with Title 23 of the California Administrative Code not later than 180 days before this expiration date as application for reissuance of waste discharge requirements.

25. Effective Date of Permit

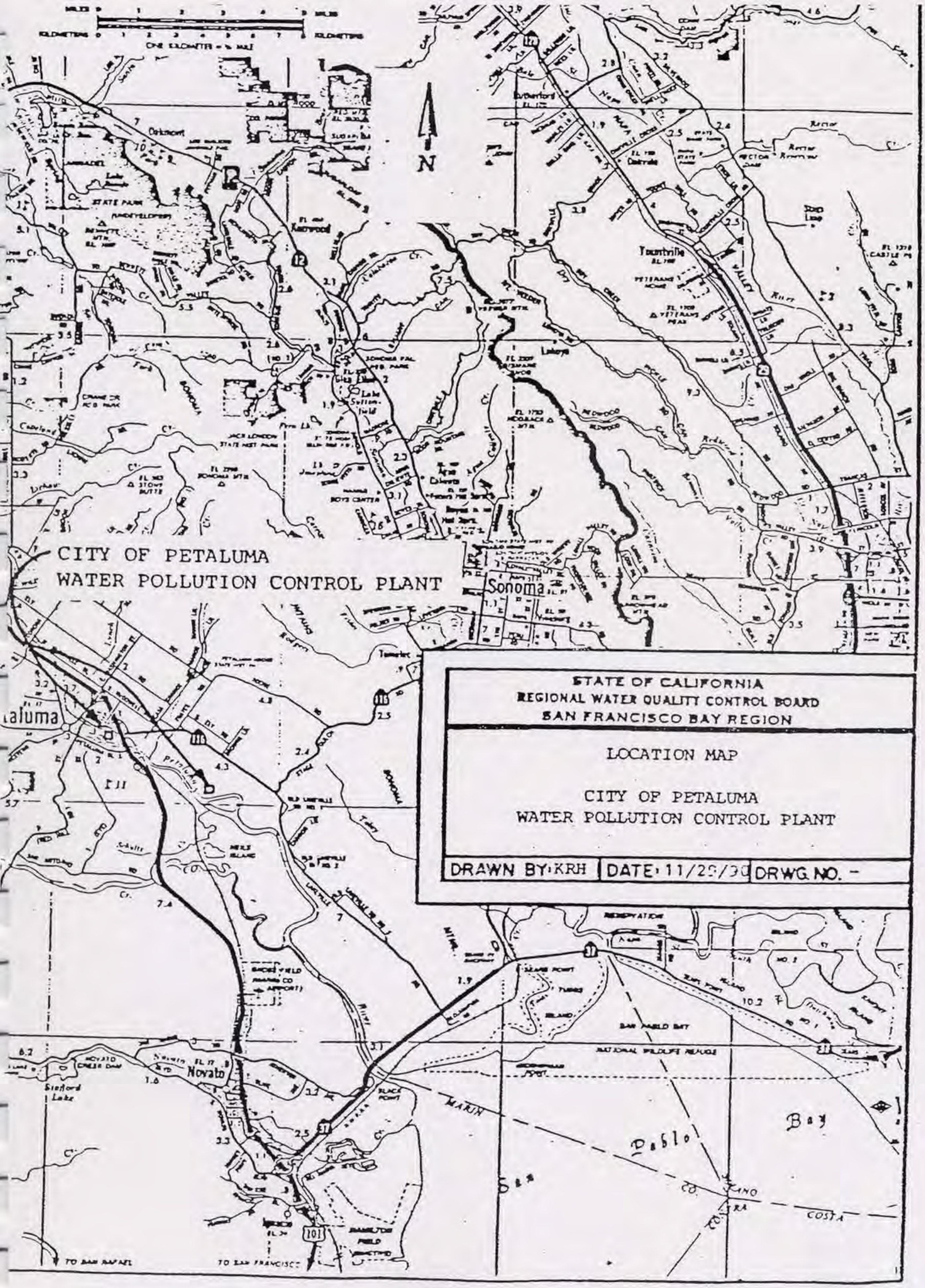
This Order shall serve as a National Pollutant Discharge Elimination System permit pursuant to Section 402 of the Clean Water Act or amendments thereto, and shall become effective on the date of adoption provided the Regional Administrator, United States Environmental Protection Agency, has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

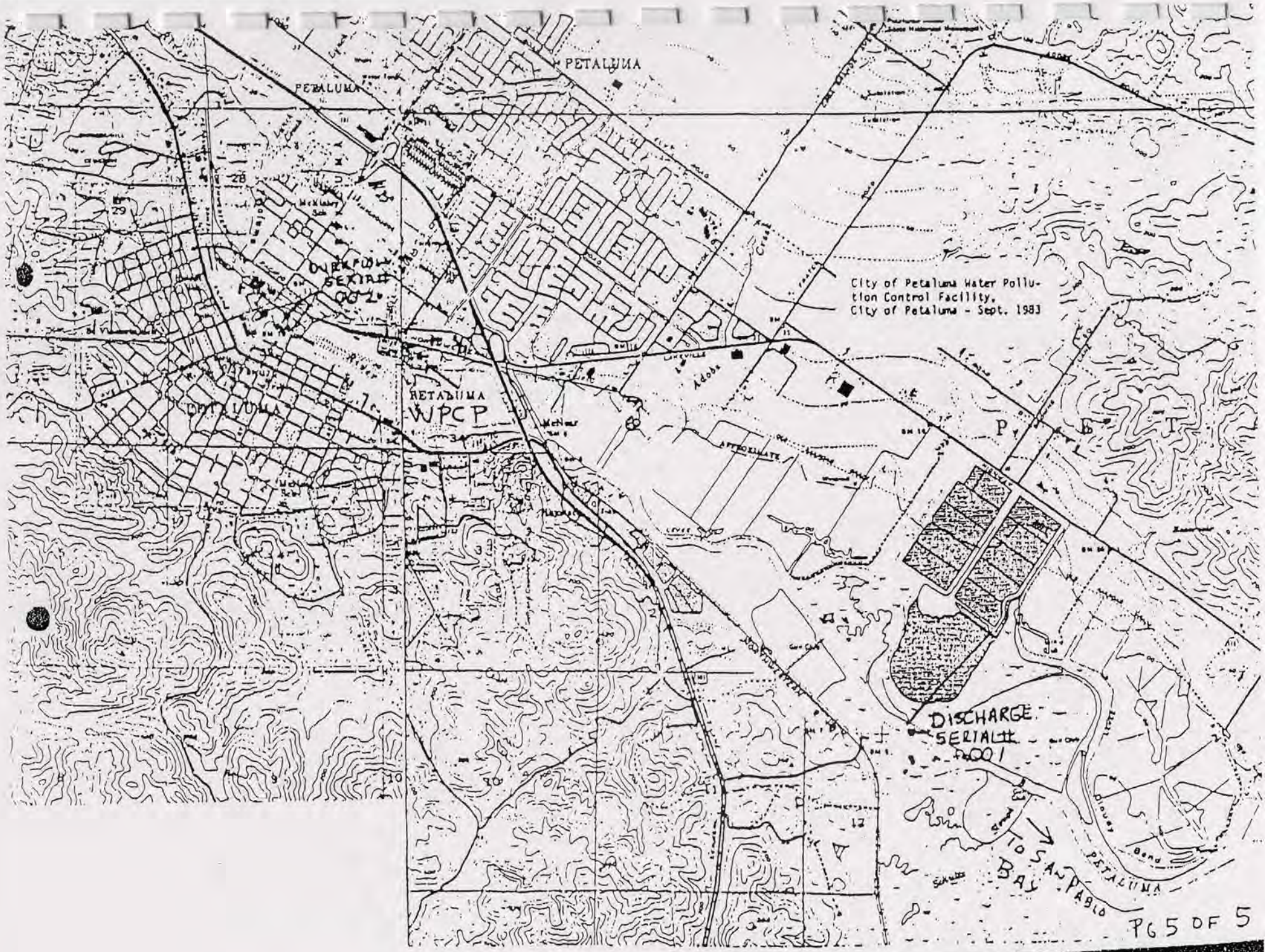
I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 15, 1998.

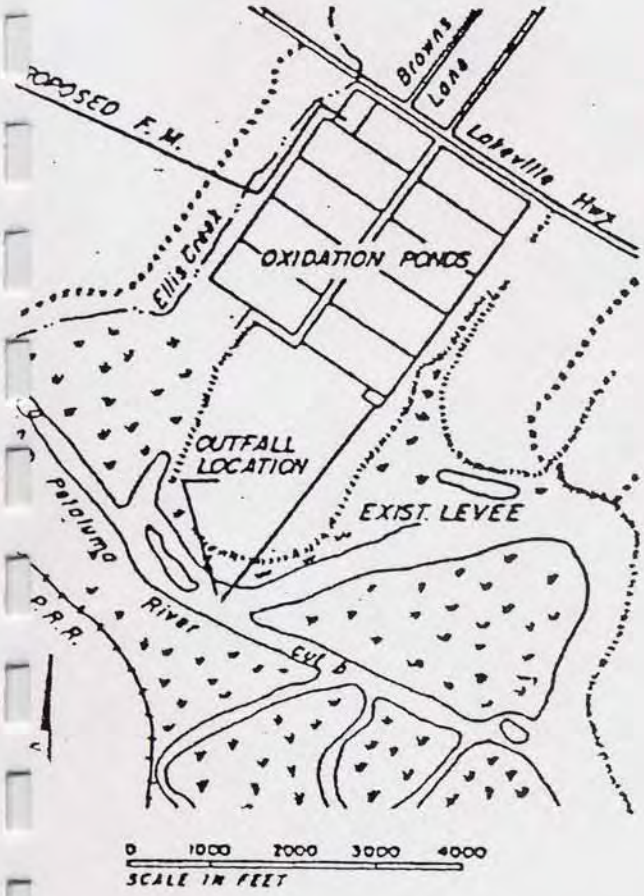
for LORETTA K. BARSAMIAN
Executive Officer

Attachments:

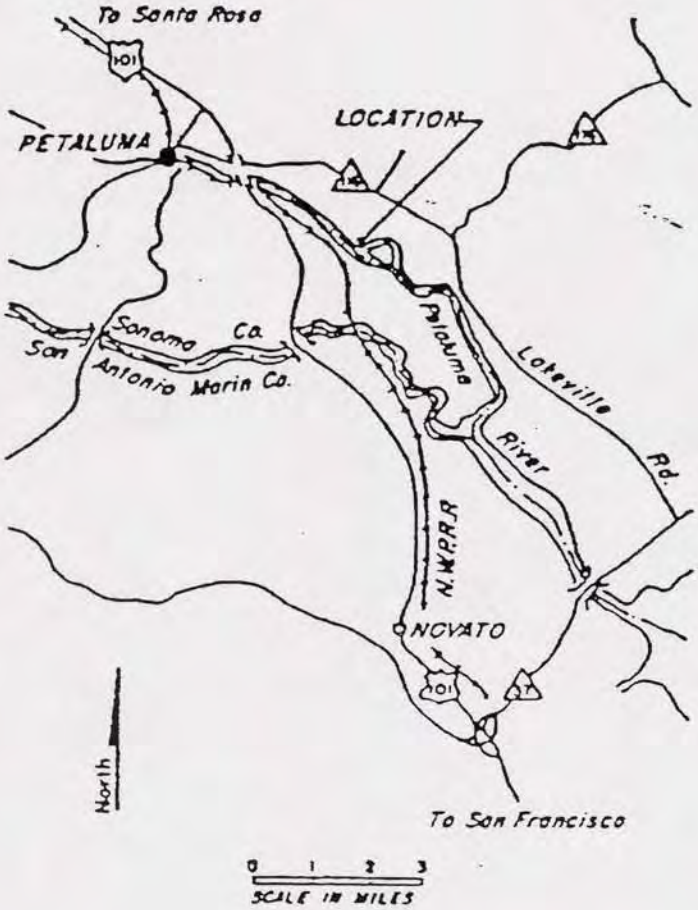
A. Location Map
B. Wastewater Process Schematic
C. Self-Monitoring Program
D. Standard Provisions and Reporting Requirements - August 1993


CITY OF PETALUMA
WATER POLLUTION CONTROL PLANT
STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
LOCATION MAP
CITY OF PETALUMA
WATER POLLUTION CONTROL PLANT
DRAWN BY: KRH
DATE: 11/29/90
DRWG. NO. -
N
Sonoma
Novato
Kenwood
Yountville
TO SAN RAFAEL
TO SAN FRANCISCO
Bay


PETALUMA
PETALUMA
PETALUMA
WPCP
City of Petaluma Water Pollution Control Facility.
City of Petaluma - Sept. 1983
DISCHARGE
SERIAL #
TO SAN PABLO
BAY
PETALUMA
PETALUMA

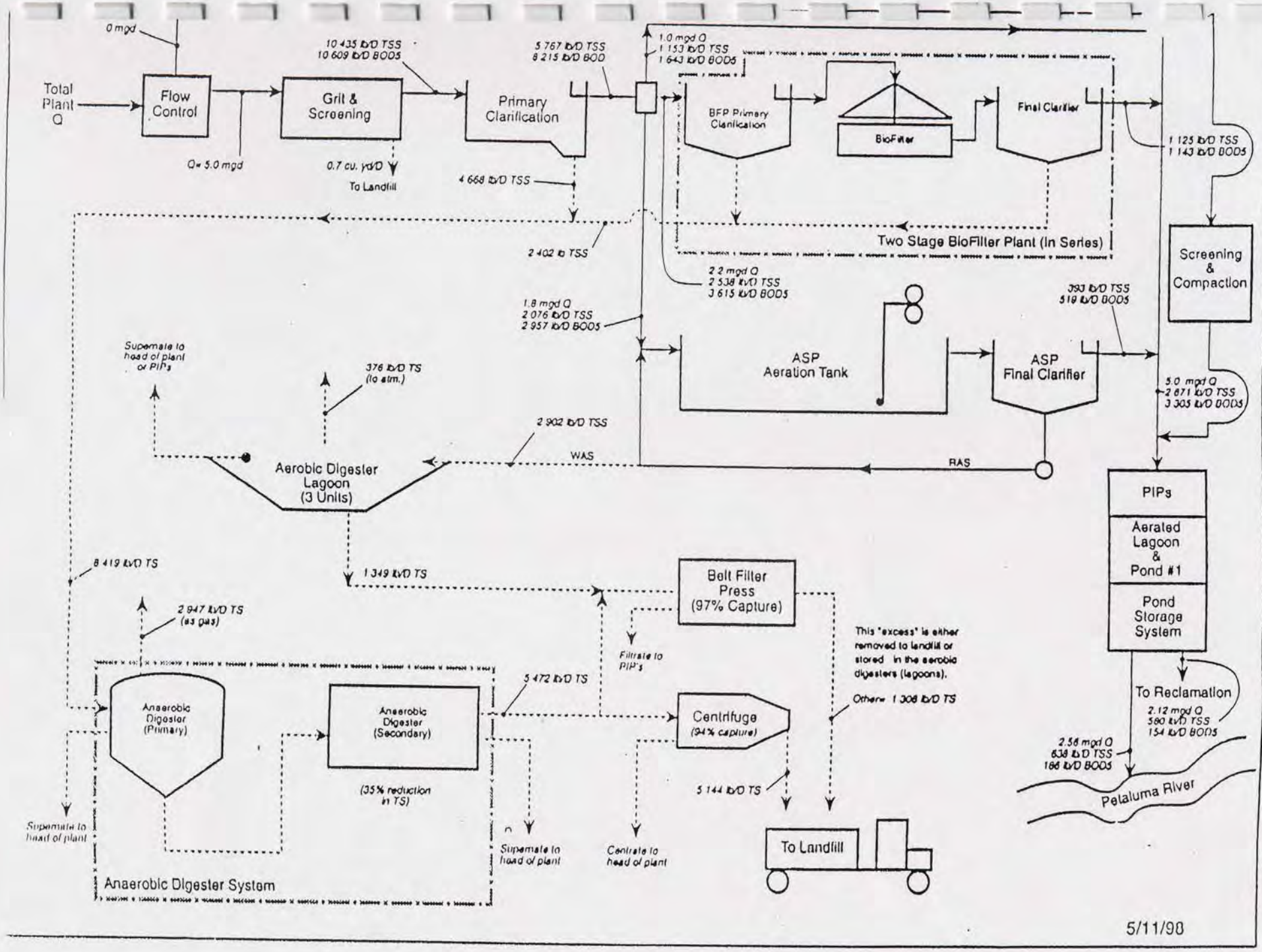


LOCATION MAP



VICINITY MAP

STE DISCHARGE LOCATION #001 Figure 2-1


0 mgd
Total Plant Q
Flow Control
Q= 5.0 mgd
Grit & Screening
0.7 cu. yd/D
To Landfill
10 435 lb/D TSS
10 609 lb/D BOD5
Primary Clarification
5 767 lb/D TSS
8 215 lb/D BOD
4 668 lb/D TSS
2 402 lb TSS
1.0 mgd Q
1 153 lb/D TSS
1 643 lb/D BOD5
BFP Primary Clarification
BioFilter
Final Clarifier
1 125 lb/D TSS
1 143 lb/D BOD5
Two Stage BioFilter Plant (In Series)
2.2 mgd Q
2 538 lb/D TSS
3 615 lb/D BOD5
Screening & Compaction
1.8 mgd Q
2 076 lb/D TSS
2 957 lb/D BOD5
393 lb/D TSS
519 lb/D BOD5
ASP Aeration Tank
ASP Final Clarifier
5.0 mgd Q
2 871 lb/D TSS
3 305 lb/D BOD5
Supernate to head of plant or PIPs
376 lb/D TS (to atm.)
2 902 lb/D TSS
WAS
RAS
Aerobic Digester Lagoon (3 Units)
PIPs
Aerated Lagoon & Pond #1
Pond Storage System
8 419 lb/D TS
1 349 lb/D TS
Belt Filter Press (97% Capture)
2 947 lb/D TS (as gas)
Filtrate to PIP's
This "excess" is either removed to landfill or stored in the aerobic digesters (lagoons).
Other= 1 308 lb/D TS
5 472 lb/D TS
Anaerobic Digester (Primary)
Anaerobic Digester (Secondary)
(35% reduction in TS)
Centrifuge (94% capture)
To Reclamation
2.12 mgd Q
590 lb/D TSS
154 lb/D BOD5
2.56 mgd Q
638 lb/D TSS
166 lb/D BOD5
Petaluma River
5 144 lb/D TS
Supernate to head of plant
Supernate to head of plant
Centrate to head of plant
To Landfill
Anaerobic Digester System
5/11/98

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

CITY OF PETALUMA
WATER POLLUTION CONTROL PLANT
SONOMA COUNTY

NPDES NO. CA0037810
ORDER NO. 98-076

CONSISTS OF

PART A (August 1993)
PART B
SELF-MONITORING PROGRAM
PART B

CITY OF PETALUMA
WATER POLLUTION CONTROL PLANT

I. DESCRIPTION OF SAMPLING STATIONS

A. INFLUENT

Station	Description
A-001	At any point in the treatment facilities headworks at which all waste tributary to the system is present, and preceding any phase of treatment.

B. EFFLUENT

Station	Description
E-001	At any point in the outfall from the treatment facilities between the point of discharge and the point at which all flow tributary to that outfall is present. (May be the same as E-001-D).

E-001-D	At any point in the disinfection facilities for flow E-001, at which point adequate contact with the disinfectant is assured.
E-001-S	At any point in the treatment and disposal facilities following dechlorination.

C. RECEIVING WATERS

Station	Description
C-1	At a point in the Petaluma River directly above the center of the diffuser.
C-2A C-2B	At points in the Petaluma River located 500 upstream and downstream, respectively, of the center of the diffuser.
C-R	At a point in the Petaluma River located 2,000 feet downstream from the diffuser.

D. LAND OBSERVATIONS

Station	Description
P-1 through P-'n'	Located along the corners and midpoints of the perimeter of the waste treatment facilities at equidistant intervals, not to exceed 200 feet. (A sketch showing the locations of these stations will accompany each annual report).

E. OVERFLOWS AND BYPASSES

Station	Description
O-1 through O-'n'	At points in the collection system including manholes, pump stations, or any other location where overflows and bypasses occur.

F. SLUDGE

The discharger shall chemically analyze sludge as necessary to comply with requirements for landfill disposal, or for reuse and/or disposal of sludge ash.

II. CHRONIC TOXICITY MONITORING REQUIREMENT

A. Test Species and Frequency: The discharger shall collect 24-hour composite samples of treatment plant effluent at the compliance point station specified in Table 1 of this Self-Monitoring Program, for critical life stage toxicity testing as indicated below. For

toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

Test Species	Frequency
Mysidopsis bahia (Mysid shrimp), or *Pimephales promelas* (Fathead minnow)	Quarterly (during discharge season)

B. Conditions for Accelerated Monitoring: The discharger shall accelerate the frequency of monitoring to monthly (or as otherwise specified by the Executive Officer) when there is an exceedance of either of the following conditions:

1. three sample median value of 10 TUc, or
2. single sample maximum value of 20 TUc

C. Methodology: Sample collection, handling and preservation shall be in accordance with EPA protocols. The test methodology used shall be in accordance with the references cited in the Permit, or as approved by the Executive Officer. A concurrent reference toxicant test shall be performed for each test.

D. Dilution Series: The discharger shall conduct tests at 50%, 25%, 10%, 5%, and 2.5%. The "%" represents percent effluent as discharged.

III. CHRONIC TOXICITY REPORTING REQUIREMENTS

A. Routine Reporting: Toxicity test results for the current reporting period shall include at a minimum, for each test

1. sample date(s)
2. test initiation date
3. test species
4. end point values for each dilution (e.g. number of young, growth rate, percent survival)
5. NOEC value(s) in percent effluent
6. IC_{15}, IC_{25}, IC_{40}, and IC_{50} values (or EC_{15}, EC_{25} ... etc.) in percent effluent
7. TUc values (100/NOEC, $100/IC_{25}$, and $100/EC_{25}$)
8. Mean percent mortality ($\pm$s.d.) after 96 hours in 100% effluent (if applicable)
9. NOEC and LOEC values for reference toxicant test(s)
10. IC_{50} or EC_{50} value(s) for reference toxicant test(s)
11. Available water quality measurements for each test (ex. pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

B. Compliance Summary: The results of the chronic toxicity testing shall be provided in the most recent self-monitoring report and shall include a summary table of chronic toxicity data from at least eleven of the most recent samples. The information in the table shall include the items listed above under Section A item numbers 1, 3, 5, 6(IC_{25} or EC_{25}), 7, and 8.

C. Reporting Raw Data in Electronic Format: The discharger shall report all chronic toxicity data upon completion of chronic toxicity testing in the format specified in "Suggested

Standardized Reporting Requirements for Monitoring Chronic Toxicity," February 1993, SWRCB. The data shall be submitted in either high or low density, double sided 3.5-inch floppy diskettes.

IV. SCHEDULE OF SAMPLING AND ANALYSIS

A. The schedule of sampling and analysis shall be that given in Table 1 (attached).

B. Sample collection, storage, and analyses shall be performed according to requirements in the latest 40 CFR 136, in the Permit, or as specified by the Executive Officer.

V. REPORTING REQUIREMENTS

A. General Reporting Requirements are described in Section E of the Board's "Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits", dated August 1993.

B. Self-Monitoring Reports for each calendar month shall be submitted monthly, by the twentieth day of the following month in accordance with Section F.4 of Part A.

C. An Annual Report for each calendar year shall be submitted to the Board within 60 days after the end of the year. The required contents of the annual report are described in Section F.5 of Part A.

D. Any overflow in excess of 1,000 gallons, any bypass, or any significant non-compliance incident that may endanger health or the environment shall be reported in accordance with Sections F.1 and F.2 of Part A as modified below, and any additional reporting guidance as may be provided by Board staff. Written reporting requirements for collection system spills and overflows may be satisfied by submittal of summary information with the monthly report.

E. Flow Monitoring and Reporting.

a. Influent and Effluent (A-001, E-001, E-001-D and E-001-S):
Flows shall be measured continuously, and recorded and reported daily. The following information shall also be reported, for each calendar month: Average, Maximum and Minimum Daily Flows (mgd).

F. BOD and TSS Percent Removal.
Percent removal for BOD and TSS shall be reported for each calendar month, in accordance with Effluent Limitation B.4.

G. Collection system sewage spills and overflows where the estimated quantity is over 100 gallons shall be reported in each monthly report. Summary information for each spill or overflow shall include the date, time, duration, location, estimated volume, cause, and any sampling data collected.

VI. MODIFICATIONS TO PART A & STANDARD PROVISIONS AND REPORTING REQUIREMENTS

A. This monitoring program does not include the following sections of Part A: C.3, C.5, and E.3.

B. The second sentence of Section F.1, Spill Reports, is revised to read as follows: "Spills shall be reported to this Regional Board (510-286-1255 on weekdays during office hours from 8 a.m. to 5 p.m.), and to the Office of Emergency Services (800- 852-7550 during non office hours) immediately after the occurrence.

Section F.1.b is revised to read: "Best estimate of volume involved".
Section F.1.d is revised to read: "Cause of spill or overflow".
Section F.1.i is revised to read: "Agencies or persons notified".

C. Section G, Definitions, No. 14, Overflows is revised to read as follows: "Overflow is defined as the intentional or unintentional spilling or forcing out of untreated or partially treated wastes from a collection or transport system (e.g. collection points, sewer system manholes, pump stations) upstream from the treatment plant headworks caused by excess flows, capacity restrictions, stoppages (obstructions, blockages, and/or structural failure), and the actions of others."

VII. MISCELLANEOUS REPORTING

A. The discharger shall retain and submit (when required by the Executive Officer) the following information concerning the monitoring program for organic and metallic pollutants.

a. Description of sample stations, times, and procedures.

b. Description of sample containers, storage, and holding time prior to analysis.

c. Quality assurance procedures together with any test results for replicate samples, sample blanks, and any quality assurance tests, and the recovery percentages for the internal surrogate standard.

B. The discharger shall submit in the monthly self-monitoring report the metallic and organic test results together with the detection limits (including unidentified peaks). All unidentified (non-Priority Pollutant) peaks detected in the USEPA 624, 625 test methods shall be identified and semi-quantified. Hydrocarbons detected at <10 μg/L based on the nearest internal standard may be appropriately grouped and identified together as aliphatic, aromatic and unsaturated hydrocarbons. All other hydrocarbons detected at > 10 μg/L based on the nearest internal standard shall be identified and semi-quantified.

I, Loretta K. Barsamian, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Order No. 98-076.

2. Is effective on the date shown below.

3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger and revisions will be ordered by the Executive Officer, pursuant to 40 CFR 122.62 and 124.4.

for LORETTA K. BARSAMIAN
Executive Officer

Effective Date: July 15, 1998

Attachments:
Table 1 - Schedule of Sampling, Measurement and Analysis Part A, dated August 1993
A. Chronic Toxicity Definition of Terms
B. Chronic Toxicity Screening Phase Monitoring Requirements

CITY OF PETALUMA
WATER POLLUTION CONTROL PLANT
NPDES Permit No. CA0037810
Self-Monitoring Program, Attachment A

TABLE 1

SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSIS [1]

Sampling Station:	A-1	E-001			E-001- S			P	C	O
Type of Sample: Parameter (units) [notes]	C-24 [1]	G [2]	C-24 [2]	Co [2]	G [2]	C-2 [2]	Co [2]	Ob [1]	G[2]	Ob [1]
Flow Rate (mgd) [3]	D			D						
BOD_5 (mg/L & kg/d) [4]	3/W		3/W							
Total Susp. Solids (mg/l & kg/d) [4]	3/W		3/W							
Chlorine Residual (mg/L) [5]			Cont/2H			Cont/2H				
Settleable Matter (ml/L-hr)		D								
Oil & Grease (mg/L & kg/d) [6]		M								
Total Coliform (MPN/100 ml)					5/W					
Acute Toxicity (% Surv.) [7]						M				
Chronic Toxicity [8]						3M				
Ammonia Nitrogen (mg/L & kg/d)					M				M	
Conductivity (µmhos/cm)									M	
Unionized Ammonia (mg/l as N) [9]									M	
Turbidity (NTU)					M				M	
pH (units)					D				M	
Temperature (°C)					D				M	
Dissolved Oxygen (mg/l & % Sat)					D				M	
Sulfides, Total & Dissolved (mg/L/l) (if D.O. < 2.0 mg/L/l)					D				M	
Hardness (mg/L/l as $CaCO_3$)									M	
Total Dissolved Solids (mg/L/l)									M	
Chlorophyll-a (ug/L/l)									M	
All Applicable Standard Observations								M	M	E

Sampling Station:	A-1	E-001			E-001- S			L	C	O
Type of Sample: Parameter (units) [notes]	C-24	G	C-24	Co	G	C-24	Co	Ob	G	Ob
Arsenic (µg/L & kg/d)	Q		Q							
Cadmium (µg/L & kg/d)	M		M							
Chromium VI (µg/L & kg/d)	M		M							
Copper (µg/L & kg/month)	M		M							
Cyanide (µg/L & kg/d)	M		M							
Lead (µg/L & kg/d)	M		M							
Mercury (µg/L & kg/month)	M		M							
Nickel (µg/L & kg/d)	M		M							
Selenium (µg/L & kg/d)	Q		Q							
Silver (µg/L & kg/d)	Q		Q							
Zinc (µg/L & kg/d)	Q		Q							
Table 1A Constituents [6]			As indicated on Table 1A (Attached)							

LEGEND FOR TABLE 1:

Types of Samples

Co = Continuous
C-24 = 24-hour composite
G = Grab
Ob = Observations

Types of Stations

A = Treatment Plant Influent
E = Treatment Plant Effluent
O = Overflow and Bypass Points
P = Treatment Facility Perimeters
C = Receiving Water
L = Pond Levee Stations

Frequency of Sampling

D = Once each day
W = Once each week
M = Once each month
A = Once each year
Q = Once each calendar quarter (with with at least two month intervals)
E = Each occurrence
3/W = 3 days per week
2H = Every 2 hours
2M = Every 2 months
3M = Every 3 months

TABLE 1A

Monitoring Frequency for Priority Pollutants [10]

Constituent	Frequency	Notes/Comment
1, 2 - Dichlorobenzene	Q	
1, 3 - Dichlorobenzene	Q	
1, 4 - Dichlorobenzene	Q	
2, 4 - Dichlorophenol	Q	

2, 4, 6 - Trichlorophenol	Q
4 - Chloro - 3 - Methylphenol	Q
Aldrin	M
A - BHC	M
Benzene	Q
B - BHC	Q
Chlordane	Q
Chloroform	Q
DDT	Q
Dichloromethane	Q
Dieldrin	M
Diazinon	Q
Endosulfan	Q
Endrin	Q
Fluoranthene	Q
G - BHC (Lindane)	M
Halomethanes	Q
Heptachlor	Q
Heptachlor Epoxide	Q
Hexachlorobenzene	Q
AH's	M [11]
PCB's	Q [12]
Pentachlorophenol	Q
Phenol	Q
TCDD Equivalents	Q [13]
Toluene	Q
Toxaphene	Q
Tributlytin	A

FOOTNOTES FOR TABLE 1 AND TABLE 1A

[1] Indicated sampling is required during the entire year.

[2] Indicated sampling is required during periods when effluent is being discharged to the Petaluma River.

[3] Flow Monitoring: Influent and effluent flows shall be measured continuously, and recorded and reported daily. For influent and effluent flows, the following information shall also be reported, monthly:

Daily:	Daily Flow (MG)
Monthly:	Average Daily Flow (MGD)
Monthly:	Maximum Daily Flow (MGD)
Monthly:	Minimum Daily Flow (MGD)
Monthly:	Total Flow Volume (MG)

[4] The percent removal for BOD and TSS shall be reported for each calendar month, in accordance with Effluent Limitation B.4.

[5] Chlorine Residual: Monitor dechlorinated effluent (E-001-S) continuously or, at a minimum, every 2 hours. Report, on a daily basis, the maximum chlorine residual for samples taken following dechlorination. If a violation is detected, the maximum and average concentrations and duration of each non-zero residual event shall be reported, along with the cause and corrective actions taken.

[6] Oil & Grease: Each Oil and Grease sample shall consist of three grab samples taken at equal intervals, no less than two hours apart, during the sampling day. Each grab sample shall be collected in a separate glass container, and analyzed separately. Results shall be expressed as weighted average of the three values, based upon the instantaneous flow rates occurring at the time of each grab sample.

[7] Bioassays: Effluent used for fish bioassays must be dechlorinated prior to testing. Monitoring of the bioassay water shall include, on a daily basis, the following parameters: pH, dissolved oxygen, ammonia nitrogen, and temperature. These results shall be reported. If a violation of acute toxicity requirements occurs, bioassay testing shall continue back to back until compliance is demonstrated.

The discharger shall use three-spined stickleback and fathead minnow as the compliance species for acute toxicity testing. Rainbow trout may be required as a compliance species, depending upon the outcome of testing pursuant to Provision F.3 of this Order.

[8] Chronic Toxicity: Chronic toxicity shall be monitored twice during each discharge season, with at least three months between the samples. At least one test period shall take place during the first six weeks of discharge.

[9] Monitoring for unionized ammonia, total dissolved solids, hardness, and chlorophyll-a shall only be performed at the following receiving water stations: C-1, C-2A, and C-2B.

[10] Selected Toxic Pollutant Monitoring: Monitoring for these constituents may be done in conjunction with that conducted for the Pretreatment Program; however, in addition to inclusion with Pretreatment submittals, the results shall be submitted with the monthly Self-Monitoring Report for the period of monitoring.

[11] PAHs (Polynuclear Aromatic Hydrocarbons): Polynuclear aromatic hydrocarbons, PAHs, shall be analyzed using the latest version of USEPA Method 610 (8100 or 8300). The discharger shall attempt to achieve the lowest detection limits commercially available. If an analysis cannot achieve a quantification limit for a particular sample at or below the effluent limits for PAHs, the discharger shall provide an explanation in its self-monitoring report. Note that the samples must be collected in amber glass containers. These samples shall be collected for the analysis of the

regulated parameters. An automatic sampler which incorporates glass sample containers, and keeps the samples refrigerated at 4°C, and protected from light during compositing may be used. The 24-hour composite samples may consist of eight grab samples collected at three hour intervals. The analytical laboratory shall remove flow proportioned volumes from each sample vial or container for the analysis.

PAHs shall mean the following constituents. Each constituent shall be limited individually at 0.049 µg/l as indicated below. If any of these PAHs are detected in the quarterly samples, monthly monitoring shall begin.

Constituent [a]	Unit	Monthly Average Effluent Limit [b]
1,2-Benzanthracene	µg/l	0.049
3,4-Benzofluoranthene	µg/l	0.049
Benzo[k]fluoranthene	µg/l	0.049
1,12-Benzoperylene	µg/l	0.049
Benzo[a]pyrene	µg/l	0.049
Chrysene	µg/l	0.049
Dibenzo[a,h]anthracene	µg/l	0.049
Indeno[1,2,3-cd]pyrene	µg/l	0.049

[a] The limit for PAHs, as defined by the Basin Plan, is the sum of about sixteen constituents measured in USEPA Method 610. The NTR, which is based on more updated data, list standards for just eleven of the PAHs measured in Method 610. The USEPA criteria for three of the eleven are higher than the other eight; these are anthracene (NTR objective at 110,000 ppb), fluorene (14,000 ppb), and pyrene (11,000 ppb). Therefore, the PAH limits in the current permit are for the other eight PAHs that may be present in the discharge at concentrations which pose a reasonable potential to contribute to water quality impacts.

[b] USEPA human health criteria calculations from the TSD, with updated cancer potencies (q*) and reference doses (RfD) from the California Office of Environmental Health Hazard Assessment, and in USEPA's Integrated Risk Information System (IRIS). Calculations based on average human body weight of 70 kg, USEPA estimated national average fish consumption of 6.5 g/d, and a 10^{-6} cancer risk level for carcinogens.

12] PCBs: (polychlorinated biphenyls) shall mean the sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254, and Aroclor-1260.

[13] Dioxins: Monitoring for TCDD Equivalents shall be done four times each year during the discharge period over the three year period 1998 through 2000. Thereafter, monitoring frequency shall be as specified by the Executive Officer. TCDD Equivalents shall mean the Chlorinated dibenzodioxins (2,3,7,8 - CDDs) and chlorinated dibenzofurans (2,3,7,8 - CDFs) as listed below. Data submitted shall include detection limits and concentrations of each of the following:

2,3,7,8 - tetra CDD1,2,3,7,8 - penta CDD
1,2,3,4,7,8 - hexa CDDs

1,2,3,4,6,7,8 - hexa CDDs
1,2,3,4,6,7,8 - hepta CDD
Total hepta CDDs
octa CDD
2,3,7,8 -tetra CDF
2,3,4,7,8 -penta CDF
1,2,3,4,7,8 -hexa CDF
1,2,3,6,7,8 -hexa CDF
2,3,4,6,7,8 -hexa CDF
1,2,3,7,8.9 -hexa CDF
Total hexa CDFs
1,2,3,4,6,7,8 -hepta CDF
1,2,3,4,7,8,9 -hepta CDF
Octa CDF"

General Notes

1. Bypass Monitoring: During any time when bypassing occurs from any treatment process (primary, secondary, chlorination, dechlorination, etc.) in the treatment facilities, the self-monitoring program shall include the following sampling and analyses in addition to the Table 1 schedule:

   a. When bypassing occurs from any primary or secondary treatment unit(s), composite samples on an hourly basis for the duration of the bypass event for BOD and TSS analyses, grab samples at least daily for Settleable Matter and Oil and Grease analyses; and continuous monitoring of flow.

   b. When bypassing the chlorination process, grab samples at least daily for fecal coliform analyses; and continuous monitoring of flow.

   c. When bypassing the dechlorination process, grab samples hourly for chlorine residual; and continuous monitoring of flow.

   d. Daily receiving water sampling and observations shall be performed until it is demonstrated that no adverse impact on the receiving water is detected.

2. Percent removal for BOD and TSS (effluent vs. influent) shall also be reported.

3. Grab samples shall be taken on day(s) of composite sampling.

4. If any sample is in violation of limits, sampling frequency shall be increased for that parameter until compliance is demonstrated in two successive samples. Frequency shall be increased as follows:

   - BOD, TSS, Sett. Solids, Coliform: Daily
   - Oil & Grease: Weekly
   - Acute Toxicity: As indicated in Footnote [6]
   - Metals & other priority pollutants: Monthly

5. Chlorine residual analyzers shall be calibrated against grab samples as frequently as necessary to maintain accurate control and reliable operation. If an effluent violation is detected, grab samples shall be taken at a minimum every 30 minutes until compliance is achieved.

6. Acute and chronic toxicity, and pH monitoring shall be conducted using dechlorinated effluent.

7. Grab samples shall be taken for volatile organic compound analyses.

8. Overflows:
   (a) Flow: For all overflow events, a best estimate of the total overflow volume (gallons) shall be reported.

   (b) BOD and Coliform: For any overflow event which involves discharge of wastewater to any surface water or waterway (including dry streams and drainage channels), grab samples shall be taken and analyzed for BOD, and both Total and Fecal Coliform.

9. Receiving water monitoring is to be done by high slack tide sampling.

10. All flow other than to the outfall (e.g. sludge) shall be reported monthly. Daily records shall be kept of the quantity and solids content of dewatered sludge disposed of and the location of disposal.

ATTACHMENT A

CHRONIC TOXICITY - DEFINITION OF TERMS

A. No observed effect level (NOEL) for compliance determination is equal to IC_{25} or EC_{25}. If the IC_{25} or EC_{25} cannot be statistically determined, the NOEL shall be equal to the NOEC derived using hypothesis testing.

B. Effective concentration (EC) is a point estimate of the toxicant concentration that would cause an adverse effect on a quantal, "all or nothing," response (such as death, immobilization, or serious incapacitation) in a given percent of the test organisms. If the effect is death or immobility, the term lethal concentration (LC) may be used. EC values may be calculated using point estimation techniques such as probit, logit, and Spearman-Karber. EC_{25} is the concentration of toxicant (in percent effluent) that causes a response in 25% of the test organisms.

C. Inhibition Concentration (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a non-lethal, non-quantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25% reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as EPA's Bootstrap Procedure.

D. No observed effect concentration (NOEC) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. It is determined using hypothesis testing.

ATTACHMENT B

CHRONIC TOXICITY - SCREENING PHASE REQUIREMENTS

A. The discharger shall perform screening phase monitoring:

1. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to pretreatment, source control, and waste minimization efforts, or

2. Prior to Permit reissuance. Screening phase monitoring data shall be included in the NPDES Permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

B. Design of the screening phase shall, at a minimum, consist of the following elements:

1. Use of test species specified in Tables 1 and 2 (attached), and use of the protocols referenced in those tables, or as approved by the Executive Officer;

2. Two stages:

   a. Stage 1 shall consist of a minimum of one battery of tests conducted concurrently. Selection of the type of test species and minimum number of tests shall be based on Table 3 (attached); and

   b. Stage 2 shall consist of a minimum of two test batteries conducted at a monthly frequency using the three most sensitive species based on the Stage 1 test results and as approved by the Executive Officer.

3. Appropriate controls; and

4. Concurrent reference toxicant tests.

CHRONIC TOXICITY

TABLE B-1

CRITICAL LIFE STAGE TOXICITY TESTS FOR ESTUARINE WATERS

SPECIES	EFFECT	TEST DURATION	REFERENCE
alga (Skeletonema costatum) (Thalassiosira pseudonana)	growth rate	4 days	1
red alga (Champia parvula)	number of cystocarps	7-9 days	3
giant kelp (Macrocystis pyrifera)	percent germination; germ tube length	48 hours	2
abalone (Haliotis rufescens)	abnormal shell development	48 hours	2
oyster (Crassostrea gigas) mussel (Mytilus edulis)	abnormal shell development; percent survival	48 hours	2
Echinoderms (urchins - Strongylocentrotus purpuratus); (sand dollar - Dendraster excentricus)	percent fertilization	1 hour	2
shrimp (Mysidopsis bahia)	percent survival; growth	7 days	3
shrimp (Holmesimysis costata)	percent survival; growth	7 days	2
Topsmelt (Atherinops affinis)	percent survival; growth	7 days	2
silversides (Menidia beryllina)	larval growth rate; percent survival	7 days	3

TOXICITY TEST REFERENCES

1. American Society for Testing Materials (ASTM). 1990. Standard Guide for conducting static 96-hour toxicity tests with microalgae. Procedure E 1218-90. ASTM, Philadelphia, PA.

2. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA/600/R-95/136. August 1995

3. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA-600/4-90/003. July 1994

TABLE B-2
CRITICAL LIFE STAGE TOXICITY TESTS FOR FRESH WATERS

SPECIES	EFFECT	TEST DURATION	REFERENCE
fathead minnow (Pimephales promelas)	survival; growth rate	7 days	4
water flea (Ceriodaphnia dubia)	survival; number of young	7 days	4
alga (Selenastrum capricornutum)	cell division rate	4 days	4

TOXICITY TEST REFERENCE

4. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Third edition. EPA/600/4-91/002. July 1994

TABLE B-3
TOXICITY TEST REQUIREMENTS FOR STAGE ONE SCREENING PHASE

REQUIREMENTS	RECEIVING WATER CHARACTERISTICS		
	DISCHARGES TO COAST	DISCHARGES TO SAN FRANCISCO BAY[1]	
	Ocean	Marine	Freshwater
Taxonomic Diversity	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish
Number of tests of each salinity type:			
Freshwater[2]	0	1 or 2	3
Marine	4	3 or 4	0
Total number of tests	4	5	3

[1] Marine refers to receiving water salinities greater than 5 ppt at least 75% of the time during a normal water year.
Fresh refers to receiving water with salinities less than 5 ppt at least 75% of the time during a normal water year.

[2] The fresh water species may be substituted with marine species if:

1) the salinity of the effluent is above 5 parts per thousand (ppt) greater than 75% of the time, or

2) the ionic strength (TDS or conductivity) of the effluent at the test concentration used to determine compliance is documented to be toxic to the test species.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 Webster Street, Suite 500
Oakland, California 94612

FACT SHEET
July 1998

REISSUANCE OF WASTE DISCHARGE REQUIREMENTS FOR DISCHARGE TO STATE WATERS FOR

City of Petaluma
Water Pollution Control Plant
Sonoma County
NPDES No. CA0037810

I. FACILITY DESCRIPTION

The City of Petaluma (hereinafter called the City) has applied to the California Regional Water Quality Control Board (the Board) for reissuance of its National Pollutant Discharge Elimination System Permit No. CA0037810, for discharge of pollutants to State waters from the City of Petaluma Water Pollution Control Plant. The City owns the treatment plant, currently regulated by Order No. 90-153, which discharges an annual average flow of approximately 5.16 million gallons per day (mgd) of treated wastewater through an outfall into the Petaluma River. The City contracts out for operation of the municipal treatment plant, which is located at 950 Hopper Street in Petaluma, Sonoma County. The plant provides secondary level treatment for combined domestic, commercial, and industrial wastewater collected in the City of Petaluma, the nearby community of Penngrove, and unincorporated areas in the vicinity of Petaluma. The City's service area currently has a population of about 49,800.

This NPDES permit regulates the discharge of treated wastewater to the Petaluma River, waters of the State and the United States. The U.S. Environmental Protection Agency (USEPA) and the Board have classified this discharger as a major discharge.

II. DISCHARGE DESCRIPTION

The treatment plant has an average dry weather flow design capacity of 5.2 million gallons per day (mgd). The plant presently discharges an average dry weather flow of about 4.45 mgd, and an annual average effluent flow of about 5.16 mgd. The maximum daily flow average during the five year period from 1992 through 1996 was 13.78 mgd.

Currently, during the period from October 21 through April 30 each winter, treated wastewater is discharged into the Petaluma River through a submerged diffuser located about 100 feet off shore (Latitude 38 deg., 12 min., 33 sec.; Longitude 122 deg., 34 min., 22 sec.). Treatment facilities utilized prior to discharge consist of two distinct and separate operations. The first operation, located at 950 Hopper Street in Petaluma, includes primary sedimentation, trickling filters and activated sludge, secondary sedimentation, and aerobic and anaerobic sludge digestion. The effluent from this treatment process is pumped to the second portion of the plant, the oxidation ponds. Here, the effluent receives

further aeration and oxidation in the pond system. The 162 acre pond system and outfall diffuser are located approximately 2.5 miles southeast of the plant, along Lakeville Highway.

At the headworks for the treatment plant on Hopper Street, wastewater is screened prior to being pumped to the aerated grit removal chamber. Following grit removal, wastewater flows to one of two primary clarifiers. Flows greater than 4.0 mgd are sent directly from a primary clarifier to the pond system. Flows under 4.0 mgd are split between two secondary treatment processes. Up to 2.0 mgd is treated in a biofiltration system consisting of three trickling filters in series, and up to 2.5 mgd is treated in an activated sludge process. Daily flows in excess of 6 mgd during wet weather are pumped directly to the pond system from the headworks, after rag removal in the screening unit.

Flows from the trickling filters and the activated sludge process are directed to secondary clarifiers and then to the pond system. The pond system consists of an aerated lagoon followed by an aerated pond and nine oxidation ponds following in series. In order to optimize the pond system to achieve the highest quality of effluent, the number of ponds used for treatment at any given time may vary, depending on the time of year, flows, and weather conditions. Effluent from these ponds is chlorinated and dechlorinated prior to discharge to the Petaluma River.

The general quality of effluent discharged from the plant during the past three years, based on information provided in the application and self-monitoring reports, is as follows:

Constituents	Average
Biological Oxygen Demand, mg/l	14.74
Suspended Solids, mg/l	33.20
Settleable Matter, ml/l/hr	<0.1

Solids Treatment

Wastewater solids removed during the primary and trickling filter processes are conveyed to an anaerobic digester. After digestion, the sludge is dewatered in a centrifuge. Wastewater solids removed from the activated sludge process are conveyed to an aerobic digester, then a belt filter press for dewatering. All dewatered sludge is taken to a landfill.

Shallow Water Discharge Prohibition & Wastewater Reclamation

The Basin Plan prohibits the discharge of any wastewater which has particular characteristics of concern to beneficial uses at any point at which the wastewater does not receive an initial dilution of at least 10:1, or into any nontidal water, dead-end slough, similar confined waters, or any immediate tributaries thereof. Discharge of wastewater to the Petaluma River is contrary to this prohibition, due to the tidal nature of the Petaluma River, and the limited fresh water flows upstream of the outfall. The discharge is classified as a shallow water discharge, and effluent limitations are calculated assuming no dilution.

The Basin Plan provides that exceptions to the above prohibition will be considered for discharges where: 1) an inordinate burden would be placed on the discharger relative to beneficial uses protected, and an equivalent level of environmental protection can be achieved by alternate means such as an alternative discharge site, a higher level of treatment, and/or improved treatment reliability; or, 2) the discharge is approved as a part of a reclamation project; or, 3) it can be demonstrated that net environmental benefits will be derived as a result of the discharge.

In addition to the criteria stated above for exceptions, the Basin Plan requires that the Board consider the reliability of the discharger's system in preventing inadequately treated wastewater from being discharged to the receiving water, and the environmental consequences of such discharges.

The discharger currently reclaims treated wastewater for irrigation of agricultural lands used to grow fodder, fiber, or seed crops, and on lands used for pasture. The discharger also reclaims treated wastewater for irrigation of a golf course, a field located on property owned by the City of Petaluma, and land adjacent to the oxidation ponds where trees have been planted. The dry weather prohibition period is typically May 1 through October 20 of each year. Discharges of treated wastewater to land are governed by Wastewater Reclamation Requirements in Order No. 88-036, adopted by the Board on March 16, 1988. A General Permit for water reuse in the San Francisco Bay area, issued January 17, 1996, is also applicable to the reclamation project.

The discharger's pond system, utilized for both treatment and storage of wastewater, affords the discharger a significant volume of storage capacity that can be used for containment of peak wet weather flows, or for emergency storage in the event of plant upset. The use of these ponds minimizes the possibility of discharge of untreated or partially treated wastewater to the Petaluma River.

The water reuse program implemented by the discharger complies with the exception provision of the Basin Plan, as the discharge is approved as part of a reclamation project. Further, the use of the oxidation ponds is likely to prevent discharge of inadequately treated wastewater to the river.

III. GENERAL RATIONALE

In general, the purpose of the proposed permit requirements are to protect the beneficial uses of the Petaluma River, and contiguous waters such as San Pablo Bay, as described in the Basin Plan (reference below). The following documents are the bases for requirements contained in the permit, and are referred to under the specific rationale section of this Fact Sheet. In addition to the following documents, recent plant performance and best professional judgment (BPJ) have been used as bases for some requirements.

1. Federal Water Pollution Control Act, as amended (hereinafter referred to as the Clean Water Act).

2. Federal Code of Regulations, Title 40 - Protection of Environment, Chapter 1, Environmental Protection Agency, Subchapter D, Water Programs, Parts 122-131 (hereinafter referred to as 40 CFR specific part number).

3. Water Quality Control Plan, San Francisco Bay Basin, June 21, 1995 (Basin Plan). The California Regional Water Quality Control Board, San Francisco Bay Region, adopted the Basin Plan on June 21, 1995. The Basin Plan was approved by the State Water Resources Control Board (State Board) and the Office of Administrative Law on July 20 and November 13, respectively, of 1995. A summary of regulatory provisions is contained in Title 23 of the California Code of Regulations at Section 3912. Basin Plan identifies beneficial uses and water quality objectives for waters of the State, including surface and ground waters.

4. Quality Criteria for Water, EPA 440/5-86-001, 1986 (hereinafter referred to as the Gold Book).

5. *Technical Support Document for Water Quality-Based Toxics Control,* EPA/505/2-90-001, March 1991 (hereinafter referred to as the TSD).

6. National Toxics Rule, 57 FR 60848, December 22, 1992 (NTR).

IV. SPECIFIC RATIONALE

The following section provides a specific rational for the proposed permit requirements in the Tentative Order:

A. Basis for Prohibitions

Discharge Prohibition A.1. (no discharge receiving less than 10:1 dilution or to dead-end sloughs): The Basin Plan prohibits discharges not receiving a least 10:1 minimum initial dilution or to dead-end sloughs (Chapter 4, Discharge Prohibition No. 1).

Discharge Prohibition A.2 & A.5. (no bypass or overflow of untreated wastewaters, no discharge of anything other than storm water to storm drains, unless as authorized by this permit): The Basin Plan prohibits discharge of untreated wastes (Chapter 4, Discharge Prohibition No. 15). This prohibition is based on general concepts contained in Sections 13260 through 13264 of the California Water Code that relate to the discharge of waste to State Waters without filing for and being issued a permit.

Discharge Prohibition A.3. (average dry weather flow not to exceed 5.2 mgd): Exceedance of the treatment plant's average dry weather flow design capacity of 5.2 mgd may result in lowering the reliability of meeting effluent quality requirements.

Discharge Prohibition A.4. (no discharge to Petaluma River from October 20 through April 30): Discharge to shallow waters is prohibited by the Basin Plan; the City has been granted an exception to this prohibition based on zero discharge during the dry weather months, through implementation of the reclamation program.

Discharge Prohibition A.6. (no stormwater pollution, contamination, or nuisance): This prohibition is based on storm water regulations intended to protect beneficial uses of receiving waters from storm water pollutants.

B. Basis for Effluent Limitations

Effluent Limitations B.1

BOD, total suspended solids: These effluent limitations are technology-based, are unchanged from the existing permit and are based on plant performance, Chapter IV of the Basin Plan (Effluent Limitation 3b), and BPJ. The additional requirement that the discharger evaluate options for reducing suspended solids, and implement measures that will allow for compliance with the standard secondary requirements for suspended solids (30 and 45 mg/l for monthly and weekly averages, respectively) is based on data from the past three years, 1995 through 1997. Although elevated suspended solids may result from suspension of clay particles from the pond bottoms, erosion of the pond levees, and/or algae growth (rather than inadequate wastewater treatment), the impacts of the discharge under the limits established in the earlier permit are uncertain. The alternate limits (45 and 65 mg/l for monthly and weekly averages, respectively) were originally granted in 1985. The Federal Regulations specify that alternative limits may only be applied if (1) the BOD and TSS effluent concentrations, consistently achievable through proper operation and maintenance of the treatment works, exceed the minimum level of the effluent quality set forth in 133.102(a) and 133.102(b); and, (2) waste stabilization ponds or trickling filters are the principal process used for secondary treatment. The secondary treatment processes include the

trickling filters, activated sludge unit, and oxidation ponds. The trickling filters and oxidation ponds, together, treat over 50% of the wastewater. However, the BOD effluent quality is not compromised by the ponds or the trickling filters. This Order maintains the alternate limits provided that options for reducing suspended solids are considered.

Oil and grease, settleable matter: These effluent limitations are from the existing permit and are based on Chapter IV of the Basin Plan (Effluent Limitations 3e and 3d).

Total chlorine residual: This effluent limitation is in the existing permit, and is from Chapter IV of the Basin Plan (Effluent Limitation 3c).

Effluent Limitation B.2. (pH): This effluent limitation is in the existing permit and is based on Chapter IV of the Basin Plan (Effluent Limitation 3a).

Effluent Limitation B.3. (coliform bacteria): The effluent limitations for coliform bacteria are based on the water quality objectives for total and fecal coliform included in Chapter III of the Basin Plan. Effluent limitations for conventional pollutants are contained Chapter IV of the Basin Plan (Table 4-2).

Effluent Limitation B.4. (85% removal of BOD and TSS): The limitations included are based on Chapter IV of the Basin Plan, are technology based, and are effluent limitations in the prior NPDES permit (Effluent Limitation 2c).

Effluent Limitation B.5. (acute toxicity): The basis for the acute toxicity limitation is the Basin Plan (Table 4-4).

Effluent Limitation B.6. (chronic toxicity): The narrative chronic toxicity requirements are based on USEPA and SWRCB Task Force guidance, as well as BPJ. The chronic toxicity limit is a narrative toxicity objective, implemented via monitoring. Numeric test values will be used as toxicity "triggers" to initiate accelerated monitoring and perform a chronic toxicity reduction evaluation (TRE). The narrative limit for accelerated monitoring and triggering a toxicity reduction evaluation (TRE) is based on the Basin Plan.

Effluent Limitation B.7. (toxic materials): The Federal Clean Water Act requires that NPDES permits include, where appropriate, water quality based effluent limits. Effluent limits for toxic constituents in the permit are water quality based. These limits are intended to protect the beneficial uses of the receiving waters. They are derived from the Basin Plan, the Gold Book, Applicable Federal Regulations (40 CFR Parts 122 and 131), the NTR, and BPJ. The Basin Plan water quality objectives, the Gold Book, and NTR are numeric interpretations of the Basin Plan's narrative toxicity objective. Water quality based effluent limits for copper and mercury with compliance schedules are included in the Order in addition to interim effluent limits designed to assure no further degradation during the development of TMDLs and site-specific studies.

Limits for some constituents (cadmium, copper, mercury, and cyanide) are lower than in the previous permit. The bases are described in the Notes following the table. In general, Clean Water Act Section 402(o) and 40 CFR 122.44(l) requires that water quality based limits in reissued permits be at least as stringent as in the previous permit. Therefore, some of the requirements in the proposed permit are based on limits specified in the existing NPDES permit.

The specific rationale for each of the proposed limits is summarized in the following table. It should be noted that only the primary bases are listed in the table. Other bases may exist for the requirements, and they are contained in the documents listed under General Rationale.

USEPA water quality criteria exist for both marine and fresh surface waters. During the discharge season from November through April, the Petaluma River in the vicinity of the discharge has periods of both marine and fresh water flows. The river is tidally influenced during most of the discharge season, however, there are periods of sustained fresh water flow during the rainy season in normal to wet years. Due to the seasonal salinity characteristics of the river, effluent limitations for the discharge are based on the lower value of the marine and fresh water quality objectives.

SPECIFIC BASIS FOR PERMIT REQUIREMENTS

REQUIREMENT	Existing Permit	Basin Plan	Gold Book	Comment/Other
Cadmium		✓	✓	Note 1
Chromium	✓	✓	✓	NTR
Copper				Plant Performance & BPJ; Note 3
Lead	✓	✓		
Mercury				Plant Performance & BPJ; Note 4
Nickel	✓	✓		
Cyanide				Plant Performance & BPJ; Note 5
PAHs			✓	NTR
Lindane			✓	NTR, Note 1 and 6

NOTES FOR TABLE:

1) Effluent limitations are calculated from water quality criteria using the simple steady-state mass balance equation derived from the TSD and described in the Basin Plan (p. 4-11):

$$C_e = C_o + D_m(C_o - C_s)$$

where:

C_e = the effluent limitation for the constituent
C_s = ambient background concentration
C_o = concentration objective for receiving waters
D_m = assigned dilution ration for the discharge

The allocated dilution ratio for the City's discharge is zero (D=0). This is based on policy specified in the Basin Plan (p. 4-12).

The following describes the bases for proposed effluent limits for cadmium. The Basin Plan (Tables 3-3 & 3-4) provides numeric objectives for some constituents, including cadmium. For cadmium, the limit is based on a fresh water objective expressed by a formula where H = ln(hardness) as $CaCO_3$ in mg/l: the four-day average objective for cadmium is $e^{(0.7852H - 3.490)}$, where H = 200 mg/l as $CaCO_3$ (conservatively based on an assumed ambient hardness). The rationale for effluent

limitations of the constituents other than those discussed below, is based on the lower of the two Basin Plan objectives in Tables 3-3 and 3-4 and effluent limitations in Table 4-3.

2) Reasonable Potential Basis: As specified in 40 CFR 122.44(d) (1) (i), permits are required to include limits for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard." The Reasonable Potential analysis determined that numeric limits are required for cadmium, chromium, copper, lead, mercury, nickel, PAHs and Lindane. For copper and mercury, the effluent limitation is based on current performance of the treatment plants and is intended to assure that ambient conditions in the Petaluma River will be maintained. The permit will be revised with final water quality based effluent limits for copper and mercury when additional information becomes available. A time schedule for development of these limits is included in the provisions. For other parameters with a reasonable potential, US EPA water quality criteria, and the Basin Plan objectives are used to set effluent limits.

The table below lists results of the reasonable potential analysis performed on the constituents whose detection limits are below the water quality objective. Included in the table are the maximum concentration observed in the data set, the projected maximum concentrations (PEQ) computed from the analyses (based on a 99% confidence level), the water quality objectives (WQO) used in the analyses, effluent limitations, and the basis of those limits. The PEQ is used to compare with the WQO to determine reasonable potential; i.e., if the projected maximum concentration (PEQ) is greater than the WQO, then there is reasonable potential for that constituent to cause or contribute to exceedance of the objective, and a water quality based effluent limitation (WQBEL) is required. The PEQ was computed based on concentration data measured during discharge periods from 1995 through 1997. No dilution was used in the determination. All concentrations are in µg/l.

Reasonable Potential and Basis for Limitations

Constituent	Max conc observed	PEQ (99%)	WQO	Reasonable Potential	Effluent Limits	Basis for Limitations
Copper	13	24.7	4.9	yes	14	Performance-based, bpj
Mercury	0.2	0.82	0.012	yes	0.07	Performance-based, bpj
Cadmium	1	2.5	2	yes	2	$e^{(0.7852H - 3.490)}$, where H = 200 mg/l as $CaCO_3$
Chromium	5.7	11.4	11	yes	11	Basin Plan, Table 4-3
Lead	5	7.5	5.6	yes	5.6	Basin Plan, Table 4-3
Nickel	11	17.6	7.1	yes	7.1	Basin Plan, Table 4-3
Lindane	0.23	0.94	0.16	yes	0.16	BPJ, NTR
PAHs	22.7	61.3	0.049	yes	0.049	BPJ, NTR
Arsenic	9	16.2	20	no	---	---
Silver	0.5	0.85	2.3	no	---	---
Zinc	21	33.6	58	no	---	--
Selenium	1	1	5	no	---	---

For certain toxic constituents (α-BHC, Dieldrin, and Aldrin) which have been detected in the effluent[1], a conclusive reasonable potential analysis cannot be determined due to analytical problems with measuring these constituents and the potential for "false positive" results. Based on BPJ, one detectable data point during the past three years is not enough data to determine reasonable potential. Therefore, accelerated monitoring is required for these constituents as well as use of alternative analytical techniques whenever possible. A justifiable reasonable potential analysis also cannot be determined for cyanide due to questionable data and possible cyanide production from treatment plant chlorination. A study is required in the provisions to investigate these interferences.

For PAHs, the existing limit in the Basin Plan is defined as the sum of sixteen constituents measured in USEPA Method 610. The PAH limit in this permit is based on more current data from the NTR, which lists standards for just eleven of the PAHs measured in Method 610. The USEPA criteria for three of the eleven are higher than the other eight; these are anthracene (NTR objective at 110,000 ppb), fluorene (14,000 ppb), and pyrene (11,000 ppb). Therefore, the PAH limits in the current permit are for the eight PAHs that may be present in the discharge at concentrations which pose a reasonable potential to contribute to water quality impacts. The USEPA criteria for each of these eight PAHs are 0.049 ppb based on updated cancer potency factors (q*)[2] from USEPA's Integrated Risk Information System (IRIS). Three of these eight PAHs have been detected in the discarger's effluent in the past 5 years. Therefore, there is reasonable potential that PAHs may be contributing to an excursion of water quality objectives. However, because the current detection limits for PAHs are greater than the 0.049 ppb criteria, compliance of the limit shall be based on the practical quantitation level (4.0 ppb), or five times the method detection level (0.8 ppb) for each of the eight PAHs.

3. Copper: A performance-based, interim effluent limitation is specified in this permit in addition to the WQBEL, 4.9 µg/l, which is effective seven years from the date of reissuance of this permit. A seven year compliance schedule is necessary to perform the necessary site-specific objective and TMDL studies. No federal statute, regulation, or judicial opinion explicitly precludes a seven-year compliance schedule and USEPA has authorized such schedules in the proposed CTR. In addition, 40 CFR 312, Appendix F, explicitly approves compliance schedules that extend beyond the life of the permits containing them.

   The performance-based, interim limit is based on monitoring data from the past three years (1995-1997) during discharge periods of the year. The highest concentration observed was 13 µg/l in February 1995 (the average was 4.72 µg/l). The interim effluent limit, 14 µg/l, was derived based on the 99.7%th level (three standard deviations above the mean) of plant performance during the past three years (1995-1997). This interim limitation may be changed by the Regional Board based on additional information and studies requested.

   Specific information regarding the development of a water quality objective for copper, and the possible use of a dissolved criteria, is included in the Findings of the permit. A final water quality based effluent limit for copper will be determined when more site specific information becomes

[1] Dieldrin and Aldrin were detected in April, 1995, at 0.1µg/l and November, 1995, at 0.05µg/l, respectively (WQOs = 0.0019 and 0.00013 µg/l). Alpha-BHC was last detected in April, 1995, at a concentration of 0.18 µg/l (previous to this, it was detected twice in the spring of 1994 and once in 1993) (WQO = 0.013 µg/l).

[2] USEPA human health criteria calculations from the TSD, with updated cancer potencies (q*) and reference doses (RfD) from the California Office of Environmental Health Hazard Assessment, and in USEPA's Integrated Risk Information System (IRIS). Calculations based on average human body weight of 70 kg, USEPA estimated national average fish consumption of 6.5 g/d, and a 10^{-6} cancer risk level for carcinogens.

available. Developing this limit will involve gathering site specific data that reflects the particular binding capacity and/or characteristics of the receiving waters that could then be used to translate the national dissolved copper criteria to an effluent limit expressed as total recoverable metal.

A different water quality based limit may be established by the Board based on information developed by the discharger, the Regional Board, and other parties, and any other relevant information regarding protection of beneficial uses of the receiving waters. The copper interim limit specified in the permit will be applicable to the discharge until the Board revises this permit with a different water quality based limit than that established with a compliance schedule. If a water quality based effluent limit is not established within seven years of the date this permit is reissued, then the limit will be 4.9 µg/l.

Copper Reduction Program. Due to uncertainties about the quantities of copper that could be a stress to the ecosystem, particularly in locations other than the water column (such as sediments, and/or organisms that take in particulate matter) the discharger is required to continue to participate in efforts to reduce influent copper concentrations. Implementation of a source control program will also provide information that can be used to assess the discharger's ability to comply with a new water quality based limit.

4. Mercury: The performance-based, interim effluent limitation specified in this permit is based on the 99.7th percentile from the past two years (1996-1997) of monitoring data, excluding January 1996.[3]; this data point was significantly higher than the rest and therefore was discarded as an outlier. The water quality based effluent limit, 0.012 µg/l, is also included in the permit with a seven-year compliance schedule. A different WQBEL may replace this interim limitation based on additional information and studies requested. However, if a different WQBEL than that established is not specified within seven years of the date this permit is reissued, then the effluent limit of 0.012 µg/l shall become effective. A seven year compliance schedule is necessary to perform the necessary site-specific objective and TMDL studies. No federal statute, regulation, or judicial opinion explicitly precludes a seven-year compliance schedule and USEPA has authorized such schedules in the proposed CTR. In addition, 40 CFR 312, Appendix F, explicitly approves compliance schedules that extend beyond the life of the permits containing them.

   Specific information regarding the water quality criteria for mercury is included in the Findings of the permit. The greatest concern with mercury is bioaccumulation, primarily with respect to human consumption of fish and shellfish. Based on information generated through the San Francisco Estuary Regional Monitoring Program, mercury has been identified as a primary constituent of concern due to elevated levels found in fish tissue samples collected from bay waters. Elevated water column concentrations have also been found. The Board recognizes that mercury loadings from the City's facility are relatively low when compared to loadings that come from other sources, such as abandoned mines in the bay watershed, and possible release from sediments in the bay. However, there remains the possibility of localized impacts related to the discharge. Because mercury loadings to the bay must be minimized, the City of Petaluma is required to implement a source control program that is aimed at reducing the most significant and controllable sources of mercury in the plant influent.

   Board staff are in the process of developing a plan to address mercury compliance for north bay shallow water dischargers, including the City of Petaluma. Review of recent data indicates that in

[3] The mercury concentration for January, 1996, of 1.6 µg/l was discarded from the dataset because of its extreme outlier characteristics.

the absence of dilution credit (as allowed for deep water dischargers) the discharge concentrations for these facilities are all generally higher than the objectives. There is uncertainty as to the discharger's ability to reduce mercury effluent concentrations through source control efforts. As such, it may be appropriate to apply a mass loading limit to these dischargers, and focus mercury reduction efforts on more significant and controllable sources.

The permit includes both a moving average monthly mass emission trigger value based on recent moving average flow and concentration performance during the discharge period, and a moving average annual mass limit based on moving average flows and concentrations during the entire year (discussed in more detail in Note 7). The Board intends to revise this permit after additional information on such factors as attainability, impacts on beneficial uses, mass loadings, and site specific limits is developed.

5. Cyanide: The US EPA saltwater criterion for cyanide is 1 µg/l as a 1-hour average. This limit, which would have been specified in this permit, is lower than the limit in the previous permit where the limit is 25 µg/l. While influent cyanide concentrations are generally below detection limits, effluent chlorination appears to be creating cyanide or compounds that are also detectable by cyanide analyses (positive interferences). Due to the uncertainty regarding the persistence of cyanide in the environment, a performance-based limit is established in this Order. The Basin Plan (page 4-70, Footnote f) states that "the Regional Board will consider information on the persistence of cyanide in evaluating alternate limit proposals". The performance-based, interim effluent limitation specified in this permit is based on the 99.7th percentile from the past three years (1995-1997) of monitoring data. The discharger will investigate potential analytical interferences, in-plant sources of cyanide and potential reduction measures as cited in the Provisions.

6. Basis for Proposed Additional Effluent Limitation to the Permit

   Lindane (γ-BHC): In the past five years Lindane has been detected in the discharger's effluent ai levels varying from 0.02 to 0.23 µg/l. USEPA's current method detection level for this organic constituent is 0.005 µg/l, which is below the objective of 0.16 µg/l (monthly average). Due to the reasonable potential for this constituent to cause or contribute to exceedances of water quality objectives, Lindane has been added to the effluent limitations list. However, due to the minimal information available regarding this constituent and its impacts on water quality monitoring and source-control programs are also required.

7. Mass loading limit and "trigger" for mercury

   In addition to the interim concentration limit and a WQBEL with compliance schedule, the discharger is required to maintain ambient water quality by 1) not exceeding the annual mass limit specified in Effluent Limitations B.8.a, and 2) initiating actions specified in Provision 5 if monthly mass loading for mercury exceeds those specified in Effluent Limitation B.8.b. The mass limit and trigger values were calculated using effluent flows and concentration data from January 1995 through May 1998. The annual mass limit was calculated from the highest 12-month moving average load, obtained from corresponding moving average year-round flows and concentrations. This limit, therefore, credits the discharger for the reclamation during the dry season when no discharge occurs. The mass loading trigger value in Effluent Limitations B.8.b was calculated using the highest moving average load obtained from only "ultra-clean" concentration data and only flows during the discharge period. Compliance for both the mass limit and trigger values are based on 12-month moving average flow and concentration data.

These mass loading limit and trigger values will be in effect until a final water quality based effluent limit or wasteload allocation / TMDL for mercury is established. This mass loading "trigger" is included in this permit in order to address the impairment of water quality in San Pablo Bay and mercury's bioaccumulation effects. The mass amount was calculated based on 12-month moving average discharge flows and effluent concentrations measured using ultra-clean sampling and analytical techniques between 1995 and 1997.

C. Basis for Receiving Water Limitations

Receiving Water Limitations D.1 and D.2. These limitations are in the existing permit and are based on water quality objectives for physical, chemical, and biological characteristics from Chapter III of the Basin Plan.

Receiving Water Limitation D.3. This limitation is in the existing permit, requires compliance with Federal and State law, and is self explanatory.

Receiving Water Limitation D.4. This limitation is based on storm water regulations intended to protect beneficial uses of receiving waters from storm water pollutants.

D. Basis for Sludge Requirements

Sludge Requirements E.1 through E.5. These requirements come from the Basin Plan (Chapter IV) and 40 CFR 257 and 503.

E. Basis for Provisions.

Provision F.1. (rescind existing order): This provision is based on 40 CFR 122.46.

Provision F.2. and F.4. (mercury and copper source control): These provisions are based on past monitoring data that indicate the City's plant may have difficulty complying with the water quality based effluent limits for copper and mercury that are established with a compliance schedule in this permit. This requirement is also based on the defined need for reduction of mercury to the San Francisco Bay waters, and concerns about copper toxicity in the receiving waters, both as dissolved copper in the water column, and in particulate form. Requirements are intended to reduce effluent mercury and copper concentrations to achieve compliance with future effluent limits that will be based on water quality objectives.

Provision F.3. (copper translator): If the Board decides to apply the national dissolved water quality objective for copper to the discharge, then it will be in the City's best interest to provide site specific data that can be used to translate the dissolved criteria into a total recoverable limit. Without site specific data, a translator of "one" may be used.

Provision F.5. (mercury mass loading reduction): This provision requires that the discharger initiate a series of actions, including notification, identification, corrective action, and future preventative measures, when mass loading for mercury exceeds **0.015** kg/month during the discharge period. This provision is required in order that the discharger maintain the status quo of the effluent discharged to the Petaluma River until a final water quality based effluent limit based on a wasteload allocation and TMDL for mercury is established. This "trigger" value is a closer approximation to the actual mercury load

discharged to the river than the mass limit since the trigger is based on only ultra-clean data and only flows during the discharge period. Whereas, the mass limit value (0.6 kg/year) was based on year-round flows and all concentration data available from 1995 through May 1998. Therefore, this provision is required in order that ambient water quality is in fact maintained at the current level by increasing the pollution prevention activities spsecified.

Provision F.6. (acute toxicity): This provision establishes protocol for compliance with the acute toxicity limitation specified in Effluent Limitation B.5 or the Order; it is based on the Basin Plan.

Provision F.7. and F8. (chronic toxicity): This provision requires implementation of toxicity identification and toxicity reduction evaluations when there is consistent chronic toxicity in the discharge. This requirement is based on the Basin Plan.

Provision F.9. (total suspended solids reduction): This provision requires the City to evaluate options for reduction of suspended solids in the effluent. This requirement is imposed because the suspended solids concentrations in the City's effluent are higher than typically required for secondary treatment plants including treatment plants which rely on waste stabilization ponds for a significant portion of their treatment process.

Provision F.10. (cyanide): This provision is based on indication by past monitoring data that the City's plant may have difficulty complying with future water quality based effluent limits for cyanide. It requires the City to evaluate source control options and treatment options to reduce cyanide concentrations in the treated effluent, including a technical analysis of cyanide removals across the Plant, and its potential for generating cyanide.

Provision F.11. (Lindane): This provision is based on effluent concentrations of this constituent indicated by past monitoring data. Due to the limited knowledge surrounding this constituent and the difficulty which the City's plant may have in complying with the current water quality objective of 0.16 µg/l (monthly maximum), this provision requires implementation of a monitoring and source control program.

Provision F.12. (status reports on new or upgraded facility): These reports are intended to keep the Board informed as to progress towards upgrade or replacement of the treatment facilities. Such action is necessary due to the age of the existing facility, its potential vulnerability for needing future repairs, and anticipated increase in wastewater flows for the community. The existing facility has not been designed to accommodate anticipated increase in flows.

Provision F.13. (PAHs, Dieldrin, Aldrin, alpha-BHC, and other pesticides): The effluent goal proposed for PAHs (and other organics) is lower than analytical quantification limits available from commercial laboratories using approved USEPA protocols. The Basin Plan, NTR, and TSD provide that for this circumstance, the effluent limit shall be set at a level to protect water quality, and compliance should be determined at the analytical quantification level. These levels are proposed in the Self-Monitoring Program and the basis for them is as discussed in that section. However, analytical methodologies may improve, or new ones may be developed which would lower analytical quantification levels. This provision requires that, in the event that either new and improved or current analytical methods consistently measure levels of PAHs above the effluent limit and above the analytical quantification limit, then the City is required to initiate a source identification and reduction program. This trigger for a compliance investigation instead of immediate permit violation is based on Basin Plan policy which

allows for compliance schedules in cases where the discharger's current performance has not worsened, but the limits have become more stringent.

Provision F.14. (storm water pollution prevention plan): This provision requires ongoing implementation of the Storm Water Pollution Prevention Plan, to ensure compliance with Federal storm water pollution controls.

Provisions F.15 through F.21. (pretreatment requirements, pollution prevention, operations and maintenance, contingency plan, system reliability, self-monitoring program, and standard provisions): These requirements come from the Basin Plan and 40 CFR part 122.

Provision F.22. (change of ownership requirements): This provision is based on 40 CFR 122.61.

Provision F.23 through F.25. (modification or revocation and reissuance of permit, permit expiration and re-application, and EPA concurrence): Provision F. 21 specifies permit expiration after 5 years in accordance with 40 CFR 122.46(a). The other provisions are based on 40 CFR 123.

V. SELF MONITORING PROGRAM REQUIREMENTS

A. General Basis

Part A of the monitoring program is a standard requirement in almost all NPDES permits issued by the Regional Board. Most of the requirements are also existing requirements for the discharger. Part A contains definitions, specifies general sampling and analytical protocols, and specifies reporting of spills, violations, and routine monitoring data in accordance with NPDES regulations, the California Water Code, and Regional Board policy. Part B of the monitoring program is specific for the discharger. It defines the stations, constituents, and frequency of monitoring, and additional reporting requirements. Constituents required to be monitored include all parameters for which effluent limitations are specified. This is to allow determination of compliance with permit limits in accordance with 40 CFR 122.44(i).

VI. WRITTEN COMMENTS

Interested persons are invited to submit written comments on these draft Waste Discharge Requirements. Comments should be submitted either in person or by mail to the Regional Board office at the address indicated above by **July 1, 1998**. Comments received after this date may not receive full consideration in the formulation of final determinations.

VII. PUBLIC HEARING

The draft Waste Discharge Requirements will be considered by the Regional Board at a public hearing during the Board's regular monthly meeting to be held on July 15, 1998, beginning at 9:30 a.m. The meeting will be held at the BART Headquarters Building, 800 Madison Street, 2nd Floor Meeting Room, Oakland, CA 94612.

VIII. ADDITIONAL INFORMATION

For additional information on this matter, interested persons should contact Tobi Tyler of the Regional Board staff at (510) 286-1287.

APPENDIX B

Inundation Analysis

Harding Lawson Associates

December 19, 1996

34232 001

William K. Faisst, Ph.D, P.E.
Brown and Caldwell
3480 Buskirk Avenue
Pleasant Hill, California 94523-4342

Inundation Analysis
Wastewater Treatment Oxidation Ponds
City of Petaluma
Petaluma, California

Dear Mr. Faisst:

This letter and the attached exhibits present the results of an inundation analysis completed for the existing oxidation ponds at the City of Petaluma wastewater treatment facility. The purpose of the analysis was to: (1) estimate the pond water volume that might reasonably inundate the downstream Petaluma River floodplain during a catastrophic failure of one or more of the ponds during a seismic event or other failure scenario, (2) use a computer model to simulate catastrophic failure of the ponds, (3) calculate whether the flood wave generated by pond failure would exhibit flow depths and velocities that exceed the human life danger criteria established by the State of California Governor's Office of Emergency Services (OES), (4) delineate downstream inundation areas for locations that exceed the OES human life danger criteria, and (5) determine whether the preparation and submittal of an inundation map is required for the facility under Sections 6025.6 and 8589.5 of California Water Code (*DWR, 1995*). The results of this inundation analysis are to be used for planning purposes only and do not in any way imply that the failure scenario presented herein will occur.

SETTING

The existing wastewater treatment facility is located in Sections 1 and 12 of Township 4 North and Range 7 West, and Section 6 of Township 4 North and Range 6 West on Lakeville Highway approximately 2 miles southeast of Petaluma, California (Plate 1). The facility lies immediately south of Ellis Creek on the west side of Lakeville Highway. The western boundary of the facility lies adjacent to the floodplain and wetlands of the Petaluma River. The main channel of the Petaluma River lies approximately 3,000 feet west of the facility and drains south toward San Pablo Bay.

The facility consists of ten oxidation ponds, an aerated lagoon, chlorination facilities, and an outfall pipeline terminating at a diffuser along the north bank of the Petaluma River. The ponds lie in two parallel rows of five ponds each separated by a central drainage ditch that drains west toward the Petaluma River. The ponds are contained by compacted earth fill berms with 2:1 (horizontal/vertical) side slopes and range in height from 13 to 15 feet. The ponds are numbered 1 through 10 from east to west (Plate 2).

Engineering and Environmental Services
105 Digital Drive, P.O. Box 6107 Novato, California 94949
415-883-0112 Fax 415-884-3300

The modeling of the pond failure, calculations of the breach characteristics, and routing of the flood wave through the downstream topography were completed in conformance with methods acceptable to the OES *Revised Sequence of Steps in Inundation Map Preparation* (*OES, 1991*). The pond water was assumed to be at a maximum level at the beginning of the analysis, and no storm water runoff volume or discharge was added to the pond storage capacity or the downstream terrain after the model was initiated.

CROSS SECTIONS

Ten cross sections were input into the DAMBRK model using topographic information shown on the USGS 7-1/2 minute Petaluma River Quadrangle Map (*USGS, 1954*). The cross sections were input into the model as a series of elevations and top widths with associated Manning "n" roughness factors, contraction or expansion coefficients, flooding depths, and travel distances (in miles from the pond) along the main channel flowline. The last cross section of the model series is within the floodplain of the Petaluma River, 2.28 miles downstream of the ponds (Plate 2).

A high tide depth of 3.6 feet above mean sea level (msl) was input for the Petaluma River as the channel bottom elevation for the ten cross sections. Utilizing a tidal elevation as a downstream water surface elevation control is the worst-case scenario (i.e., will generate the greatest flood elevations) and is acceptable by OES standards (*OES, 1991*). The tidal information for the Petaluma River near the Petaluma Marina was obtained from the City of Petaluma Engineering and Public Works Department (*Pedroncelli, 1995*).

BREACH CHARACTERISTICS

The breach shape in the analysis was assumed to be trapezoidal, with a 2:1 side slope and a minimum breach bottom elevation equal to the pond bottom elevation (Table 2). The breach was assumed to start as a piping failure (localized seepage along a transverse crack in the berm) at an elevation that coincided with half of the total storage volume in the pond (Table 1). Once seepage through the berm was initiated, the piping failure expanded to a trapezoidal shape, with 2:1 side slopes and an ultimate breach bottom elevation equal to the lowest pond elevation of 3.5 feet above msl.

The time for the breach to reach maximum size was calculated (according to OES standards) to be 1.1 hours after the start of the model. The maximum breach base width was 80 feet (Table 2). The final breach characteristics input into the model and the maximum peak discharge generated by the model for the cross section located downstream of the pond are presented in Table 2.

MODEL OUTPUT SUMMARY

The flood flow generated by the catastrophic failure of the pond was routed across the terrain west of the ponds to the main channel and overbank areas of the Petaluma River. The DAMBRK model output is presented as an attachment. Plate 2 shows the location of the ponds and the location and station (in miles downstream of the ponds) of each cross section input into the DAMBRK computer model. The limits of the inundation area are not shown because the product of the flow depth (in

REFERENCES:

Fread, D.L., 1988. *The NWS DAMBRK Model: Theoretical Background/User Documentation.*

Harding Lawson Associates (HLA), 1995. *Preliminary Geotechnical Investigation, Wastewater Treatment Plant Modifications, Petaluma, California.*

Moore and Taber, 1971. *Petaluma W.P.C. Facility.* December (selected borings logs only).

_____, 1981. *Soils Investigation for Pile Support, Proposed Chlorination Facilities/Pond 10, Petaluma Sewage Treatment Facilities, Petaluma, California.* February 4.

Pedroncelli, R., 1995. City of Petaluma, Engineering and Public Works Department. Telephone conversation with and facsimile transmission to Jay Mosley, Harding Lawson Associates. May 10.

State of California, Department of Water Resources (DWR), 1995. *Statutes and Regulations Pertaining to Supervision of Dams and Resevoirs.* Division of Safety of Dams.

State of California, Governor's Office of Emergency Services (OES), 1991. *Revised Sequence of Steps in Inundation Map Preparation.* August.

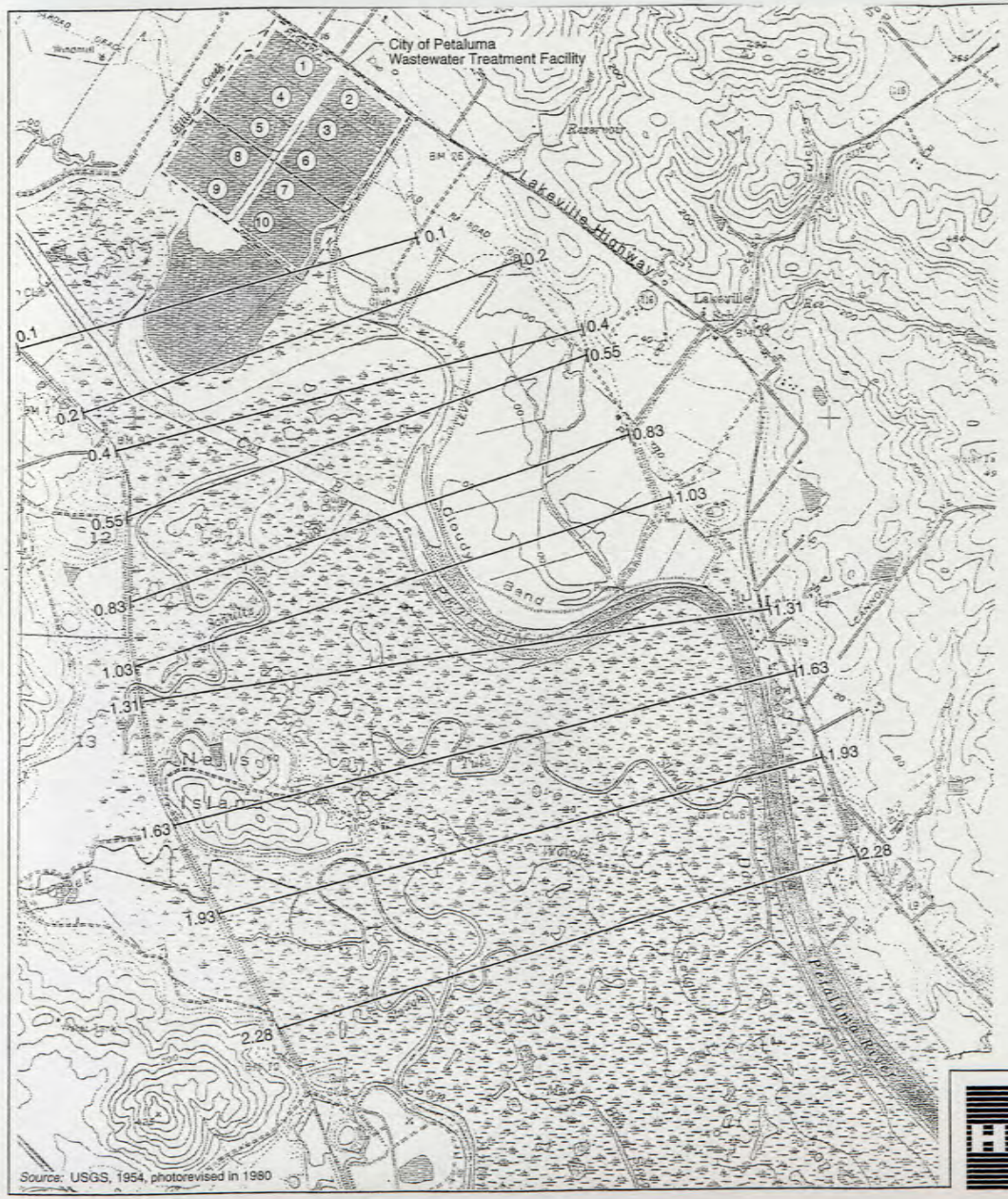
United States Geological Survey (USGS), 1954. Petaluma River, California. 7½ minute series (topographic). Photorevised in 1980.

Table 2. DAMBRK Output Summary
Wastewater Treatment Oxidation Ponds
City of Petaluma
Petaluma, California

Cross Section Number and Distance From Ponds (miles)	Maximum Water Surface Elevation (feet above msl)	Maximum Water Depth (feet)	Maximum Peak Discharge (cfs)	Time of Maximum Flow (hours)	Maximum Velocity (fps)	Product of Velocity and Depth
0.1	4.42	0.82	2693	1.045	0.68	0.56
0.2	4.33	0.74	2375	1.1	0.68	0.50
0.4	4.13	0.55	1682	1.32	0.57	0.31
0.55	4.02	0.45	1096	1.65	0.49	0.22
0.83	3.87	0.31	432	2.86	0.31	0.10
1.03	3.79	0.24	271	7.07	0.22	0.05
1.31	3.72	0.18	167	8.22	0.11	0.02
1.63	3.69	0.16	101	11.87	0.09	0.01
1.93	3.66	0.14	75	19.336	0.06	0.01
2.28	3.64	0.13	54	19.912	0.04	0.01

Maximum elevation of ponds	12.0 feet above msl
Minimum elevation of ponds	3.5 feet above msl
Breach piping initiation elevation	7.7 feet above msl
Elevation of maximum breach depth	3.5 feet above msl
Maximum breach bottom width	80 feet
Breach side slope	2:1
Time of breach initiation after start of model	1.045 hours
Time required for breach to reach maximum depth	1.1 hours
Duration of DAMBRK breach analysis	20 hours
Minimum outflow from ponds	10 cfs
Maximum breach outflow from ponds	2693 cfs
Time of maximum breach outlow after start of model	0.726 hours
Total volume of breach outflow	177 acre-feet

cfs Cubic feet per second.
fps Feet per second.
msl Mean sea level.



Source: USGS, 1954, photorevised in 1980

Cross-section Number and Distance from Ponds (miles)	DAMBRK Maximum Water Depth (feet)	DAMBRK Maximum Velocity (feet per second)
0.1	0.82	0.68
0.2	0.74	0.68
0.4	0.55	0.57
0.55	0.45	0.49
0.83	0.31	0.31
1.03	0.24	0.22
1.31	0.18	0.11
1.63	0.16	0.09
1.93	0.14	0.06
2.28	0.13	0.04

EXPLANATION

(1) Oxidation pond number

1.31 ├──┤ 1.31 DAMBRK cross-section location and distance from pond in miles

- - - - - - - Wastewater treatment facility boundary

—·—·— Approximate boundary of bay mud deposits (from HLA,1955; and Moore and Taber,1971,1981)

0 2000 4000

SCALE IN FEET

Contour Interval = 40 feet

N

Harding Lawson Associates
Engineering and Environmental Services

Cross-section Location Map
Inundation Analysis
Wastewater Treatment Oxidation Ponds
City of Petaluma
Petaluma, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	34232 001		6/96	10/96

061196DJP

APPENDIX C

Species List

U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

IN REPLY REFER TO
1-1-01-SP-2903

August 10, 2001

John M. Miller, Ph.D.
Parsons
2233 Watt Avenue, Suite 330
Sacramento, California 95825

Subject: Species List for Petaluma Wastewater EIR, 739461, Sonoma County, California

Dear Dr. Miller:

We are sending the enclosed list in response to your July 23, 2001, request for information about endangered and threatened species (Enclosure A). The list covers the following U.S. Geological Survey 7½ minute quad or quads: Petaluma River Quad.

Please read *Important Information About Your Species List* (enclosed). It explains how we made the list and describes your responsibilities under the Endangered Species Act. Please contact Harry Mossman, Biological Technician, at (916) 414-6674, if you have any questions about the attached list or your responsibilities under the Endangered Species Act. For the fastest response to species list requests, address them to the attention of Mr. Mossman at this address. You may fax requests to him at 414-6712 or 6713.

Sincerely,

for Nick Steinhauser
Jan C. Knight
Chief, Endangered Species Division

Enclosures

Important Information
About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute *quads*. The United States is divided into these quads, which are about the size of San Francisco. If you requested your list by quad name or number, that is what we used. Otherwise, we used the information you sent us to determine which quad or quads to use.

Animals

The animals on your species list are ones that occur within, *or may be affected by projects within*, the quads covered by the list. Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.

Plants

Any plants on your list are ones *that have actually been observed* in the quad or quads covered by the list. We have also included either a county species list or a list of species in nearby quads. We recommend that you check your project area for these plants. Plants may exist in an area without ever having been detected there.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. For plant surveys, we recommend using the enclosed *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Species*. The results of your surveys should be published in any environmental documents prepared for your project.

State-Listed Species

If a species has been listed as threatened or endangered by the State of California, but not by us nor by the National Marine Fisheries Service, it will appear on your list as a Species of Concern. *However you should contact the California Department of Fish and Game for official information about these species.* Call (916) 322-2493 or write Marketing Manager, California Department of Fish and Game, Natural Diversity Data Base, 1416 Ninth Street, Sacramento, California 95814.

Your Responsibilities Under the Endangered Species Act

All plants and animals identified as *listed* on Enclosure A are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the *take* of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal. Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

> If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a *formal consultation* with the Service. Such consultation would result in a *biological opinion* addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.
>
> If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an *incidental take permit*. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project. Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that mitigates for the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the mitigation plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as *critical habitat*. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Maps and boundary descriptions of the critical habitat may be found in the *Federal Register*. The information is also reprinted in the *Code of Federal Regulations* (50 **CFR** 17.95).

Candidate Species

We recommend that you address impacts to *candidate* species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Your list may contain a section called *Species of Concern*. This term includes former *category 2 candidate species* and other plants and animals of concern to the Service and other Federal, State and private conservation agencies and organizations. Some of these species may become candidate species in the future.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6580.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed, candidate and special concern species in your planning, this should not be a problem. We also continually strive to make our information as accurate as possible. Sometimes we learn that a particular species has a different range than we thought. This should not be a problem if you consider the species on the county or surrounding-quad lists that we have enclosed. If you have a long-term project or if your project is delayed, please feel free to contact us about getting a current list. You can also find out the current status of a species by going to the Service's Internet page: *www.fws.gov*

GUIDELINES FOR CONDUCTING AND REPORTING BOTANICAL INVENTORIES FOR FEDERALLY LISTED, PROPOSED AND CANDIDATE PLANTS

(September 23, 1996)

These guidelines describe protocols for conducting botanical inventories for federally listed, proposed and candidate plants, and describe minimum standards for reporting results. The Service will use, in part, the information outlined below in determining whether the project under consideration may affect any listed, proposed or candidate plants, and in determining the direct, indirect, and cumulative effects.

Field inventories should be conducted in a manner that will locate listed, proposed, or candidate species (target species) that may be present. The entire project area requires a botanical inventory, except developed agricultural lands. The field investigator(s) should:

1. Conduct inventories at the appropriate times of year when target species are present and identifiable. Inventories will include all potential habitats. Multiple site visits during a field season may be necessary to make observations during the appropriate phenological stage of all target species.

2. If available, use a regional or local reference population to obtain a visual image of the target species and associated habitat(s). If access to reference populations is not available, investigators should study specimens from local herbaria.

3. List every species observed and compile a comprehensive list of vascular plants for the entire project site. Vascular plants need to be identified to a taxonomic level which allows rarity to be determined.

4. Report results of botanical field inventories that include:

    a. a description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species.

    b. a map of project location showing scale, orientation, project boundaries, parcel size, and map quadrangle name.

    c. survey dates and survey methodology(ies).

    d. if a reference population is available, provide a written narrative describing the target species reference population(s) used, and date(s) when observations were made.

    e. a comprehensive list of all vascular plants occurring on the project site for each habitat type.

    f. current and historic land uses of the habitat(s) and degree of site alteration.

g. presence of target species off-site on adjacent parcels, if known.

h. an assessment of the biological significance or ecological quality of the project site in a local and regional context.

5. If target species is(are) found, report results that additionally include:

a. a map showing federally listed, proposed and candidate species distribution as they relate to the proposed project.

b. if target species is (are) associated with wetlands, a description of the direction and integrity of flow of surface hydrology. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

c. the target species phenology and microhabitat, an estimate of the number of individuals of each target species per unit area; identify areas of high, medium and low density of target species over the project site, and provide acres of occupied habitat of target species. Investigators could provide color slides, photos or color copies of photos of target species or representative habitats to support information or descriptions contained in reports.

d. the degree of impact(s), if any, of the proposed project as it relates to the potential unoccupied habitat of target habitat.

6. Document findings of target species by completing California Native Species Field Survey Form(s) and submit form(s) to the Natural Diversity Data Base. Documentation of determinations and/or voucher specimens may be useful in cases of taxonomic ambiguities, habitat or range extensions.

7. Report as an addendum to the original survey, any change in abundance and distribution of target plants in subsequent years. Project sites with inventories older than three years from the current date of project proposal submission will likely need additional survey. Investigators need to assess whether an additional survey(s) is (are) needed.

8. Adverse conditions may prevent investigator(s) from determining presence or identifying some target species in potential habitat(s) of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. An additional botanical inventory(ies) in a subsequent year(s) may be required if adverse conditions occur in a potential habitat(s). Investigator(s) may need to discuss such conditions.

9. Guidance from California Department of Fish and Game (CDFG) regarding plant and plant community surveys can be found in Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities, 1984. Please contact the CDFG Regional Office for questions regarding the CDFG guidelines and for assistance in determining any applicable State regulatory requirements.

ENCLOSURE A

Endangered and Threatened Species that May Occur in or be Affected by

PROJECTS IN SONOMA COUNTY

Reference File No. 1-1-01-SP-2903

August 10, 2001

Listed Species

Mammals

sei whale, *Balaenoptera borealis* (E)

blue whale, *Balaenoptera musculus* (E)

finback (=fin) whale, *Balaenoptera physalus* (E)

right whale, *Eubalaena glacialis* (E)

humpback whale, *Megaptera novaeangliae* (E)

sperm whale, *Physeter catodon (=macrocephalus)* (E)

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Guadalupe fur seal, *Arctocephalus townsendi* (T)

Steller (=northern) sea-lion, *Eumetopias jubatus* (T)

Birds

California brown pelican, *Pelecanus occidentalis californicus* (E)

California clapper rail, *Rallus longirostris obsoletus* (E)

Critical habitat, marbled murrelet, *Brachyramphus marmoratus* (T)

marbled murrelet, *Brachyramphus marmoratus* (T)

Critical habitat, western snowy plover, *Charadrius alexandrinus nivosus* (T)

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

northern spotted owl, *Strix occidentalis caurina* (T)

Reptiles

leatherback turtle, *Dermochelys coriacea* (E)

loggerhead turtle, *Caretta caretta* (T)

green turtle, *Chelonia mydas (incl. agassizi)* (T)

olive (=Pacific) ridley sea turtle, *Lepidochelys olivacea* (T)

Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Critical habitat, Alameda whipsnake, *Masticophis lateralis euryxanthus* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

tidewater goby, *Eucyclogobius newberryi* (E)

Critical habitat, winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Critical habitat, coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)
Northern California steelhead, *Oncorhynchus mykiss* (T)
Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)
Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)
So. OR/CA coastal chinook salmon, *Oncorhynchus tshawytscha* (T)
Sacramento splittail, *Pogonichthys macrolepidotus* (T)
delta smelt, *Hypomesus transpacificus* (T) *

Invertebrates

white abalone, *Haliotes sorenseni* (E)
Behren's silverspot butterfly, *Speyeria zerene behrensii* (E)
Myrtle's silverspot butterfly, *Speyeria zerene myrtleae* (E)
California freshwater shrimp, *Syncaris pacifica* (E)

Plants

Sonoma alopecurus, *Alopecurus aequalis var. sonomensis* (E)
Clara Hunt's milk-vetch, *Astragalus clarianus* (E)
Baker's stickyseed, *Blennosperma bakeri* (E)
white sedge, *Carex albida* (E)
Vine Hill clarkia, *Clarkia imbricata* (E)
Pennell's bird's-beak, *Cordylanthus tenuis ssp. capillaris* (E)
yellow larkspur, *Delphinium luteum* (E)
Burke's goldfields, *Lasthenia burkei* (E)
Pitkin Marsh lily, *Lilium pardalinum ssp. pitkinense* (E)
Sebastopol meadowfoam, *Limnanthes vinculans* (E)
clover lupine [Tidestrom's lupine], *Lupinus tidestromii* (E)
Pt. Reyes clover lupine, *Lupinus tidestromii var. layneae* (E)
many-flowered navarretia, *Navarretia leucocephala ssp. plieantha* (E)
Kenwood Marsh checkermallow, *Sidalcea oregana ssp. valida* (E)
showy Indian clover, *Trifolium amoenum* (E)
Sonoma spineflower, *Chorizanthe valida* (E) *
soft bird's-beak, *Cordylanthus mollis ssp. mollis* (E) *
Baker's larkspur, *Delphinium bakeri* (E) *
Hickman's potentilla (=cinquefoil), *Potentilla hickmanii* (E) *

Proposed Species

Birds

short-tailed albatross, *Diomedea albatrus* (PE)

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C)

Invertebrates

black abalone, *Haliotes cracherodii* (C)

Species of Concern

Mammals

gray whale, *Eschrichtius robustus* (D)

California red tree vole, *Arborimus pomo* (SC)

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

Suisun ornate shrew, *Sorex ornatus sinuosus* (SC)

Birds

Western yellow-billed cuckoo, *Coccyzus americanus occidentalis* (CA)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

black rail, *Laterallus jamaicensis coturniculus* (CA)

Aleutian Canada goose, *Branta canadensis leucopareia* (D)

Critical habitat, peregrine falcon, *Falco peregrinus* (D)

American peregrine falcon, *Falco peregrinus anatum* (D)

Snowy Egret, *Egretta thula* (MB)

grasshopper sparrow, *Ammodramus savannarum* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

short-eared owl, *Asio flammeus* (SC)

western burrowing owl, *Athene cunicularia hypugaea* (SC)

American bittern, *Botaurus lentiginosus* (SC)

ferruginous hawk, *Buteo regalis* (SC)

Vaux's swift, *Chaetura vauxi* (SC)

lark sparrow, *Chondestes grammacus* (SC)

olive-sided flycatcher, *Contopus cooperi* (SC)

hermit warbler, *Dendroica occidentalis* (SC)

white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

Pacific-slope flycatcher, *Empidonax difficilis* (SC)

common loon, *Gavia immer* (SC)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

Harlequin duck, *Histrionicus histrionicus* (SC)

loggerhead shrike, *Lanius ludovicianus* (SC)
San Pablo song sparrow, *Melospiza melodia samuelis* (SC)
long-billed curlew, *Numenius americanus* (SC)
rufous hummingbird, *Selasphorus rufus* (SC)
Allen's hummingbird, *Selasphorus sasin* (SC)
red-breasted sapsucker, *Sphyrapicus ruber* (SC)
Xantus' murrelet, *Synthliboramphus hypoleucus* (SC)
California thrasher, *Toxostoma redivivum* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)
California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

Northern red-legged frog, *Rana aurora aurora* (SC)
foothill yellow-legged frog, *Rana boylii* (SC)
western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

green sturgeon, *Acipenser medirostris* (SC)
Russian River tule perch, *Hysterocarpus traski pomo* (SC)
Pacific lamprey, *Lampetra tridentata* (SC)
Gualala roach, *Lavinia symmetricus parvipinnis* (SC)
longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Sonoma arctic skipper, *Carterocephalus palaemon ssp* (SC)
sandy beach tiger beetle, *Cicindela hirticollis gravida* (SC)
globose dune beetle, *Coelus globosus* (SC)
brownish dubiraphian riffle beetle, *Dubiraphia brunnescens* (SC)
Ricksecker's water scavenger beetle, *Hydrochara rickseckeri* (SC)
Leech's skyline diving beetle, *Hydroporus leechi* (SC)
bumblebee scarab beetle, *Lichnanthe ursina* (SC)

Plants

northcoast sand-verbena, *Abronia umbellata ssp. breviflora* (SC)
Blasdale's bentgrass, *Agrostis blasdalei var. blasdalei* (SC)
Baker's manzanita, *Arctostaphylos bakeri ssp. bakeri* (SC)
Vine Hill manzanita, *Arctostaphylos densiflora* (SC)
Rincon manzanita, *Arctostaphylos stanfordiana ssp. decumbens* (SC)
Thurber's reedgrass, *Calamagrostis crassiglumis* (SC)
The Cedars globe-lily, *Calochortus raichei* (SC)
Mt. Saint Helena morning-glory, *Calystegia collina ssp. oxyphylla* (SC)
swamp harebell, *Campanula californica* (SC)

salt marsh owl's clover (=johnny-nip), *Castilleja ambigua ssp. ambigua* (SC)
Rincon Ridge ceanothus, *Ceanothus confusus* (SC)
Calistoga ceanothus, *Ceanothus divergens* (SC)
Vine Hill ceanothus, *Ceanothus foliosus var. vineatus* (SC)
Sonoma ceanothus, *Ceanothus sonomensis* (SC)
San Francisco Bay spineflower, *Chorizanthe cuspidata var. cuspidata* (SC)
northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris* (SC)
Mendocino cypress, *Cupressus goveniana ssp. pigmaea* (SC)
supple daisy, *Erigeron supplex* (SC)
Snow Mountain buckwheat, *Eriogonum nervulosum* (SC)
San Francisco wallflower, *Erysimum franciscanum* (SC)
fragrant fritillary, *Fritillaria liliacea* (SC)
seaside tarplant, *Hemizonia multicaulis ssp. multicaulis* (SC)
Tiburon tarplant, *Hemizonia multicaulis ssp. vernalis* (SC)
two-carpeled dwarf-flax, *Hesperolinon bicarpellatum* (SC)
coast lily, *Lilium maritimum* (SC)
Gairdner's yampah, *Perideridia gairdneri ssp. gairdneri* (SC)
northcoast semaphore grass, *Pleuropogon hooverianus* (SC)
Marin knotweed, *Polygonum marinense* (SC)
California beaked-rush, *Rhynchospora californica* (SC)
Marin checkermallow, *Sidalcea hickmanii ssp. viridis* (SC)
Pacific cordgrass (=California cordgrass), *Sparina foliosa* (SC)
Contact (Socrates) Mine jewelflower, *Streptanthus brachiatus ssp. brachiatus* (SC)
Freed's jewelflower, *Streptanthus brachiatus ssp. hoffmanii* (SC)
secund jewelflower, *Streptanthus glandulosus var. hoffmanii* (SC)
Three Peaks jewelflower, *Streptanthus morrisonii ssp. elatus* (SC)
Dorr's Cabin jewelflower, *Streptanthus morrisonii ssp. hirtiflorus* (SC)
Kruckeberg's jewelflower, *Streptanthus morrisonii ssp. kruckebergii* (SC)
Morrison's jewelflower, *Streptanthus morrisonii ssp. morrisonii* (SC)
Santa Cruz clover, *Trifolium buckwestiorum* (SC)
alkali milk-vetch, *Astragalus tener var. tener* (SC) *
legenere, *Legenere limosa* (SC) *
Petaluma popcornflower, *Plagiobothrys mollis var. vestitus* (SC) **
woolly-headed gilia, *Gilia capitata ssp. tomentosa* (SC) *
Crystal Springs lessingia, *Lessingia arachnoidea* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	Other species of concern to the Service.
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
*	*Extirpated*	Possibly extirpated from the area.
**	*Extinct*	Possibly extinct
	Critical Habitat	Area essential to the conservation of a species.

ENCLOSURE A

Endangered and Threatened Species that May Occur in
or be Affected by Projects in the Selected Quads Listed Below

Reference File No. 1-1-01-SP-2903

August 10, 2001

QUAD : 484A PETALUMA RIVER

Listed Species

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Birds

western snowy plover, *Charadrius alexandrinus nivosus* (T)

bald eagle, *Haliaeetus leucocephalus* (T)

California clapper rail, *Rallus longirostris obsoletus* (E)

northern spotted owl, *Strix occidentalis caurina* (T)

Amphibians

California red-legged frog, *Rana aurora draytonii* (T)

Fish

delta smelt, *Hypomesus transpacificus* (T)

coho salmon - central CA coast, *Oncorhynchus kisutch* (T)

Central California Coastal steelhead, *Oncorhynchus mykiss* (T)

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)

Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha* (T)

Critical Habitat, Central Valley spring-run chinook, *Oncorhynchus tshawytscha* (T)

Invertebrates

California freshwater shrimp, *Syncaris pacifica* (E)

Plants

soft bird's-beak, *Cordylanthus mollis ssp. mollis* (E) *

Candidate Species

Amphibians

California tiger salamander, *Ambystoma californiense* (C)

Fish

Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha* (C)

Critical habitat, Central Valley fall/late fall-run chinook, *Oncorhynchus tshawytscha* (C)

Species of Concern

Mammals

Point Reyes mountain beaver, *Aplodontia rufa phaea* (SC)

Pacific western big-eared bat, *Corynorhinus (=Plecotus) townsendii townsendii* (SC)

greater western mastiff-bat, *Eumops perotis californicus* (SC)

long-eared myotis bat, *Myotis evotis* (SC)

fringed myotis bat, *Myotis thysanodes* (SC)

long-legged myotis bat, *Myotis volans* (SC)

Yuma myotis bat, *Myotis yumanensis* (SC)

Suisun ornate shrew, *Sorex ornatus sinuosus* (SC)

Point Reyes jumping mouse, *Zapus trinotatus orarius* (SC)

Birds

tricolored blackbird, *Agelaius tricolor* (SC)

grasshopper sparrow, *Ammodramus savannarum* (SC)

Bell's sage sparrow, *Amphispiza belli belli* (SC)

short-eared owl, *Asio flammeus* (SC)

western burrowing owl, *Athene cunicularia hypugaea* (SC)

ferruginous hawk, *Buteo regalis* (SC)

Western yellow-billed cuckoo, *Coccyzus americanus occidentalis* (CA)

white-tailed (=black shouldered) kite, *Elanus leucurus* (SC)

little willow flycatcher, *Empidonax traillii brewsteri* (CA)

American peregrine falcon, *Falco peregrinus anatum* (D)

saltmarsh common yellowthroat, *Geothlypis trichas sinuosa* (SC)

San Pablo song sparrow, *Melospiza melodia samuelis* (SC)

rufous hummingbird, *Selasphorus rufus* (SC)

Allen's hummingbird, *Selasphorus sasin* (SC)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (SC)

California horned lizard, *Phrynosoma coronatum frontale* (SC)

Amphibians

Northern red-legged frog, *Rana aurora aurora* (SC)

foothill yellow-legged frog, *Rana boylii* (SC)

western spadefoot toad, *Scaphiopus hammondii* (SC)

Fish

Pacific lamprey, *Lampetra tridentata* (SC)

longfin smelt, *Spirinchus thaleichthys* (SC)

Invertebrates

Marin blind harvestman, *Calicina diminua* (SC)

Sonoma arctic skipper, *Carterocephalus palaemon ssp* (SC)

Ricksecker's water scavenger beetle, *Hydrochara ricksecker*i (SC)

Plants

fragrant fritillary, *Fritillaria liliacea* (SC)

Petaluma popcornflower, *Plagiobothrys mollis var. vestitus* (SC) *

Marin knotweed, *Polygonum marinense* (SC)

KEY:

(E)	*Endangered*	Listed (in the Federal Register) as being in danger of extinction.
(T)	*Threatened*	Listed as likely to become endangered within the foreseeable future.
(P)	*Proposed*	Officially proposed (in the Federal Register) for listing as endangered or threatened.
(PX)	*Proposed Critical Habitat*	Proposed as an area essential to the conservation of the species.
(C)	*Candidate*	Candidate to become a *proposed* species.
(SC)	*Species of Concern*	May be endangered or threatened. Not enough biological information has been gathered to support listing at this time.
(MB)	*Migratory Bird*	Migratory bird
(D)	*Delisted*	Delisted. Status to be monitored for 5 years.
(CA)	*State-Listed*	Listed as threatened or endangered by the State of California.
(*)	*Extirpated*	Possibly extirpated from this quad.
(**)	*Extinct*	Possibly extinct.
	Critical Habitat	Area essential to the conservation of a species.

APPENDIX D

Traffic Master Plan
City of Petaluma, California
Lakeville Highway Water Recycling Facility Project
Final Report
Prepared for Carollo Engineers
by DKS Associates

March 2002

TRAFFIC MASTER PLAN
City of Petaluma, California
Lakeville Highway Water Recycling Facility Project

Final Report

Prepared for

Corollo Engineers

By

***DKS** Associates*
1956 Webster Street, Suite 300
Oakland, CA 94612
(510) 763-2061

March 2002

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Existing Conditions

Lakeville Highway (State Route 116) is an17.7 km (11 miles) highway connecting State Route 37 to Highway 101 in Sonoma County. In the vicinity of the Lakeville Highway Water Recycling Facility the highway has two mainline travel lanes in each direction and the speed limit is 88 KPH (55 MPH). Lakeville Highway (State Route 116) widens to four lanes at Pine View Way where the speed limit is reduced to 72 KPH (45 MPH). The highway's volume consists of 8.9% truck traffic. Caltrans has 18.2 meters (60 ft) of right of way for the highway.

The Lakeville Highway Water Recycling Facility is parallel to Lakeville Highway (State Route 116) for 850 m (2790 ft) and currently has two entrances, the West Gate and the East Gate as illustrated in Figure 1. Ellis Creek is located 36m (120 ft) along Lakeville Highway (State Route 116) west of the western boundary of the Lakeville Highway Water Recycling Facility. Ellis Creek Bridge is 30 m (100 ft) from the West Gate. There are two 3.4 m (11 ft) lanes and two 1.8 m (6 ft) shoulders on the bridge. The Lakeville Highway Water Recycling Facility is located in a rural area. The intersections closes to Lakeville Highway Water Recycling Facility are Browns Lane, Pine View Avenue and South Mc Dowell Extension, as illustrated with the existing lane configuration in Figure 2.

At the West Gate the entrance is 3.6 m (12 ft) at the gate and 33.5 m (110 ft) wide where the entrance meets Lakeville Highway (State Route 116) as illustrated in Figure 3. Lakeville Highway (State Route 116) has two 3.6 m (12 ft) lane and two 2.4 m (8 ft) shoulders with 0.9 m (3 ft) on either side for shoulder backing. There is overhead power along the highway. The sight distance along Lakeville Highway (State Route 116) to the west is 172.2 m (565 ft) and to the east is unlimited.

At the East Gate the entrance is 4.1 m (13.5 ft) at the gate and 24.4 m (80 ft) wide where the entrance meets Lakeville Highway (State Route 116) as illustrated in Figure 4. Lakeville Highway (State Route 116) has two 3.6 m (12ft) lane and two 2.4 m (2.8 ft) shoulders. East of the gate there is a 1200 mm (48 in) diameter culvert 1.5 m (5 ft) from the highway edge. There is also a guardrail to the east of the gate along the highway. Across from the East Gate there is a driveway (Traca Road).

Midway between the two access points, Browns Lane forms a tee intersection with Lakeville Highway as illustrated in Figure 5. At this intersection, Lakeville Highway has two 11 ft (3.4 m) lanes, two 2.1 m (7 ft) shoulders and no curbs and gutters. The approach lane on Browns Lane is 3.6 m (12 ft) while the departure lane varies. There is no street lighting and no shoulders along Browns Lane. The sight distance to the east on Lakeville Highway is 245.9 m (807 ft).

To the west of the Lakeville Highway Water Recycling Facility is the intersection of Pine View Avenue and Lakeville Highway (State Route 116), which provides access to the business park as, illustrated in Figure 6. Pine View Avenue forms a tee intersection with Lakeville Highway (State Route 116). Pine View Avenue has 5.5 m (18 ft) approach and

departure lanes, a 4.6 m (15 ft) median, a stop sign and no lighting. Lakeville Highway (State Route 116) has two 3.4 m (11 ft) eastbound lanes, one 3.4 m (11ft) westbound through lane, one 3.4 m (11ft) westbound left-turn land, and 2.4 m (8ft) shoulders. There are no curbs or gutters on Lakeville Highway (State Route 116).

The intersection to the west of Pine View Avenue and Lakeville Highway (State Route 116) is the tee intersection of South McDowell Extension and Lakeville Highway (State Route 116) as illustrated in Figure 7. South McDowell Extension has 5.5 m (18ft) approach and departure lanes, a 4.6 m (15 ft) median, a stop sign and no lighting. Lakeville Highway (State Route 116) has two 3.4 m (11 ft) eastbound lanes, one 3.4 m (11 ft) westbound through lane, one 3.4 m (11 ft) westbound left-turn land, and 2.4 m (8 ft) shoulders. There are no curbs or gutters on Lakeville Highway (State Route 116). The sight distance to the west on Lakeville Highway (State Route 116) is 245.9 m (807 ft).

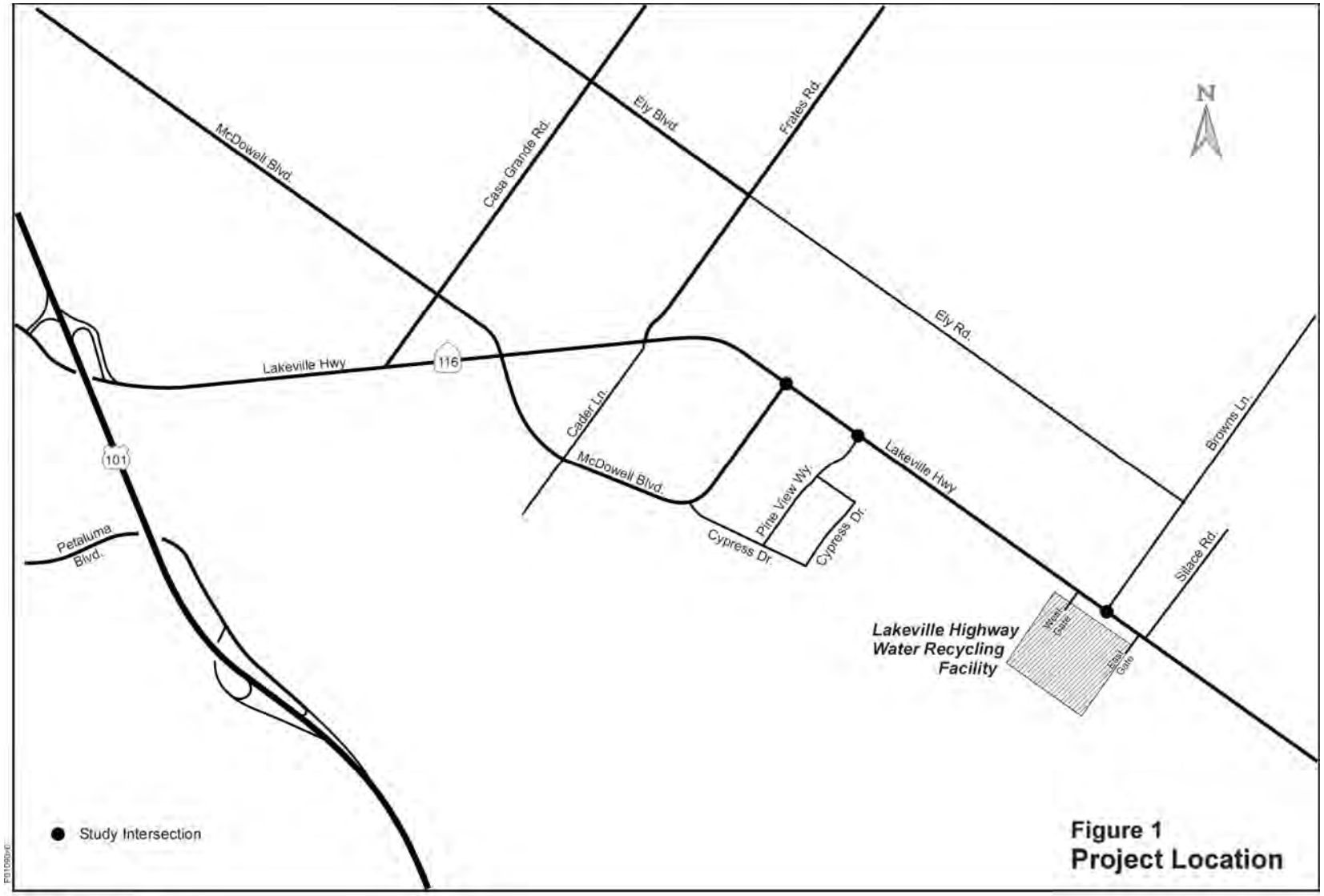

Figure 1
Project Location

***DKS** Associates*

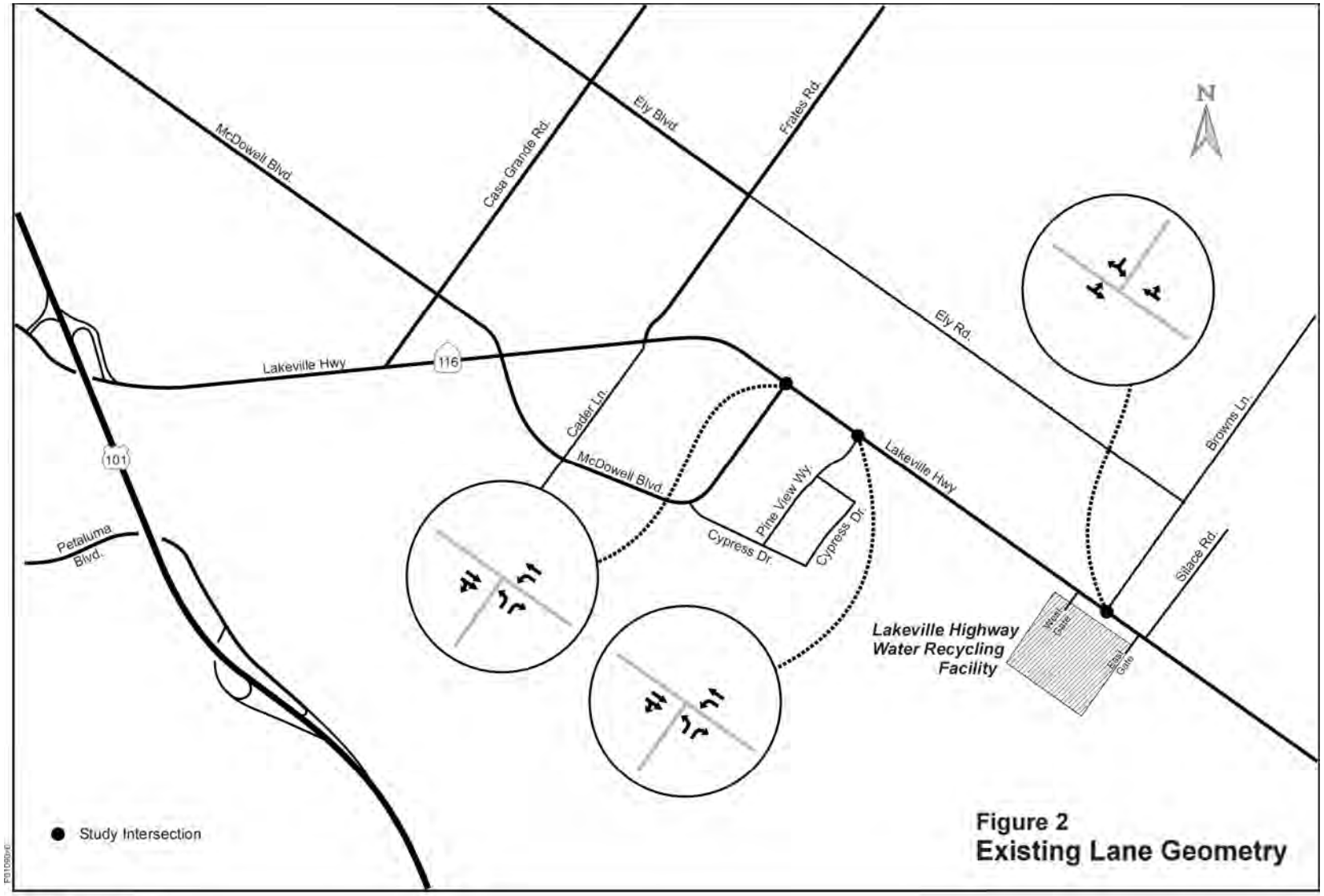

Figure 2
Existing Lane Geometry

DKS *Associates*

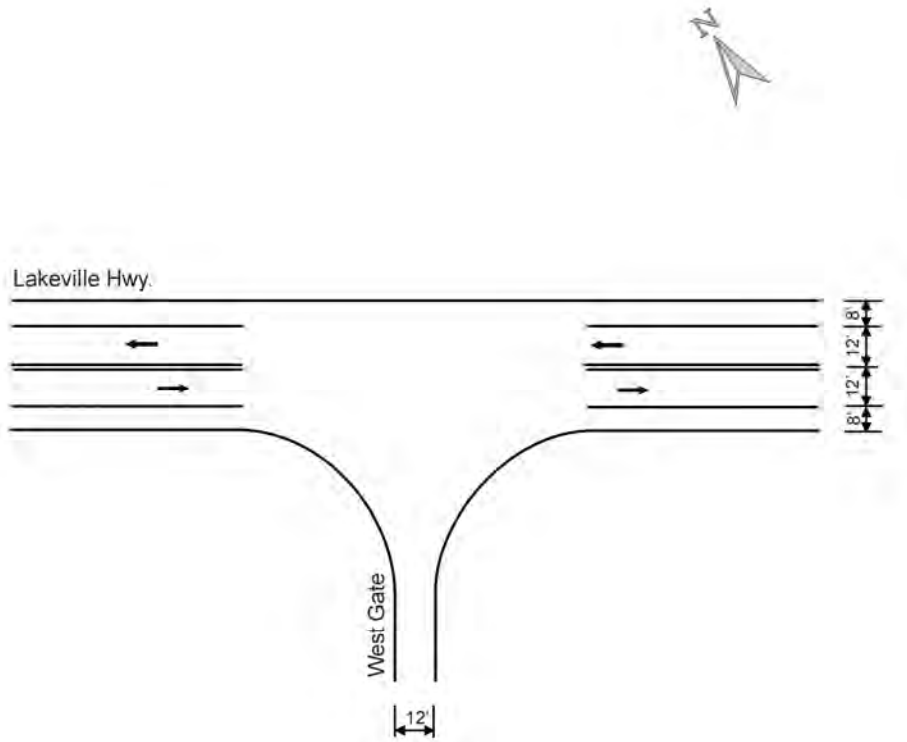

Figure 3
Existing Conditions
Lakeville Hwy./West Gate

P0109(1)(x)

DKS *Associates*

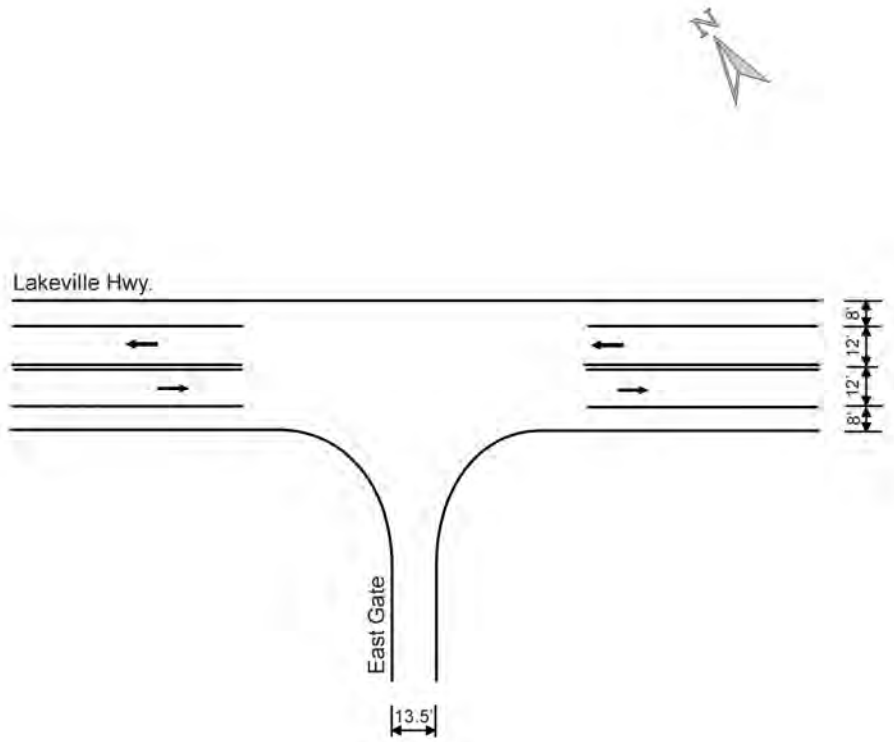

Figure 4
Existing Conditions
Lakeville Hwy./East Gate

P0106(1)(x)

***DKS** Associates*

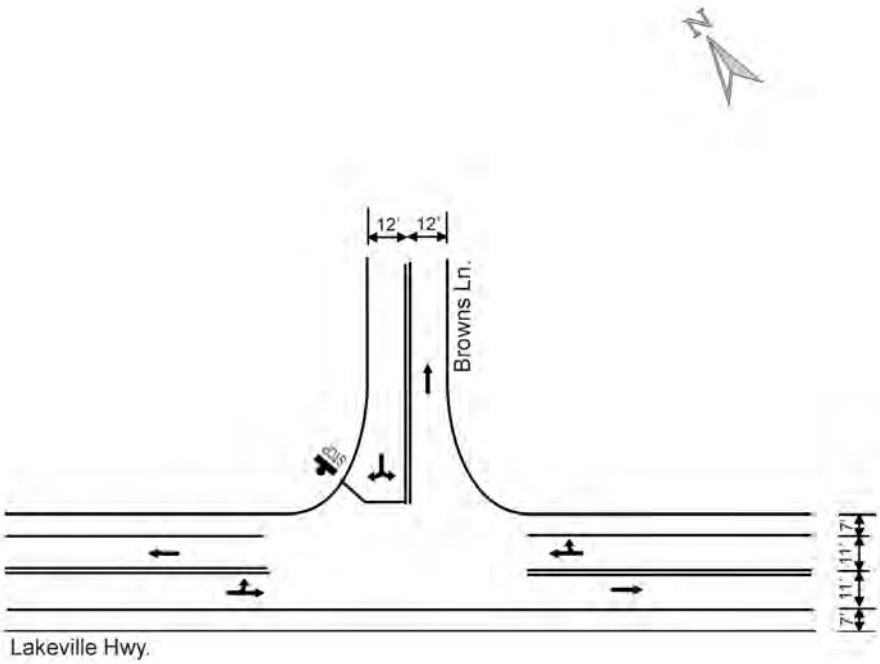

Figure 5
Existing Conditions
Lakeville Hwy./Browns Lane

P0109(1)(x)

***DKS** Associates*

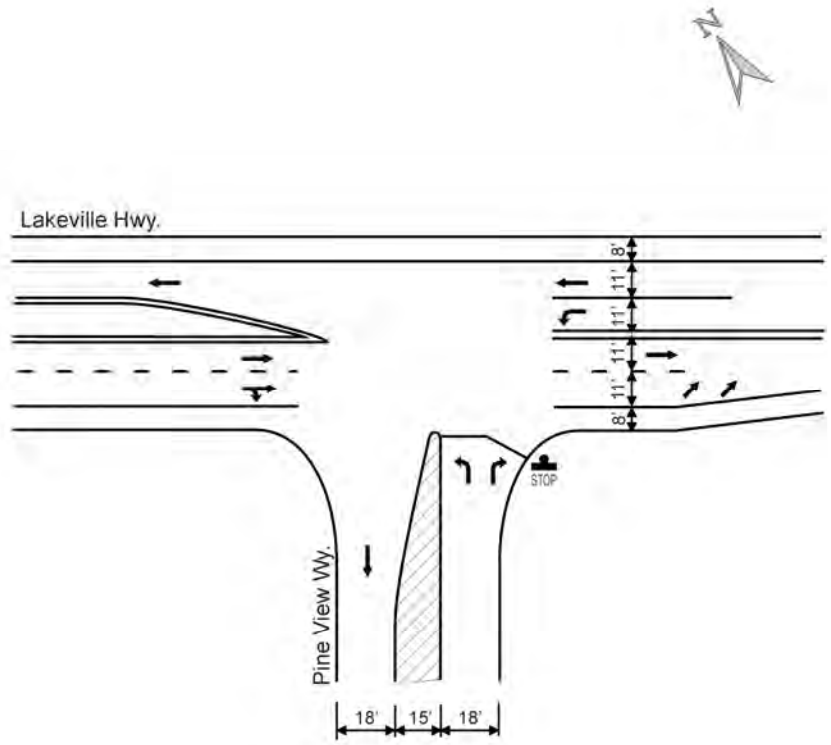

Figure 6
Existing Conditions
Lakeville Hwy./Pine View Wy.

P0109(1)(2)

DKS *Associates*

Transit

Petaluma Transit Route 2 runs along Lakeville Highway (State Route 116) from Frates Road and turns left onto Pine View Way. The bus then turns onto Cypress Drive which the route follows that until it meets South McDowell Extension. The route follows South McDowell Boulevard across Lakeville Highway (State Route 116).

There are no transit routes along Lakeville Highway (State Route 116) where the Lakeville Highway Water Recycling Facility is located.

Accidents

According to Caltrans' records, within a three-year period from April 1, 1998 to March 31, 2001, 20 accidents occurred on Lakeville Highway (State Route 116) in between Frates Road and just past Traca Road, Post Kilometers 58.7 and 61.9 (Post Miles 36.5 and 38.5). Of the 20 reported accidents, 11 were resulted in injuries. 40% of the accidents were caused from the drivers' failure to yield. 3 of the accidents are attributed to speeding, 2 were caused from drivers following too close, 2 were caused from drivers falling asleep, 1 was an alcohol influenced accident, and 4 were caused by other violations. The types of collisions that resulted include rear ends (5), hit objects (5), broadsides (5), sideswipe (4), and head-on (1). Most of the accidents occurred under daylight (75%), clear (75%) and dry (85%) conditions.

One of the accidents occurred at the intersection of South McDowell and Lakeville Highway (State Route 116) and another seven occurred at the intersection of Pine View Avenue and Lakeville Highway (State Route 116). Seven accidents occurred in the 1.6 m (1 mile) along Lakeville Highway from Pine View Avenue to the East Gate. Accident data obtained from Caltrans is provided in Appendix A.

According to the Petaluma Police Department the following accidents occurred from 1999 through 2001 (as summarized in Table 1) along Pine View Way and Cypress Drive.

Table 1 - Accident Summary

Accident Summury of Pine View Way and Cypress Drive
1999-2001

Year	Intersection	Location	Type of Collision	Injury
1999	Pine View Way and Cypress Drive (S)	In the intersection	Broadside	1
1999	Pine View Way and Lakeville Highway	30 ft west of the intsection	Rear-End	0
2000	Pine View Way and Lakeville Highway	50 ft west of the intsection	Rear-End	1
2001	Pine View Way and Lakeville Highway	In the intersection	Other	1
2001	Pine View Way and Cypress Drive (S)	528 ft east of the intsection	Broadside	0
2001	Pine View Way and Lakeville Highway	250 ft south of the intsection	Broadside	1

Source : Petaluma Police Department

Existing Traffic Conditions

Traffic counts were conducted at the intersections of Browns Lane and Lakeville Highway (State Route 116), Pine View Way and Lakeville Highway (State Route 116) as well as S. McDowell Extension and Lakeville Highway (State Route 116). The data was collected September 19, 2001 between 7:00 and 9:00 AM and 4:00 to 6:00 PM. The peak hour counts for each intersection are depicted in Figure 8.

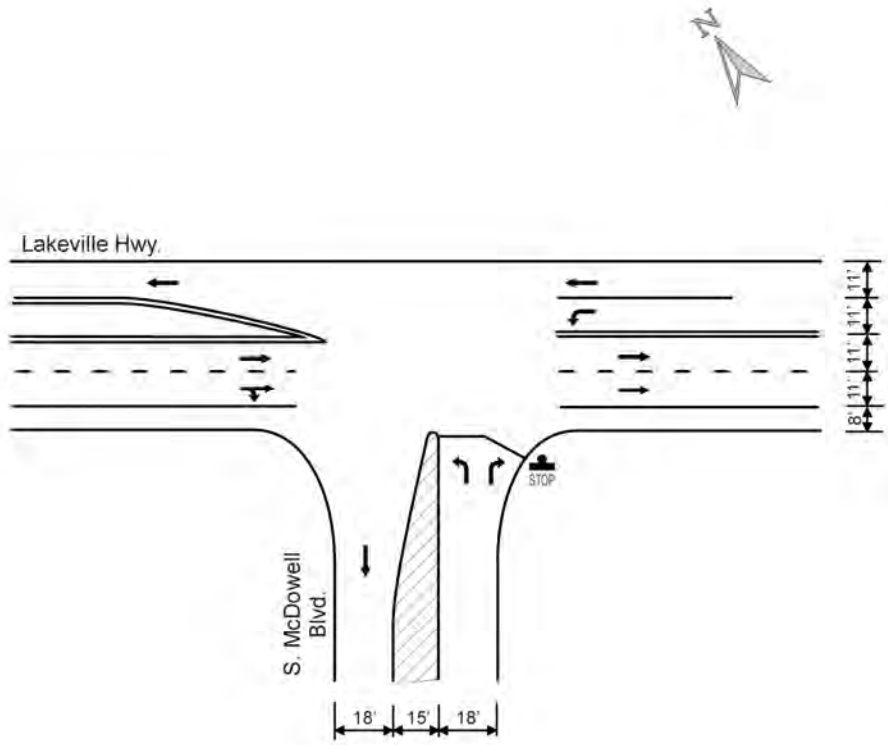

Figure 7
Existing Conditions
Lakeville Hwy./S. McDowell Blvd.

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***DKS** Associates*

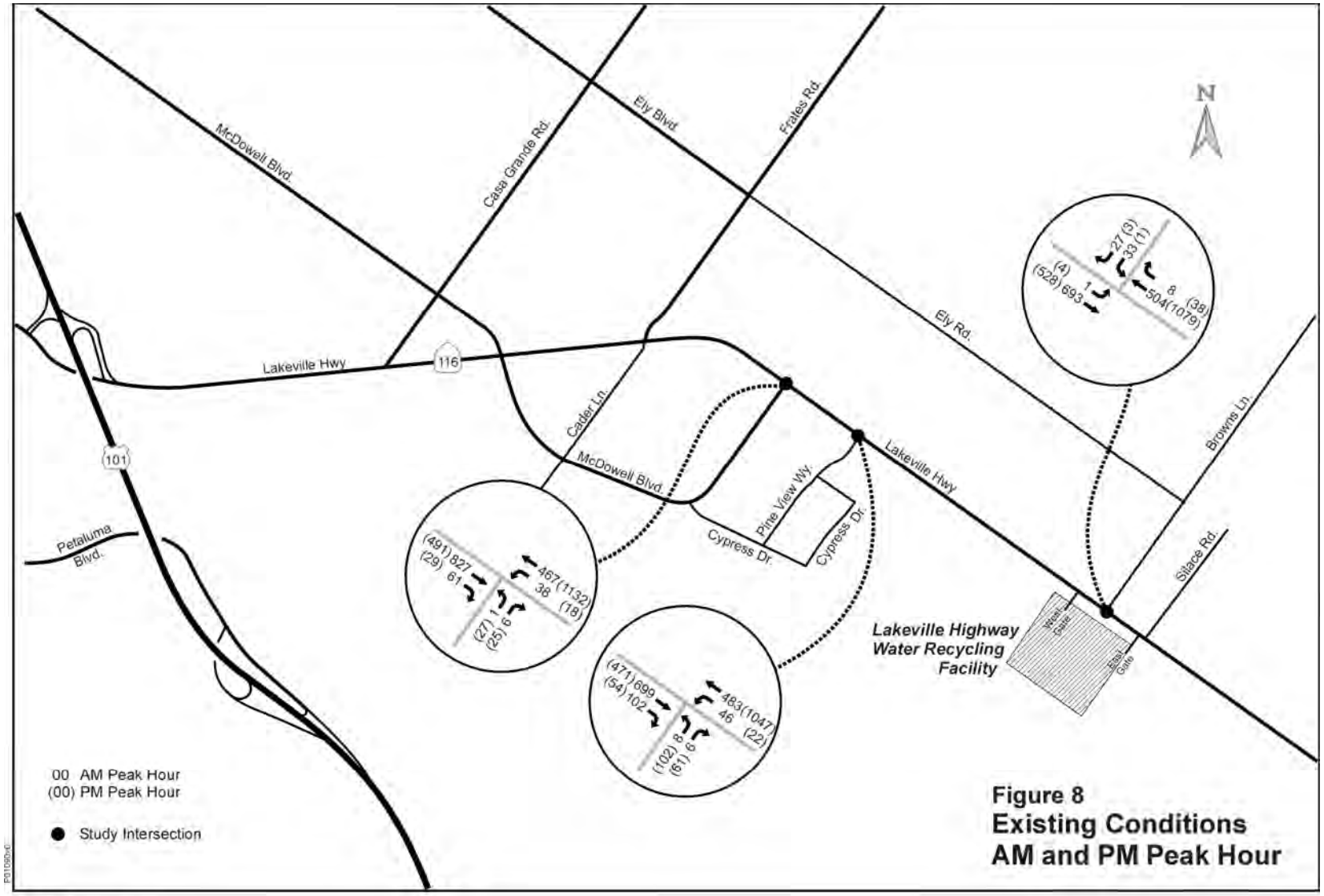

Figure 8
Existing Conditions
AM and PM Peak Hour

***DKS** Associates*

Existing intersection operations were evaluated using the *Highway Capacity Manual (HCM)* 2000 methodology with existing traffic volumes. The AM and PM peak hours for each intersection was analyzed. The level of service results for the AM and PM peak hours are summarized in Table 2. For unsignalized intersections, the *HCM* methodology rates the level of service on the movement with the highest delay at the intersection.

Table 2 - Existing Conditions Level of Service Summary

Level of Service Summary
Exsiting Conditions

	Existing Conditions			
	AM		PM	
Intersection	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**
Lakeville Highway and Browns Lane	34.6	D	36.5	E
Lakeville Highway and Pine View Way	27.1	D	>100	F
Lakeville Highway and S. McDowell Ext.	14.7	B	30.3	D

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

Level of service can range from "A" representing free-flow conditions, to "F" representing extremely long delays. LOS B and C signify stable conditions with acceptable delays. LOS D is typically considered acceptable for peak hour in urban areas. LOS E is approaching capacity and LOS F represents conditions at or above capacity. The Table 3 contains the correlation between control delay and level of service for signalized and unsignalized intersections. Control delay is the component of delay that results when a traffic control device, traffic signal or stop sign, causes a lane group to reduce speed or to stop.

Table 3 - Intersection LOS Thresholds

Level Of Service	Signalized Control Delay per Vehicle (seconds/vehicle)	Unsignalized Control Delay per Vehicle (seconds/vehicle)
A	Delay ≤ 10	Delay ≤ 10
B	10 < Delay ≤ 20	10 < Delay ≤ 15
C	20 < Delay ≤ 35	15 < Delay ≤ 25
D	35 < Delay ≤ 55	25 < Delay ≤ 35
E	55 < Delay ≤ 80	35 < Delay ≤ 50
F	Delay > 80	Delay > 50

Note:
1) At two-way stop controlled (unsignalized) intersections, the LOS is presented for the worst approach.

Source: Highway Capacity Manual, Transportation research Board, Washington D.C. 2000, DKS Associates

Future Traffic Conditions

Future intersection operations were evaluated using the *Highway Capacity Manual (HCM)* 2000 methodology with the projected 2021 traffic volumes. The existing traffic volumes were projected based on a 4% growth rate. This growth rate was determined using Caltrans highway traffic volumes comparing the data of 1992 to 2000.

The AM and PM peak hours for each intersection was analyzed. The level of service results for the AM and PM peak hours are summarized in Table 4. For unsignalized intersections, the *HCM* methodology rates the level of service on the movement with the highest delay at the intersection. The peak hour counts for each intersection are depicted in Figure 9.

Table 4 - 2021 Conditions Level of Service Summary

Level of Service Summary **Projected Conditions**				
	2021 Conditions			
	AM		**PM**	
Intersection	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**
Lakeville Highway and Browns Lane	70.4	F	>100	F
Lakeville Highway and Pine View Way	>100	F	>100	F
Lakeville Highway and S. McDowell Ext.	98.5	F	>100	F

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

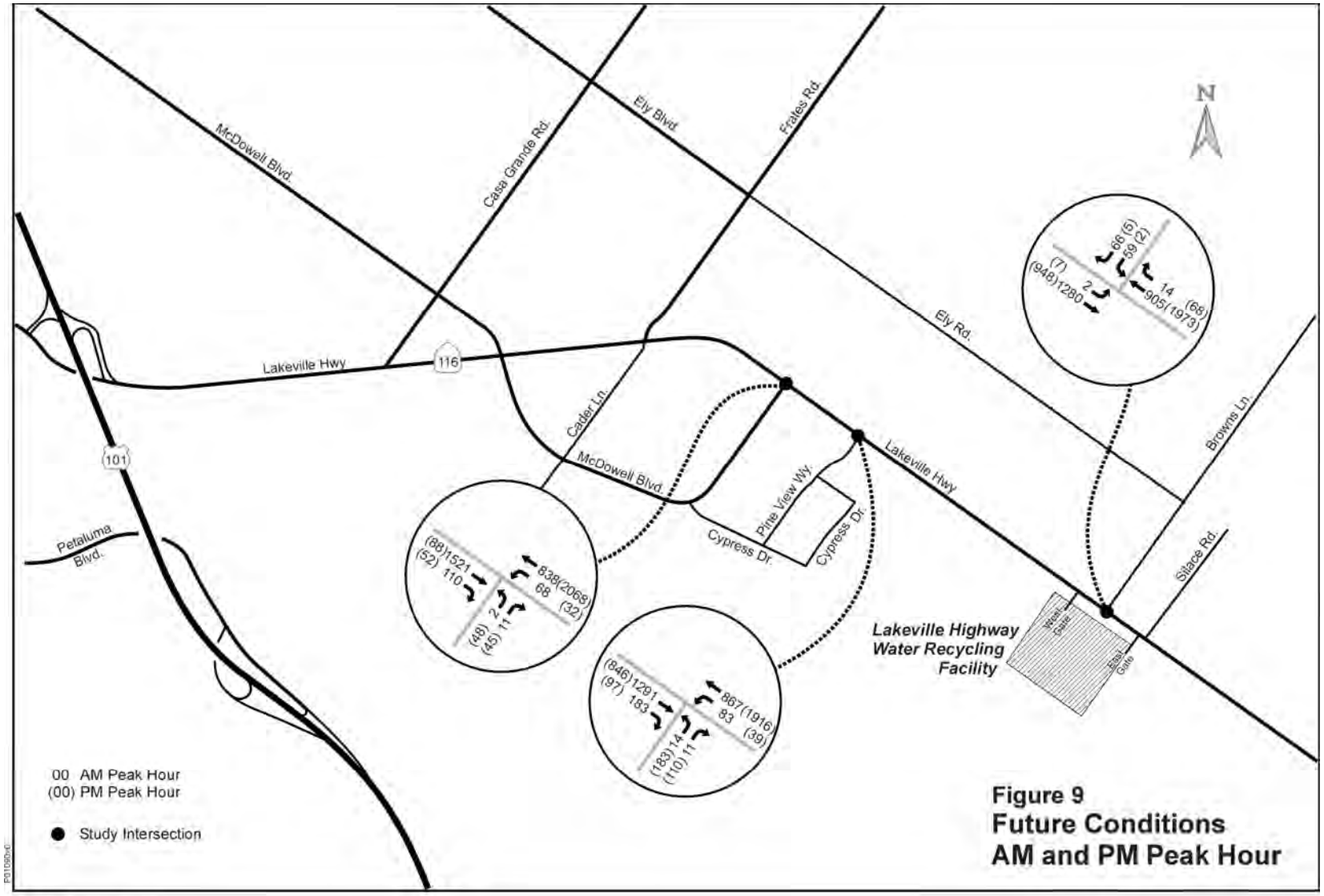

Figure 9
Future Conditions
AM and PM Peak Hour

***DKS** Associates*

Alternatives

Alternative 1

Alternative 1 allows access to the Lakeville Highway Water Recycling Facility at both the West Gate and the East Gate. Lakeville Highway (State Route 116) will be widened to accommodate new acceleration and deceleration lanes. The new highway configurations are depicted in Figures 10 through 12. Alternative 1 allows a right turn in and out as well as a left turn in and out at the East Gate, along with right turns in and out of the West Gate. There will be a frontage road inside the facility connecting the two gates.

The west side of the East Gate will have two 2.4m (8 ft) shoulders and a 3.6 m (12 ft) through travel lane in both the east and west direction. A 3.6 m (12 ft) wide deceleration lane would be added to accommodate the traffic turning right into the Lakeville Highway Water Recycling Facility. The deceleration lane would be 198 m (660 ft) long.

The east side of the East Gate will have two 2.4m (8 ft) shoulders and a 3.6 m (12 ft) through travel lane in both the east and west direction. A 3.6 m (12 ft) wide acceleration lane would be added to accommodate the traffic turning right onto Lakeville Highway (State Route 116). The acceleration lane would be 198 m (660 ft) long. A 3.6 m (12 ft) wide left-turn bay would be added to accommodate the traffic turning left into the Lakeville Highway Water Recycling Facility. The left-turn bay would be 18 m (60 ft) long and would be accompanied by a 36 m (120 ft) deceleration lane. The left-turn bay will provide for a safe-stopping distance without impacting the through movement. A taper will accompany this left-turn bay and it complies with Caltrans standards.

At the West Gate, the through travel lane in both the east and west direction will be a 3.6 m (12 ft) lane. The highway is limited in its ability to widen due to the bridge 30 m (100 ft) west of the West Gate. However, the driveway will be widened to accommodate the traffic turning right into and out of the Lakeville Highway Water Recycling Facility at the West Gate as illustrated in Figure 12. The modified driveway will be 9.1m (30 ft) wide at the gate and 54.8 m (180 ft) where it meets Lakeville Highway (State Route 116). The edge of the driveway is 7.6 m (25 ft) from the bridge.

The west side of the West Gate will have a 2.4m (8 ft) shoulder on the north side of the highway and a 2.4 m (8 ft) shoulder on the south side of the highway. The east side of the West Gate will have two 2.4m (8 ft) shoulders and a 3.6 m (12 ft) through travel lane in both the east and west direction.

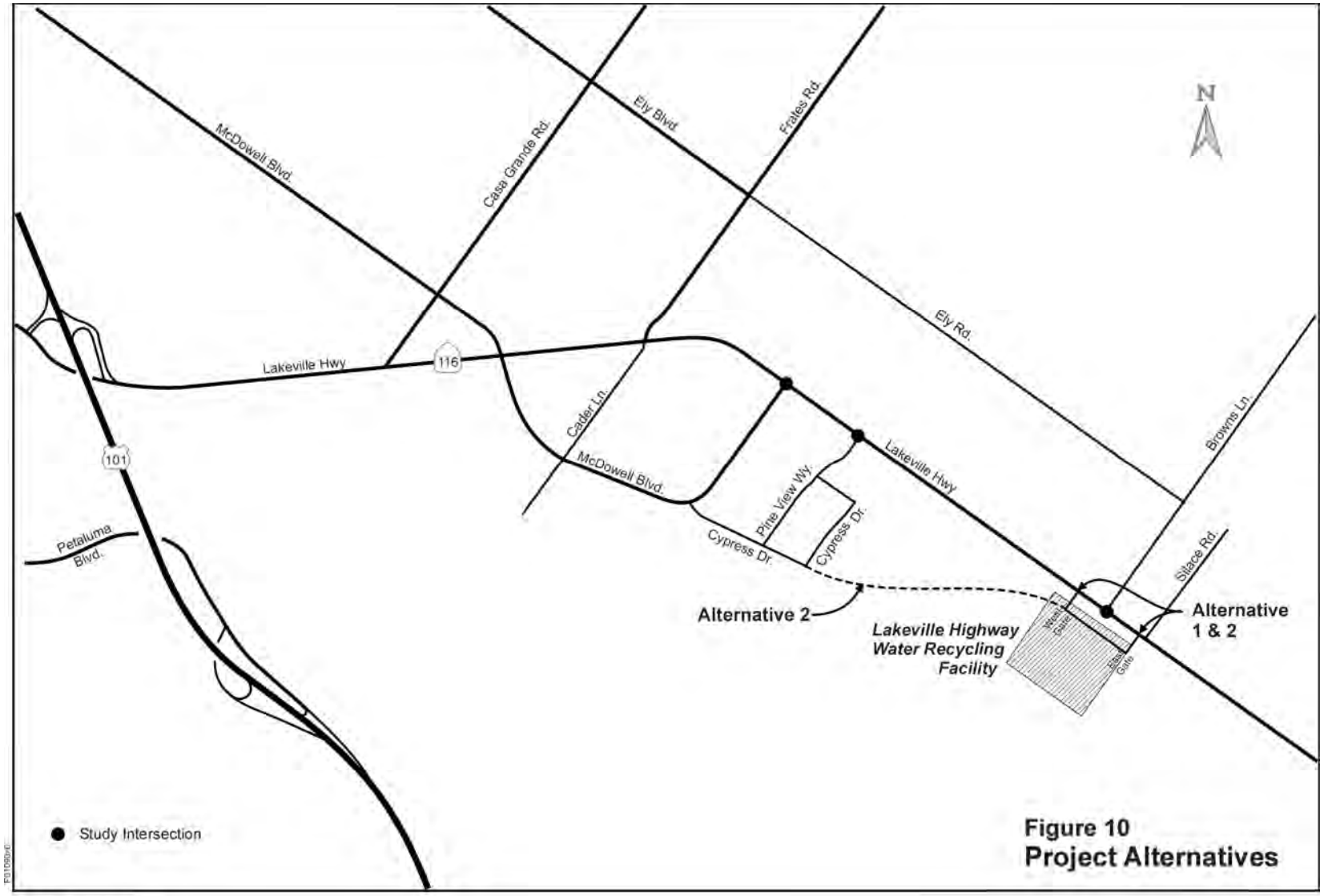

Figure 10
Project Alternatives

DKS Associates

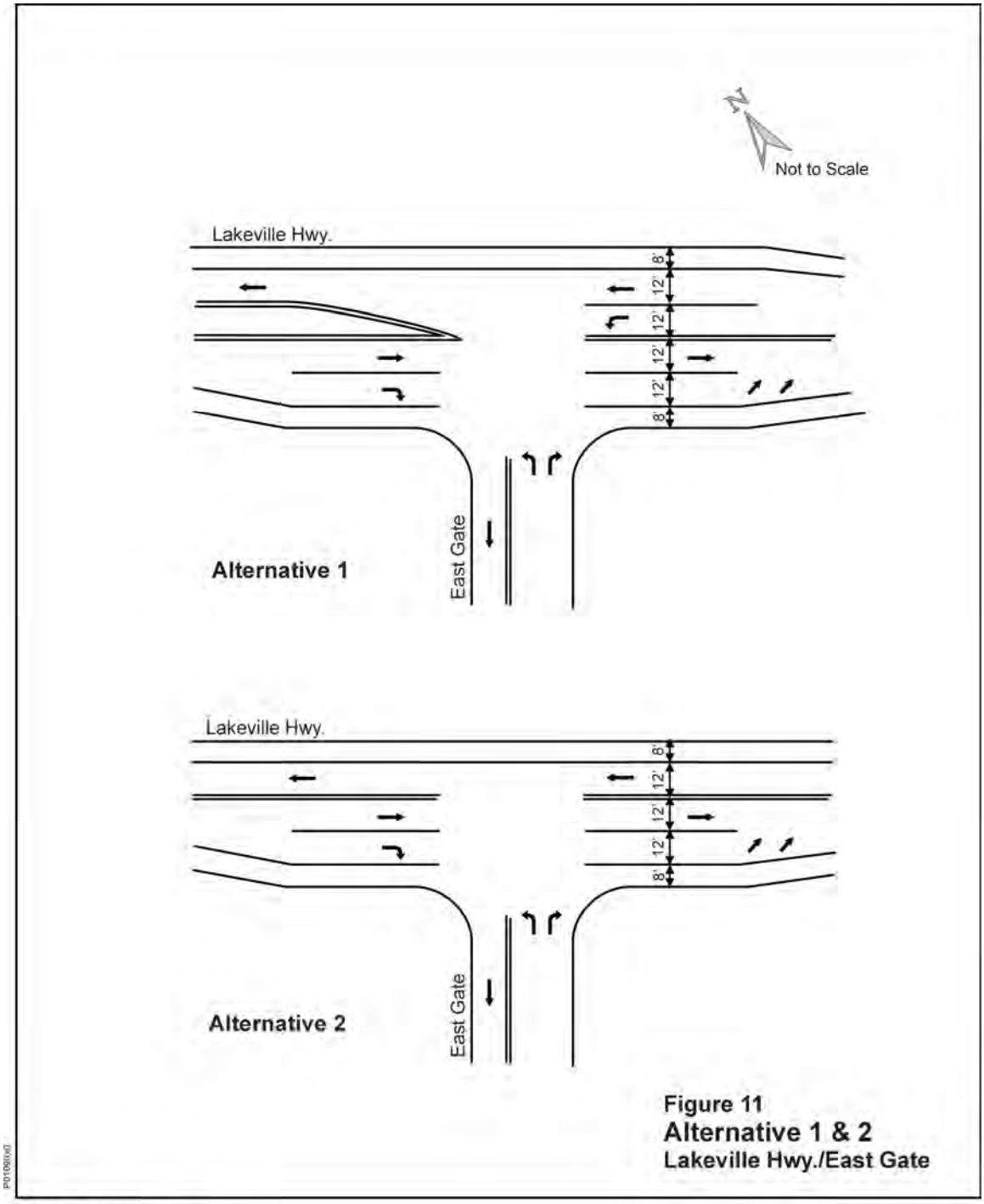

Figure 11
Alternative 1 & 2
Lakeville Hwy./East Gate

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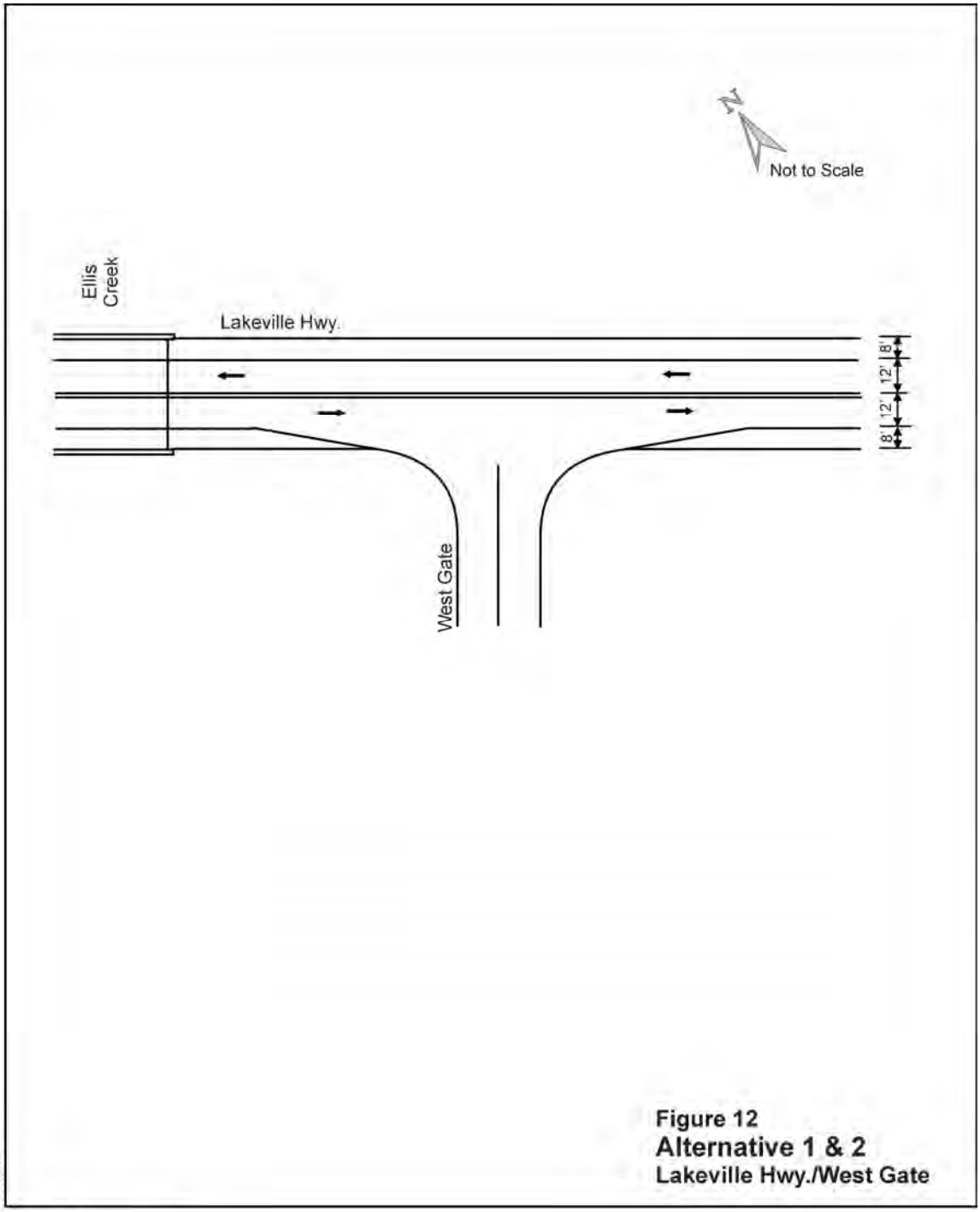
***DKS** Associates*



***DKS** Associates*

Alternative 2
Alternative 2 allows access to the Lakeville Highway Water Recycling Facility at both the West Gate and the East Gate. Lakeville Highway (State Route 116) will be widened to accommodate new acceleration and deceleration lanes. The new highway configurations are depicted in Figures 10 through 12. This alternative allows a right turn in and out of the East Gate, along with right turns in and out of the West Gate. There will be a frontage road inside the facility connecting the two gates.

Alternative 2 will also connect Lakeville Highway Water Recycling Facility to the business park from Cypress Avenue as illustrated in Figure 10. This would provide a third access point to the Lakeville Highway Water Recycling Facility.

The west side of the East Gate will have two 2.4m (8 ft) shoulders and a 3.6 m (12 ft) through travel lane in both the east and west direction. A 3.6 m (12 ft) wide deceleration lane would be added to accommodate the traffic turning right into the Lakeville Highway Water Recycling Facility. The deceleration lane would be 198 m (660 ft) long.

The east side of the East Gate will have two 2.4m (8 ft) shoulders and a 3.6 m (12 ft) through travel lane in both the east and west direction. A 3.6 m (12 ft) wide acceleration lane would be added to accommodate the traffic turning right onto Lakeville Highway (State Route 116) from the Lakeville Highway Water Recycling Facility.

At the West Gate, the through travel lane in both the east and west direction will be a 3.6 m (12 ft) lane. The highway is limited in its ability to widen due to the bridge 30 m (100 ft) west of the West Gate. However, the driveway will be widened to accommodate the traffic turning right into and out of the Lakeville Highway Water Recycling Facility at the West Gate as illustrated in Figure 12. The modified driveway will be 9.1m (30 ft) wide at the gate and 54.8 m (180 ft) where it meets Lakeville Highway (State Route 116). The edge of the driveway is 7.6 m (25 ft) from the bridge.

The west side of the West Gate will have a 2.4m (8 ft) shoulder on the north side of the highway and a 2.4 m (8 ft) shoulder on the south side of the highway. The east side of the West Gate will have two 2.4m (8 ft) shoulders and a 3.6 m (12 ft) through travel lane in both the east and west direction.

Existing Traffic Conditions with Project

Preliminary traffic volumes for the Lakeville Highway Water Recycling Facility are summarized in Table 5. These volumes were added to the existing traffic volumes. The Existing plus project intersection operations were evaluated using the *Highway Capacity Manual (HCM)* 2000 methodology with existing plus project traffic volumes. The AM and PM peak hours for each intersection was analyzed. The level of service results for the AM and PM peak hours are summarized in Table 6. For unsignalized intersections, the *HCM* methodology rates the level of service on the movement with the highest delay at the intersection.

Table 5 - Preliminary Traffic Volumes

Preliminary Traffic Counts Water Recycling Facility City of Petaluma, California				
	Process	**Media**	**May – October Vehicles/Month**	**November – April Vehicles/Month**
Trucks				
	Primary(1)	Grit Screenings	4	4
	Secondary(2)	Sludge	21	21
	Tertiary(3)	Alum, Polymer, Hypochlorite, & Bisulfite	3	10
		SUBTOTAL	28	35
Cars				
	Administrative Workers(4)	Passengers	450	450
	Operations Workers(5)	Passengers	300	300
		SUBTOTAL	750	750
		TOTALS	778	785

(1) Headworks trucks assume flow of 8 MGD.
(2) Secondary Process assumes full 7-day operation during maximum month.
(3) Hypochlorite/Bisulfite assume 8 MGD while Alum/Polymer assumes 8 MGD after secondary effluent.
(4) Assumes 15 workers (one car each) 20 days per month for a total of 300 trips. In addition 150 misc. trips to/from site.
(5) Assumes 15 workers (one car each) 20 days each month

Table 6 - Existing plus Project Conditions Level of Service Summary

Level of Service Summary Existing plus Projected Conditions				
	Existing plus Project Conditions			
	AM		PM	
Intersection	Delay[a]	LOS[b]	Delay[a]	LOS[b]
Lakeville Highway and Browns Lane	34.6	D	36.5	E
Lakeville Highway and Pine View Way	27.1	D	>100	F
Lakeville Highway and S. McDowell Ext.	14.9	B	32.4	D
Lakeville Highway and East Gate (Alt. 1)	9.7	A	12.8	B
Lakeville Highway and West Gate (Alt. 1)	0	0	12.7	B
Lakeville Highway and East Gate (Alt. 2)	12.8	B	12.8	B
Lakeville Highway and West Gate (Alt. 2)	0	0	12.9	B

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

If the employment as shown in Table 5 was increased by as much as 100% the design as proposed will still be functional.

A wetland park visitor area created in conjunction with the Lakeville Highway Water Recycling Project will generate approximately 100 visitors a day. The viewing area would be accessible from two points: one access point is the unsignalized access road from Cypress Drive within the business park, the other access point is the western most access driveway (right in/right out only). The AM and PM peak hours for each study intersection was analyzed adding the trips generated by the viewing area to the 2001 volumes. The level of service results for the AM and PM peak hours for the following intersections are summarized in Table 7 Brown Lane and Lakeville Highway, Pine View Way and Lakeville Highway, and S. McDowell Extension and Lakeville Highway. For unsignalized intersections, the *HCM* methodology rates the level of service on the movement with the highest delay at the intersection.

Table 7 - Existing plus Project Traffic Conditions with Wetland Park

Level of Service Summary Existing plus Projected Conditions								
	Existing plus Project Conditions				Existing plus Project Conditions witn Wetland Park			
	AM		PM		AM		PM	
Intersection	Delay[a]	LOS[b]	Delay[a]	LOS[b]	Delay[a]	LOS[b]	Delay[a]	LOS[b]
Lakeville Highway and Browns Lane	34.6	D	36.5	E	34.6	D	36.5	E
Lakeville Highway and Pine View Way	27.1	D	>100	F	34.6	D	>100	F
Lakeville Highway and S. McDowell Ext.	14.9	B	32.4	D	15.1	C	33.6	D

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

Future Traffic Conditions

Preliminary traffic volumes for the Lakeville Highway Water Recycling Facility are summarized in Table 5. These volumes were added to the 2021 traffic volumes. The future plus project intersection operations were evaluated using the *Highway Capacity Manual (HCM)* 2000 methodology with existing plus project traffic volumes. The AM and PM peak hours for each intersection was analyzed. The level of service results for the AM and PM peak hours are summarized in Table 7. For unsignalized intersections, the *HCM* methodology rates the level of service on the movement with the highest delay at the intersection.

A wetland park visitor area created in conjunction with the Lakeville Highway Water Recycling Project will generate approximately 100 visitors a day. The viewing area would be accessible from two points: one access point is the unsignalized access road from Cypress Drive within the business park, the other access point is the western most access driveway (right in/right out only). The AM and PM peak hours for each study intersection was analyzed adding the trips generated by the viewing area to the projected 2021 volumes. The level of service results for the AM and PM peak hours for the following intersections are summarized in Brown Lane and Lakeville Highway, Pine View Way and Lakeville Highway, and S. McDowell Extension and Lakeville Highway. For unsignalized intersections, the *HCM* methodology rates the level of service on the movement with the highest delay at the intersection.

Table 8 - Future plus Project Conditions Level of Service Summary

Level of Service Summary
2021 Projected Conditions

	2021 Conditions			
	AM		PM	
Intersection	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**
Lakeville Highway and Browns Lane	70.4	F	>100	F
Lakeville Highway and Pine View Way	>100	F	>100	F
Lakeville Highway and S. McDowell Ext.	98.5	F	>100	F
Lakeville Highway and East Gate (Alt. 1)	13.7	B	78.3	F
Lakeville Highway and West Gate (Alt. 1)	0.0	0	20.6	C
Lakeville Highway and East Gate (Alt. 2)	0.0	0	21.3	C
Lakeville Highway and West Gate (Alt. 2)	0.0	0	21.4	C

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

Table 9 - Future Traffic Conditions with Wetland Park

Level of Service Summary Projected Conditions								
	2021 Conditions				2021 Conditions with Wetlands Viewing Area			
	AM		PM		AM		PM	
Intersection	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**
Lakeville Highway and Browns Lane	70.4	F	>100	F	70.4	F	>100	F
Lakeville Highway and Pine View Way	>100	F	>100	F	>100	F	>100	F
Lakeville Highway and S. McDowell Ext.	98.5	F	>100	F	>100	F	>100	F

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

Assessment

Alternative 1

1. Sight distance
    a. The sight distance along Lakeville Highway (State Route 116) from the West Gate to the west is 172.2 m (565 ft) and to the east is unlimited.
2. Level of Service

   a. Acceptable Level of Service for the two access points to the facility as seen in Table 6.
3. Impact to adjoining intersections
   a. The acceleration lane from the West Gate will affect the intersection of Browns Lane and Lakeville Highway (State Route 116). The acceleration lane extends 198 m (660 ft) to the east of the West Gate. Browns Lane is 183 m (600 ft) east of the West Gate.
4. Merging
   a. All vehicles exiting the Lakeville Highway Water Recycling Facility are to accelerate to a safe speed within the acceleration lanes before entering the highway.
5. Pedestrian impact
   a. Currently pedestrians use the paved shoulders, as long as there are shoulders the pedestrians will not be affected.
6. Transit

   No impact to transit because it does not run along Lakeville Highway (State Route 116) where the Lakeville Highway Water Recycling Facility is located.

Alternative 2

1. Sight distance
   a. The sight distance along Lakeville Highway (State Route 116) from the West Gate to the west is 172.2 m (565 ft) and to the east is unlimited.
2. Level of Service
   a. Acceptable Level of Service for the two access points to the facility as seen in Table 6.
3. Impact to adjoining intersections
   a. The acceleration lane from the West Gate will affect the intersection of Browns Lane and Lakeville Highway (State Route 116). The acceleration lane extends 198 m (660 ft) to the east of the West Gate. Browns Lane is 183 m (600 ft) east of the West Gate.
   b. Pine View Avenue and Lakeville Highway (State Route 116) operated at LOS F in the PM peak hour. Adding more vehicles would only increase delays at this intersection as shown in Table 6.
4. Merging
   a. All vehicles exiting the Lakeville Highway Water Recycling Facility are to accelerate to a safe speed within the acceleration lanes before entering the highway.
5. Pedestrian impact
   a. Currently pedestrians use the paved shoulders, as long as are there shoulders the pedestrians will not be affected.
6. Transit
   a. No impact to transit because it does not run along Lakeville Highway (State Route 116) where the Lakeville Highway Water Recycling Facility is located.

Safety Factors

Safety factors as to what makes an intersection safer were identified as the following:

- Availability of Gaps;
- Sight Distance;
- Safe Stopping Distance;
- Speed Control; and
- Recovery Area (i.e. shoulder).

Availability of gaps, -- Gap access is a function of traffic volume and platooning that typically occurs on two lane roadways and on multi-lane roadways that are signalized. Lakeview Highway is a four-lane highway west of the project frontage. The highway transitions from four lanes to two lanes at the Pine View Way intersection located approximately 898 meters (2946-feet) to the west. The nearest traffic signal is located at the intersection of Cedar and Lakeview Highway, which is approximately 1.8 km (1.2 miles) west of the project study area.

Alternative 1 provides for right in and right out access from the westerly driveway. Therefore vehicles merge rather than conflict at this driveway. Since the proposed design provides for a lane transition from the shoulder to the travel lane, vehicles can merge at a speed approaching the travel speed of the highway. Therefore, the design is an improvement over existing conditions, which has a very short transition.

Alternative 1 provides for a full access driveway at the eastern access point. There are two conflicting movements, which are influenced by the availability and frequency of gaps, the left turn in and the left turn out. Both movements conflict with the eastbound traffic. The design provides for a slip lane for the left out movement, therefore the exiting vehicles will merge with the westbound vehicles. Since there is a left turn pocket for westbound vehicles entering the site, there is no interruption of traffic on Lakeview Highway.

It is anticipated that the gaps will not be affected by any improvements associated with Alternative 1. One opportunity to improve gaps for the eastbound traffic would be to add a traffic signal at Pine View Way at Lakeview Highway.

Alternative 2 provides for right in and right out access only from the two driveways on Lakeview Highway. Also included would be a connector roadway that extends off-site to the commercial industrial park at Cypress Drive. In conjunction with that proposal, a new traffic signal would be constructed at the intersection of Pine View Way and Lakeview Highway. This traffic signal will create gaps that would interrupt eastbound traffic and improve access opportunities for the proposed treatment facility.

Sight distance is discussed under assessments. For both alternatives, the sight distance is in excess of the stated requirements in the Caltrans Highway Design Manual for an access point on a state highway.

For both alternatives the posted speed limit is 88-km per hour. The safe stopping distance is 160-m for the portion of the highway in front of the two proposed driveways. With the removal of obstructing vegetation, the sight distance will exceed the requirements. Therefore there is no distinction between the two alternatives. The elimination of the vegetation as a site obstruction improves the sight distance over the existing conditions.

Speed control is inversely proportional to perceived safety. The width of the lanes, shoulder width, sight distance and number of adjoining driveways all contribute to the average running speed of the vehicles using the facility. Both alternatives will result in similar roadway characteristics. Therefore, there is no distinction regarding speed control between alternative one and alternative two.

Recovery areas (i.e. shoulders) are useful as potential relief from rear end collisions. Both alternatives propose to retain the same roadway shoulders for eastbound and westbound travel. Therefore, there is no distinction regarding recovery areas between the two projects.

Traffic Management Plan

There are several elements of construction of the Lakeville Highway Water Recycling Facility. These elements include improvements to the water recycling Facility, improvements to the highway access, a new administrative facility, and the construction of a new culvert crossing.

The earthwork for this project will involve a substantial amount of soil import. It is estimated will have up to 120 truck movements in and 120 truck movements out per day in 2004 and up to 220 truck movements in and out per day in 2006. In order to accommodate the truck movements created by such construction there are several alternatives that can be put in place in order to facilitate the flow of traffic on Lakeville Highway (State Route 116) as well as the construction vehicles.

Alternative 1

Truck traffic can be directed from either the east or the west. Travel from the west would result in the least conflicts. Access could be controlled by right in and right out access for the westerly or easterly driveway. There would be no conflicts with crossing lanes. Deceleration access into the western-most driveway would be the most constrained since the bridge over Ellis Creek confines the shoulder to substandard size. However, with the existing channel that bisects the site, and the drainage ponds, access to the westerly portion of the project will be cut off until the culvert crossing is installed. The easterly driveway would provide sufficient room for a deceleration lane; there are no constraints to the west of the easterly driveway.

Alternative 2

If truck access were directed from the east, access to the site would have to be across the eastbound traffic lane. This access would require the construction of a temporary left turn pocket within the existing pavement width. The existing width of Lakeview Highway is 12-m, consisting of two travel lanes of 3.6-m and two shoulders of 2.4-m.

By temporarily eliminating the shoulders in the vicinity of the existing easterly driveway, there is sufficient room for three 4.0-m lanes, one for through traffic in each direction and one for the left turn lane. Caltrans would have to agree with the temporary lane configuration as seen in Figure 13 as part of the encroachment permit process. To ensure safe access for the truck movements a flagman would have to be stationed at this access point.

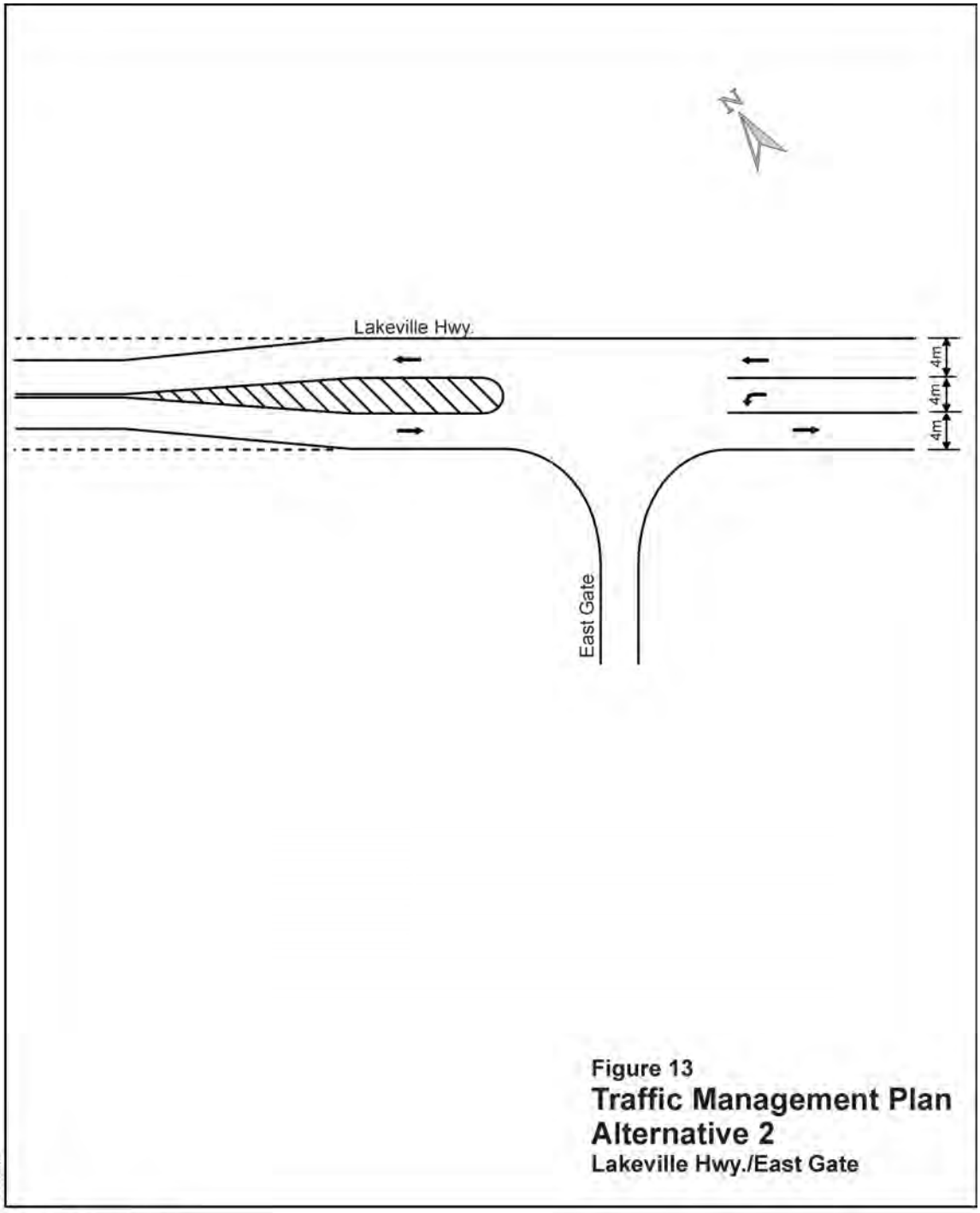


Figure 13
Traffic Management Plan
Alternative 2
Lakeville Hwy./East Gate

***DKS** Associates*

Alternative 3
Another alternative could include the staging of construction such that the on-street improvements are installed first, followed by the culvert crossing on site, and then followed by the earthwork. In this fashion, ample clearance for the truck turning activity would be accomplished for the construction stage with the least relative impact to the adjoining street system.

Of the three alternatives outlined above, the right in-right out concept of alternative 1 utilizing the access from Highway 101 and the connection Lakeville Highway to State Route 37 is the safest and has the least impact on the highway traffic as seen in Table 10.

Table 10 - Traffic Management Plan Conditions

Level of Service Summary
Traffic Management Plan Conditions

	Existing plus Project Conditions				Existing plus 2004 Project Conditions				Existing plus 2006 Project Conditions			
	AM		PM		AM		PM		AM		PM	
Intersection	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**	**Delay[a]**	**LOS[b]**
Lakeville Highway and East Gate (Alt. 1)	20.7	C	16.3	C	20.8	C	16.4	C	22.0	C	17.0	C
Lakeville Highway and East Gate (Alt. 2)	47.6	E	127.7	F	48.2	E	>100	F	59.4	F	>100	F

Notes:
a. Delay = average delay per vehicle in seconds
b. LOS = level of service

Source: DKS Associates

APPENDIX A
Caltrans Accident Data

SON-116-PM 36.5/38.5

Accident Data Analysis (4/1/1998 – 3/31/2001)

For the Petaluma Wastewater Treatment Plant Access Study

Within the three-year period from April 1, 1998 to March 31, 2001, there were 20 accidents occurred between Post Miles 36.5 and 38.5 on Lakeville Highway (Route 116). Eight of the 20 accidents occurred at/near intersections.

According to TASAS Table B, the actual accident rates were about one-thirds of the average statewide rates, as follows:

Location	No. of Accidents			Actual Rates			Average Rates		
	Total	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury
Route 116 PM 36.5/38.5	20	0	11	.42	.000	.23	1.36	.038	.64

The types of collision include: rear end (25%), hit object (25%), broadside (25%), sideswipe (20%), and head-on (5%). The primary collision factors were: failure to yield (40%), other violation (20%), speeding (15%), follow too close (10%), fell asleep (10%), and influence – alcohol (5%).

Most of the accidents occurred under daylight (75%), clear (75%) and dry (85%) conditions.

APPENDIX E

Fundamental Concepts of Environmental Acoustics

APPENDIX E

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. *A decibel (dB)* is a unit of measurement that indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA.* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise

exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) .

Table 1

Definitions Of Acoustical Terms

TERM	DEFINITIONS
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

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Table 2

Typical Sound Levels Measured In The Environment And Industry

At a Given Distance From Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
	140		
Civil Defense Siren (100')	130		
Jet Takeoff (200')	120		Pain Threshold
	110	Rock Music Concert	
Diesel Pile Driver (100')	100		Very Loud
	90	Boiler Room Printing Press Plant	
Freight Cars (50') Pneumatic Drill (50') Freeway (100')	80		
Vacuum Cleaner (10')	70	In Kitchen With Garbage Disposal Running	Moderately Loud
	60	Data Processing Center	
Light Traffic (100') Large Transformer (200')	50	Department Store	
	40	Private Business Office	Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
	0		

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The *Day/Night Average Sound Level*, L_{dn}, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard, which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

city of
Petaluma, California

water recycling

FACILITY AND RIVER ACCESS IMPROVEMENTS

Environmental Impact Report Addendum

State Clearing House #2001052089

April 2004

carollo engineers

PET404R1-6069.PSD

CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND RIVER ACCESS IMPROVEMENTS ENVIRONMENTAL IMPACT REPORT ADDENDUM

April 15, 2004

Prepared by Parsons

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1 INTRODUCTION AND SUMMARY

In August 2002, the City of Petaluma certified the Water Recycling Facility and River Access Improvements Final EIR. The City is considering revisions to the site plan evaluated in the 2002 EIR for the purpose of reducing costs, reducing the duration of construction, and preserving storage capacity. This Addendum evaluates those proposed revisions.

The revisions include relocation of the main treatment facilities from the Oxidation Pond site on the northeast side of Ellis Creek to Parcel A on the northwest side of Ellis Creek. In the 2002 EIR, the Parcel A site is the location for the polishing wetlands and public amenities associated with the River Access Improvements. These improvements are proposed to be moved toward the River to allow relocation of the facilities previously planned for the Oxidation Ponds. Refer to Chapter 2, Project Description, of this Addendum, for a complete description of the revised site plan under consideration.

This Addendum concludes that the proposed modifications to the approved project evaluated in the 2002 Certified EIR, do not cause any substantial change in impacts and do not result in any new significant impacts. Thus, an Addendum is the appropriate level of CEQA analysis and the appropriate method of amending the 2002 Certified EIR, pursuant to Sections 15162 and 15164 of the Guidelines implementing the California Environmental Quality Act ("CEQA").

ORGANIZATION OF THE ADDENDUM

The Addendum is organized in a similar fashion to the 2002 Certified EIR.

- This Introduction and Summary Chapter includes Table 1-1, a summary of the potential significant impacts and mitigation measures associated with the approved project and the proposed revisions;
- Chapter 2 contains a detailed description of the proposed modifications to the Project Description;
- Chapter 3 presents the revised Mitigation Monitoring Program;
- Chapter 4 presents the changes to the environmental analysis due to the proposed revisions;
- Chapter 5 updates the Alternatives chapter;
- Chapter 6 updates the CEQA Issues chapter;
- Chapter 7 presents the preparers of and references for this Addendum.

Table and figure numbers are carried over from the 2002 EIR, and therefore are not sequential.

PUBLIC AND AGENCY COMMENTS

This Addendum is available for review at the Petaluma City Hall and at the Petaluma Library.

Written comments should be mailed or faxed to:

City of Petaluma
Department of Water Resources and Conservation
11 English Street
Petaluma, CA 94952
707-776-3635 (fax)
Attention: Margaret Orr, P.E.

APPLICABILITY AND USE OF AN ADDENDUM

As directed by CEQA, California Public Resources Code Section 21166, and CEQA Guidelines Section 15162, when an EIR has been prepared for a project, no subsequent EIR shall be prepared, unless one or more of the following circumstances occur:

1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

    A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

    B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

    C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The change in environmental impacts due to changes in the project or changed conditions has been evaluated and measured against the standards set forth in paragraphs 1, 2, and 3 above to determine whether an Addendum is appropriate or a subsequent EIR is needed. The environmental analysis in Chapter 4 provides the detailed examination of each of these issues. The conclusion is that none of the circumstances which might require a subsequent or supplemental EIR have occurred, and that an Addendum is appropriate.

This Addendum should be read together with the full text of the 2002 Certified Petaluma Water Recycling Facility and River Access Improvements EIR. Even though modifications to the adopted project are minor, the modifications have been subjected to a detailed analytical process consistent with the methodology and thresholds of significance applied in the 2002 Certified EIR. The Addendum has been prepared by a team of professional environmental consultants managed by Parsons under the direction of the City of Petaluma (see Chapter 5, Preparers and References).

Section 15164 of the Guidelines implementing the California Environmental Quality Act ("CEQA") provides that an Addendum is the appropriate level of CEQA analysis when the circumstances defined in Section 15162 calling for preparation of a Subsequent EIR do not occur. None of the circumstances that require a Subsequent EIR, such as new significant impacts or significant impacts of a substantially more severe nature, are present. Thus, an Addendum is the appropriate level of CEQA analysis and the appropriate method of amending the 2002 Certified EIR.

SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

There are no new significant unavoidable environmental impacts as a result of the revised site plan. The one significant unavoidable impact from the approved Project remains:

- Impact **AG-1**: Loss of approximately 149 acres of farmland on Parcels A and B

When the project was approved in August of 2002, a statement of overriding considerations was adopted, explaining the City's reasons that the polishing wetlands and public educational and recreational facilities were approved despite their significant impact on farmland.

IMPACT AND MITIGATION SUMMARY

Table 1-2 provides a summary of the impacts and mitigation measures that were identified in the 2002 EIR for the approved Project and for the proposed revisions. The level of significance has changed for only one impact due to the revised project, and that change is a decrease. The level of significance for Impact BIO-4, permanent loss of sensitive native

plant communities, has been changed from significant before mitigation to less than significant because there is no longer a need for a bridge over Ellis Creek. For a complete description of the impacts of the approved Project, refer to the 2002 EIR.

The impacts and mitigation measures are identified in one of three categories:

- Significant - Impact is significant before mitigation; some of these significant impacts can be mitigated to a less than significant level, but others remain significant after mitigation.
- Less than Significant - Impact is not considered significant and no mitigation is required.
- No Impact - The project has no effect on the resource described in the criterion.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
1. Land Use			
LU-1. Will the project be inconsistent with the land use plan map of an adopted General Plan?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-2. Will the project be inconsistent with zoning?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-3. Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	No Impact	No Impact	No mitigation is necessary.
LU-4. Will the project introduce inappropriate uses in a Community Separator?	No Impact	No Impact	No mitigation is necessary.
LU-5. Will the project increase potential for conflict as a result of incompatible land uses?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-6. Will the project convert non-urban land to urban uses for Project facilities?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-7. Will the project convert public open space for Project facilities?	No Impact	No Impact	No mitigation is necessary.
LU-8. Will the project result in loss of homes due to construction of facilities?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
LU-C1: Will the project have a cumulative potential to disturb land uses?	Less than Significant	Less than Significant	No mitigation is necessary.
2. Agriculture			
AG-1. Will the project cause loss of farmland?	Significant	Significant	Previous mitigation measure AG-1, Maintain Maximum Acreage of Agricultural Production, is not recommended, because City decided, during the project approval in 2002, to reserve the flexibility to construct improvements on Parcels A and B, and made a Statement of Overriding Considerations to indicate the reasons they did not adopt Mitigation Measure AG-1.
AG-2. Will the project cause Williamson Act contracts to be canceled?	No Impact	No Impact	No mitigation is necessary.
AG-3. Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Less than Significant	Less than Significant	No mitigation is necessary.
AG-C1. Will the project have cumulative impacts to agriculture?	Significant	Significant	Previous mitigation measure AG-1, Maintain Maximum Acreage of Agricultural Production, is not recommended, see comments under AG-1.
3. Geology, Soils and Seismicity			
GS-1. Will project facilities be located within an area of unstable slope conditions?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-2. Will project facilities be subject to ground rupture due to location near a surface trace of an active fault?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
GS-3. Will project facilities be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-4. Will earthquake-induced strong ground shaking damage project facilities?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-5. Will construction of the project cause off-site water-related erosion?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-6. Will project facilities be exposed to damage due to expansive soils?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-7. Will project facilities be exposed to damage due to construction on corrosive soils?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-C1: Will the project have a cumulative potential for geologic or seismic impacts?	Less than Significant	Less than Significant	No mitigation is necessary.
4. Groundwater			
GW-1. Will the project degrade groundwater quality at existing drinking water wells, resulting in a public health hazard?	Less than Significant after Mitigation	Less than Significant after Mitigation	GW-1. Drinking Water Well Protection Program
GW-2. Will the project cause groundwater mounding or increase groundwater levels that cause surface discharge in a non-stream environment?	Less than Significant	Less than Significant	No mitigation is necessary.
GW-3. Will the project lower groundwater levels at existing wells?	No Impact	No Impact	No mitigation is necessary.
GW-C1: Will the project have a potential for cumulative groundwater impacts?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
5. Surface Water Quality			
WQ-1. Will the project discharge cause numeric-based criteria to be exceeded?	Less than Significant after Mitigation	Less than Significant after Mitigation	WQ-1a. Chromium Monitoring and Source Reduction Program WQ-1b. Nickel Monitoring and Source Reduction Program WQ-1c. Bis(2-ethylhexyl) phthalate Effluent Monitoring and Source Reduction Program WQ-1d. Constituents not Monitored in Effluent Monitoring WQ-1e. Dioxin/Furan Congener Monitoring and Source Reduction Program
WQ-2. Will the project cause narrative-based criteria to be exceeded.	Less than Significant after Mitigation	Less than Significant after Mitigation	WQ-1e. Dioxin/Furan Congener Monitoring and Source Reduction Program
WQ-3: Will project construction result in a substantial degradation of surface runoff quality?	Less than Significant	Less than Significant	No mitigation is necessary.
WQ-C1: Will the project have a cumulative potential to cause numeric or narrative-based criteria to be exceeded?	Less than Significant	Less than Significant	No mitigation is necessary.
6. Hydrology			
H-1. Will the project discharge cause flooding anywhere along the Petaluma River?	Less than Significant	Less than Significant	No mitigation is necessary.
H-2. Will the project discharge cause streambank erosion in the Petaluma River?	Less than Significant	Less than Significant	No mitigation is necessary.
H-3. Will non-discharge project components cause flooding?	Less than Significant	Less than Significant	No mitigation is necessary.
H-4. Will non-discharge project components cause streambank erosion?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
H-C1: Will the project have a cumulative potential to cause flooding or erosion?	Less than Significant	Less than Significant	No mitigation is necessary.
7. Public Health and Safety			
PHS-1. Will the project expose the public to chemicals, radionuclides, pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-2. Will the project expose workers or the public to hazards from a known hazardous waste site?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-3. Will the project increase potential exposure of the public to hazardous materials due to a chemical release?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-4. Will the project expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-5. Will the project increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-C1: Will the project have a cumulative impact on public health and safety?	Less than Significant	Less than Significant	No mitigation is necessary.
8. Biological Resources			
BIO-1. Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-1a. Aquatic Species Protection program. BIO-1c. Wildlife Protection Program

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
BIO-2. Will the project cause loss of active raptor nest, migratory bird nests, or wildlife nursery sites?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-2a. Active Raptor and Migratory Bird Nest Protection Program. BIO-2b. Rookery Protection Program.
BIO-3. Will the project cause permanent loss of sensitive wildlife habitat?	Less than Significant	Less than Significant	No mitigation is necessary.
BIO-4. Will the project cause permanent loss of sensitive native plant communities?	Less than Significant after Mitigation	Less than Significant	Previous mitigation measure BIO-4 is no longer needed (refer to the analysis in Section 4.8).
BIO-5. Will the project substantially block or disrupt major fish or wildlife migration or travel corridors?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-1a. Aquatic Species Protection Program
BIO-6. Will the project cause permanent loss of aquatic habitat (i.e., streams)?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-1a: Aquatic Species Protection Program
BIO-7. Will the project destroy wetlands or other waters of the U.S.?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-7: Create or Restore Wetlands and Waters of the U.S.
BIO-8. Will the project expose organisms to hazardous levels of toxic or bioaccumulatory substances?	Less than Significant after Mitigation	Less than Significant after Mitigation	WQ-1e: Dioxin/Furan Congener Monitoring and Source Reduction
BIO-C1. Will the project have cumulative impacts to biological resources?	Less than Significant	Less than Significant	No mitigation is necessary.
9. Traffic and Circulation			
TR-1. Will project traffic cause congestion along study area roadways?	Less than Significant after Mitigation	Less than Significant after Mitigation	TR-1a Reroute construction worker trips TR-1b Install Signage to Reroute Employee and Visitor Trips
TR-2. Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
TR-3. Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-4. Will project construction traffic damage public or private roadbeds?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-5. Will there be inadequate parking for project activities?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-6. Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-C1: Will there be traffic congestion along study area roadways during the cumulative conditions?	Less than Significant	Less than Significant	No mitigation is necessary.
10. Air Quality			
AQ-1. Will construction of the Project generate emissions that expose people to high levels of dust and equipment exhaust?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-2. Will project emissions cumulatively exceed allowable limits?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-3. Will the project expose sensitive receptors to substantial levels of toxic air contaminants?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-4. Will project violate or contribute to violation of ambient air quality standard?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-5. Will the project cause potential odors?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-C1: Will the project have the potential to have a cumulative impact to air quality?	Less than Significant	Less than Significant	No mitigation is necessary.
11. Noise			
N-1: Will construction of the Project expose the public to high noise levels?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
N-2. Will construction of the Project cause high noise levels from construction traffic?	Less than Significant	Less than Significant	No mitigation is necessary.
N-3: Will operation and maintenance of the project expose the public to high noise levels?	Less than Significant	Less than Significant	No mitigation is necessary.
N-C1: Will the project have a cumulative potential to disturb noise-sensitive receptors during or after construction?	Less than Significant	Less than Significant	No mitigation is necessary.
12. Cultural Resources			
CR-1. Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/ traditional heritage resources?	Less than Significant	Less than Significant	No mitigation is necessary.
CR-2. Will the project disturb unknown archaeological resources?	Less than Significant	Less than Significant	No mitigation is necessary.
CR-C1: Will the project have a cumulative potential to disturb historical or cultural resources?	Less than Significant	Less than Significant	No mitigation is necessary.
13. Visual Resources			
VR-1. Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?	No impact	No impact	No mitigation is necessary.
VR-2. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?	No impact	No impact	No mitigation is necessary.

Table 1-2

Impact and Mitigation Summary
Approved Project and Revised Project

Impact	Approved Project 2002 EIR	Revised Project EIR Addendum	Mitigation Measure
VR-3. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Corridors?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-4. Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-5. Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-6. Will the project cause an adverse effect on foreground views from one or more private residences	Less than Significant	Less than Significant	No mitigation is necessary.
VR-7. Will the project create a new light source?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-C1: Will the project have a cumulative potential to disturb open space or visual resources?	Less than Significant	Less than Significant	No mitigation is necessary.
14. Public Services and Utilities			
PS-1. Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?	Less than Significant	Less than Significant	No mitigation is necessary.
PS-2. Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	No Impact	No Impact	No mitigation is necessary.

PS-C1: Will the project have a cumulative potential to impact public services and utilities?	Less than Significant	Less than Significant	No mitigation is necessary.

Source: Parsons 2004

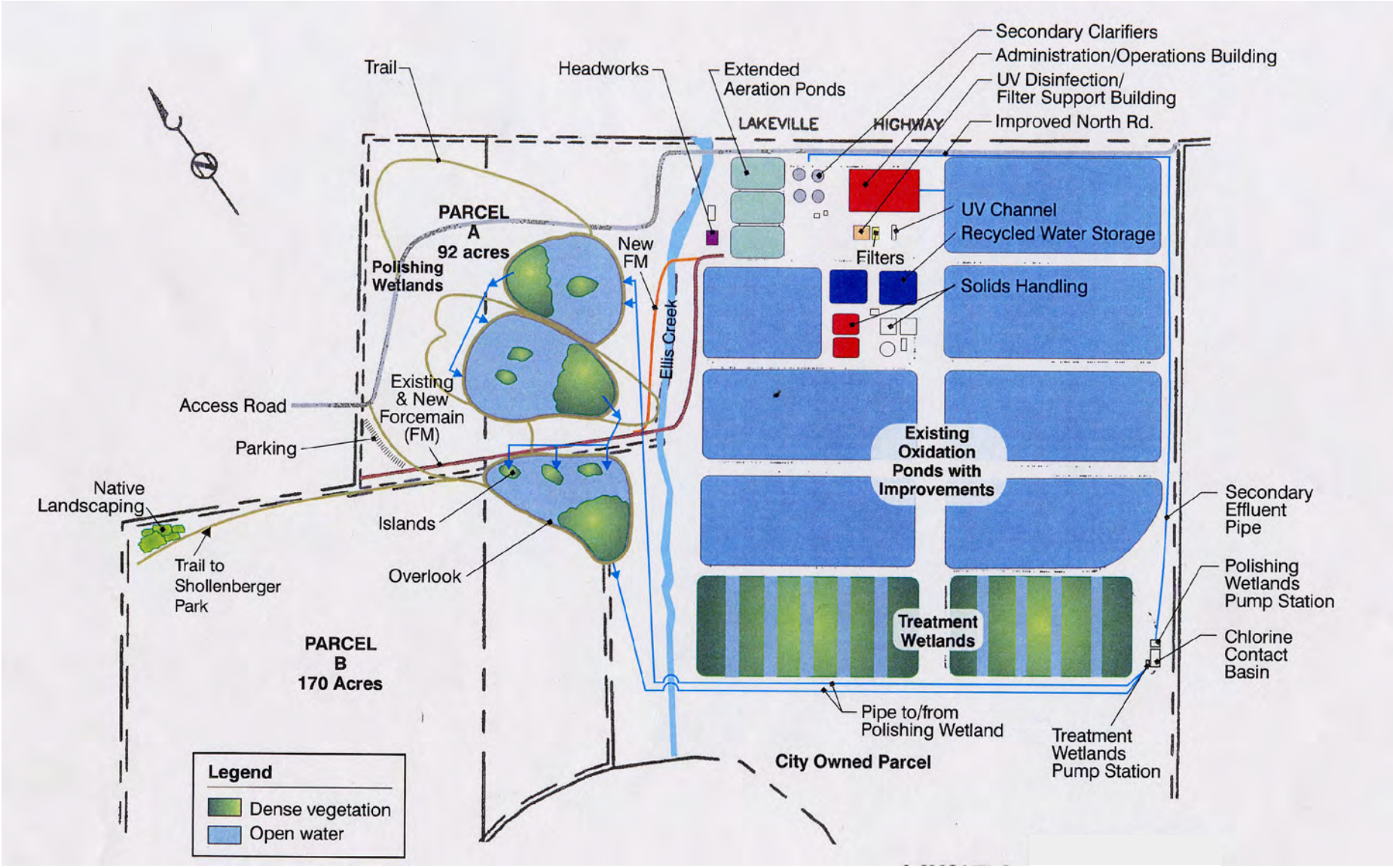
2 PROJECT DESCRIPTION

On August 5, 2002, the City of Petaluma certified the Water Recycling Facility (WRF) and River Access Improvements EIR (2002 EIR) and approved the Water Recycling Facility and River Access Improvements Project (approved project) (see Figure 2-1).

In February 2002, Carollo Engineers began the final design and prepared a 50 percent design for the City and initiated a value engineering review. The value engineering review, completed in December 2002, identified a number of cost saving ideas that could be incorporated into the design to minimize costs of the overall facilities, including moving the WRF to Parcel A (refer to Appendix A: Review of Value Engineering Report and Integration of Parcel A Cost Savings).

After the formal value engineering review was completed, the City requested that Carollo Engineers (Carollo) evaluate the feasibility of locating the WRF on Parcel A, instead of the Pond No. 1 location as proposed in the approved Project. In the approved Project the Parcel A site is the location for the polishing treatment wetlands and public amenities associated with the River Access Improvements. The City is interested in moving the WRF to Parcel A due to the high cost of construction on the Pond No. 1 site. Relocating the WRF to Parcel A would have other benefits, in that it would reduce the loss of treatment capacity during construction, provide space for future expansion to meet more stringent regulatory requirements, and reduce the time until project start-up. The estimated total construction cost saving is approximately $5.25 million based on the initial review. In addition, replacement of the storage capacity that would have been lost in the approved project could cost the City an estimated $3.3 million.

The main differences between the approved project and the proposed revised project are summarized in Table 2-1. They also can be viewed by comparing Figure 2-1 Layout of Approved Project and Figure 2-2 Layout of Proposed Revised Project.



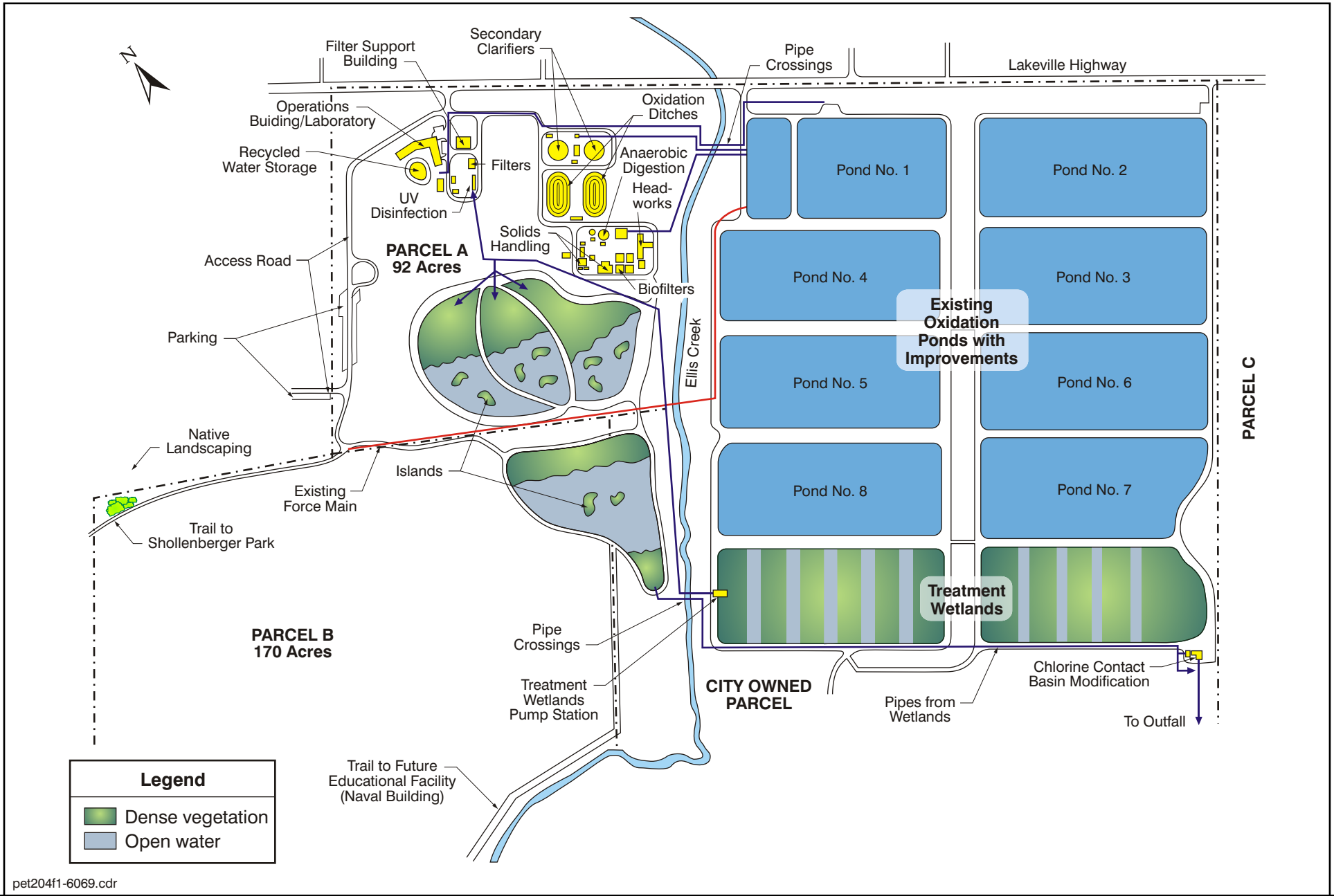
Source: Carollo Engineers, 2002

City of Petaluma
Water Recycling Facility EIR Addendum

Layout of Approved Project

PARSONS

Figure 2-1



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City of Petaluma
Water Recycling Facility EIR Addendum

Layout of Proposed Revised Project

PARSONS

Figure 2-2

Table 2-1

Summary of Revisions

	Proposed Revised Project
Main Treatment Facility Location	Relocated from Pond 1 to Parcel A
Secondary Treatment	Extended aeration basins are replaced with oxidation ditches
Site Access	
Bridge over Ellis Creek	No longer needed
East & West Gate Improvements	No longer needed
Access to Parcel A from Lakeville Highway	New west gate located at Parcel A
Existing Pond Site Road Improvements	No longer needed, except repaving of East Road
River Access/Petaluma Marsh Acquisition Improvements	
Seasonal Ponds	Removed
Levee Stabilization	Removed
River Trail	Removed
2 Levee Bridges with Boat Access at High Tide	Removed
Storm Water Distribution/Wetlands	Future phase improvement
Marsh Restoration	Future phase improvement
Pipelines Crossing Ellis Creek	Crossing near Pond 5 is deleted and replaced with 3 pipelines crossing near Pond 1

PROJECT CHARACTERISTICS

The detailed characteristics of the project remain the same as those described in the 2002 EIR with the exceptions noted below.

Secondary Treatment

The existing aerated lagoons would no longer be enlarged and converted into aeration basins. The extended aeration basins would be replaced with an oxidation ditch system. As with the extended aeration system, the oxidation ditch system would provide reduction of BOD (biological oxygen demand), partial nitrification (ammonia removal), and partial denitrification (nitrogen reduction) of the wastewater. The secondary clarifiers and sludge pump station remain as described in the EIR.

Oxidation Ponds

With the elimination of the extended aeration basins, an increased elevation of the berm would no longer be required.

Solids Handling

In the approved Project there were three covered tanks: two 15 feet in diameter and one 55 feet in diameter. The revised project would also include three covered tanks: one 24-by-24 foot square, one 56 feet in diameter and one 34 feet in diameter. As was included in the approved Project, odor control will be provided for the thickening and dewatering facilities.

Tertiary Filtration and Disinfection

Filtration and UV disinfection facilities for unrestricted reuse will be provided for treatment of up to 8 mgd. Water to be treated by these facilities will come from either the secondary treatment facilities or from the treatment and/or polishing wetlands. The filters will not be taken off-line, as described in the approved Project, during the discharge season. A small amount of recycled water will always be produced for use within the recycling plant.

Storage Reservoir and Pump Station

A 1-million gallon storage reservoir on Parcel A is now proposed to replace the two 4-million gallon storage reservoirs previously located in Pond No. 4. The pump station remains the same.

Administration Buildings

The building for the laboratory and operation/maintenance has been moved to the Parcel A site from the Pond No. 1 location. The administration buildings would be eliminated, and an outdoor classroom would be added. Landscaping around the buildings is provided as a visual buffer. See Figure 2-3 for the layout of these facilities and the conceptual landscape plans. Landscaping at the facility will be irrigated with tertiary treated recycled water produced at the facility.

Polishing Wetlands

The polishing wetlands remain the same as described in the 2002 EIR, except that the location of the wetlands has been shifted southwest, toward the river, to accommodate relocation of the main plant facilities and to avoid wetland impacts (see Figure 2-2).

Source: Carollo Engineers 2004

PARSONS

Figure 2-3

Conceptual Landscape Plan

City of Petaluma
Water Recycling Facility EIR Addendum

Force Main and Pipelines Crossing Ellis Creek

The existing 36-inch diameter force main (carrying wastewater to the oxidation pond site) runs through Parcel A adjacent to the old railroad right-of–way. It crosses under Ellis Creek near Pond No. 5. In the approved Project a new 36-inch diameter force main was to be constructed parallel to the existing pipe and would have included a new stream crossing. This stream crossing is not needed in the proposed revised project.

The proposed revised project requires three pipelines crossing Ellis Creek in the area adjacent to Pond No. 1: a 42-inch diameter Secondary Effluent (SE) line, a 42-inch diameter Headworks Effluent line and a 24-inch diameter Recycled Water (RW) line (the approximate location is shown in Figure 2-2).

The two pipelines crossing Ellis Creek near Pond No. 9 remain the same with the revised site plan.

Site Access

The following revisions to site access are proposed:

- Improvements to the existing east and west gate would no longer be needed. (The west gate would only be used for emergency access.)
- A new gate from Lakeville Highway would be added on Parcel A, west of the existing west gate on Lakeville Highway. The new west gate would include the same safety design elements as were to be included for the existing east gate: a right-turn lane on Lakeville Highway for east-bound right turns into the site and an acceleration lane added for right turns out of the site, for east-bound traffic.
- The bridge over Ellis Creek would no longer be needed as part of the access road from Oakmead/Northbay Business Park.
- None of the existing in-plant roads at the oxidation pond site would be widened with the revised site plan. The repaving of the East Road would remain.

Staging Area and Construction Zones

The staging area would be decreased from 15 acres to 10 acres. The 10-foot wide temporary construction zone on the northern side of the existing north access road would be eliminated.

Construction and Operation Schedule

Construction is expected to start in 2005 with start up in 2007 and full operation in 2008.

Cost

The Water Recycling Facility construction costs are estimated at $67.7 million. Total project costs, including administration and construction management, are estimated at $91.4 million. Annual operating costs remain the same as described in the 2002 EIR. The additional 4 mgd of tertiary facilities (above the 4 mgd facilities in the approved Project) is estimated at an additional capital cost of $7.4 million and a total project cost of $10 million.

River Access Improvements/Petaluma Marsh Acquisition, Enhancement and Access Improvements

The river access improvements have been renamed the Petaluma Marsh Acquisition, Enhancement and Access Improvements to reflect better the City's goal of providing public access to the polishing wetlands, natural wetlands and coastal marsh elements of the project. The plans for these improvements are conceptual, as shown in Figure 2-4, and project-level design has not yet occurred. These improvements are therefore evaluated at a conceptual or program level. Some of these improvements are included as a future phase of the Project. The concept for the revised project differs from the approved Project, as described in the 2002 EIR, in the following ways:

- seasonal ponds for red-legged frogs will not be constructed.
- two pedestrian bridges to span the levee breach will not be constructed.
- levee stabilization along the Petaluma River will not occur.
- the river trail along the levee of the Petaluma River will not be constructed.
- stormwater distribution/treatment system has been added south of the business park.
- restoration of existing tidal marsh has been added.
- remaining agricultural land may still be used for agricultural crop production and may be irrigated with recycled water
- abandoned naval radio building may be retrofitted for education purposes

Source: Carollo Engineers 2004

PARSONS

Figure 2-4

Conceptual Plan
Petaluma Marsh Acquisition, Enhancement & Access Improvements

City of Petaluma
Water Recycling Facility EIR Addendum

Acquisition of Land and Annexation

The City has purchased Parcels A and B (shown on Figure 2-2). Parcels A and B are currently unincorporated. The City intends to apply for annexation of Parcels A and B prior to construction of project facilities and change the General Plan Land Use Designation and zoning to a designation that allows for public facilities on the site.

UPDATE OF CUMULATIVE PROJECTS

Although the City and the County of Sonoma are currently in the process of updating their General Plans the Courts have held that, in considering water supply projects, agencies should accommodate the growth envisioned in adopted General Plans, and not in draft or anticipated futures plans. (See *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931.) Although this case focuses on a water supply project, the logic of this decision applies to basic infrastructure needs generally, such as wastewater treatment capacity. Therefore, this addendum does not need to address the possibility of increased capacity requirements based on these general plans in progress.

No other new cumulative projects have been identified.

3 MITIGATION MONITORING PROGRAM REVISIONS

This Chapter presents only the revision to the Mitigation Monitoring Program. The entire Mitigation and Monitoring Program is now available as a separate document at the Petaluma City Hall.

BACKGROUND

The legal basis for the development and implementation of mitigation measures lies in the California Environmental Quality Act (CEQA). Pursuant to Section 21002 of CEQA, public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. Subsection 21002.1 further requires that each public agency shall mitigate or avoid the significant effects on the environment of projects it approves or carries out whenever it is feasible to do so.

Assembly Bill (AB) 3180 was enacted in 1989 to ensure that required mitigation measures and project alternatives were implemented. AB 3180 specifies the public agency's responsibility to adopt a mitigation monitoring and reporting program:

> SECTION I. Section 21081.6 is added to the Public Resources Code, to read: 21081.6. When making the findings required by subdivision (a) of Section 21081 or when adopting a negative declaration pursuant to paragraph (2) of subdivision (c) of Section 21081, the public agency shall adopt a reporting or monitoring program for the changes to the Project which it has adopted or made a condition of Project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during Project implementation. For those changes which have been required or incorporated into the Project at the request of an agency having jurisdiction by law over natural resources affected by the Project, that agency shall, if so requested by the lead or responsible agency, prepare and submit a proposed reporting or monitoring program.

The reporting or monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of Project approval in order to mitigate significant effects on the environment.

PURPOSE

This Mitigation Monitoring Program is designed to serve as a tool for the evaluation of Project compliance with mitigation measures accepted from the EIR. The basic objectives of the Mitigation Monitoring Program are to achieve the following:

- To report to the City Council, and the public, information regarding compliance with the EIR mitigation measures; and
- To provide assurance and documentation that the studies and actions called for in the mitigation measures are being performed as planned.

MEASURES INCLUDED IN THE PROJECT

Two measures, PD-8 and PD-20, are revised as shown below. For a complete description of the remaining measures see the 2002 EIR or the Revised Mitigation Monitoring Program.

PD-8 Erosion, Stormwater Runoff, and Spill Control Measures

Description: The City shall develop and implement measures designed to prevent significant construction impacts to water quality. Examples of possible measures include the following:

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
Temporary Soil Stabilization	
SS-1	Scheduling
SS-2	Preservation of Existing Vegetation
SS-3	Hydraulic Mulch
SS-4	Hydroseeding
SS-5	Soil Binders
SS-6	Straw Mulch
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats
SS-8	Wood Mulching
SS-9	Earth Dikes/Drainage Swales & Ditches
SS-10	Outlet Protection/Velocity Dissipation Devices
SS-11	Slope Drains
Temporary Soil Stabilization	
SC-1	Silt Fence
SC-2	Desilting Basin
SC-3	Sediment Trap
SC-4	Check Dam
SC-5	Fiber Rolls
SC-6	Gravel Bag Berm
SC-7	Street Sweeping and Vacuuming
SC-8	Sandbag Barrier
SC-9	Straw Bale Barrier
SC-10	Storm Drain Inlet Protection
Wind Erosion Control	
WE-1	Wind Erosion Control
Tracking Control	
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash
Non-Storm Water Management	
NS-1	Water Conservation Practices

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
NS-2	Dewatering Operations
NS-3	Paving and Grinding Operations
NS-4	Temporary Stream Crossing
NS-5	Clear Water Diversion
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting
NS-7	Potable Water/Irrigation
NS-8	Vehicle and Equipment Cleaning
NS-9	Vehicle and Equipment Fueling
NS-10	Vehicle and Equipment Maintenance
Waste Management and Materials Pollution Control	
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Source: Caltrans 2000.

In addition, stormwater runoff ~~from the existing oxidation pond~~collected on the Parcel A/B treatment facilities site during operation shall be diverted into the wastewater treatment system. Stormwater runoff from the visitors parking lot on Parcel A shall be treated either by diversion into the wastewater treatment system or installation of ~~an oil and grease separator~~ a retention basin/vegetated swale at the bottom of the lot.

Construction within the Petaluma River or the lower portions of Ellis Creek shall be performed from a barge and with divers when appropriate. Excavation underwater shall be done with pressurized water.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing:	Start: Prior to start of construction
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma and San Francisco Bay Regional Water Quality Control Board
Validation:	Storm Water Pollution Prevention Plan

PD-20 Protection of Previously Undiscovered Historic and Archaeological Resources

Description: If subsurface archaeological or historical remains are discovered during construction, work in the area shall stop immediately and a qualified professional archaeologist shall be consulted to develop, if necessary, further mitigation measures to reduce any archaeological impact to a less than significant level before construction continues.

If human burials are encountered, all work in the area will stop immediately and the Sonoma County coroner's office shall be notified immediately. If the remains are determined to be Native American in origin, both the Native American Heritage Commission and any identified descendants must be notified and recommendations for treatment solicited (CEQA Section 15064.5); Health and Safety Code Section 7050.5; Public Resources Code Section 5097.94 and 5097.98).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and ~~City of Petaluma~~Construction Manager

Timing: **Start:** Upon certification of the EIR

Completion: Completion of construction

Monitoring Agency: City of Petaluma

Validation: A qualified professional archaeologist shall be consulted if subsurface archaeological or historical remains are discovered.

MITIGATION MEASURES

Two mitigation measures are removed (AG-1: this mitigation was not adopted at certification of the EIR; and BIO-4: this mitigation measure is no longer necessary since the bridge is not included in the revised project), and seven are revised (BIO-1a, BIO-1b, BIO-1c, BIO-2a, BIO-2b, BIO-7 and TR-1b) as shown below. For a complete description of these measures see the 2002 EIR or the Revised Mitigation Monitoring Program.

~~AG-1 Maintain Maximum Acreage of Agricultural Production~~

~~**Description**: The City shall maintain the maximum acreage feasible in agricultural production on Parcels A and B.~~

~~**Lead Agency**: City of Petaluma Water Resources and Conservation Department~~

~~**Implementing Agency**: City of Petaluma~~

~~**Timing**: **Start**: After certification of the EIR~~

~~**Complete**: Upon completion of construction.~~

~~**Monitoring Agency**: City of Petaluma~~

~~**Validation**:~~

BIO-1a Aquatic Species Protection Program

Description: The City shall implement an Aquatic Species Protection Plan, as follows:

- A Worker Environmental Awareness Training Program for construction personnel shall be provided.
- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.
- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.
- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.
- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of ~~2~~1:1 (~~2~~1 acre~~s~~ of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers or Regional Water Quality Control Board. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.
- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. As an appropriate example, best management practices are

described in the *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual* (November 2000). Refer to PD-8 for a potential list. These shall be implemented as necessary under the supervision of the construction manager. Detailed specifications shall be incorporated onto bid documents and construction drawings.

- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: ~~After certification of the EIR start of construction~~ Before start of construction of the affected area

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

BIO-1c Wildlife Protection Program

Description: The City shall implement rules at the public areas on Parcels A and B to require dogs to be leashed at all times. In addition, rules will be established requiring the public to remain on established trails.

Lead Agency: City of Petaluma Water Resources and Conservation Department and City of Petaluma Parks and Recreation Department

Implementing Agency: City of Petaluma

Timing: **Start**: Upon completion of construction

Complete: Throughout the life of the project

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Copy of rules

BIO-2a Active Raptor and Migratory Bird Nest Protection Program

Description: The City shall retain a qualified biologist to conduct pre-construction surveys to determine if any active raptor or migratory bird nests occur within 500 feet of the project area at least two weeks prior to initiation of construction activities.

If active nests are located in the study area, construction exclusion zones shall be established around each active nest. Appropriate construction exclusion zones shall be established through consultation with CDFG. Construction activities shall be prohibited within exclusion zone until the end of the nesting season.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors. The monitor shall also monitor the nest to determine when the young have fledged and submit weekly reports to the CDFG and the City of Petaluma throughout the nesting season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma <u>and Construction Manager</u>

Validation: Annual report

BIO-2b Rookery Protection Program

Description: ~~The City shall establish a construction exclusion zone around the rookery located near pond 8 of the water treatment facility. Furthermore,~~A qualified biologist will conduct pre-construction surveys to determine if ~~any~~rookeries or other nests occur within 500 feet of the project area. A construction exclusion zone shall be maintained around each rookery between January 15 and June 15 to ensure that no construction activities occur within 500 feet of an active rookery (personal communication, Wilcox 2001).

If an active rookery is found, a qualified biologist shall monitor the rookery to evaluate potential disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the rookery.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

~~BIO-4 Prepare a Riparian Census and Conceptual Riparian Mitigation Plan~~

~~**Description**: A qualified biologist shall conduct a census of all riparian woody vegetation from the top-of-bank and/or drip-line of the tree or shrub canopy within the project area of the proposed Ellis Creek bridge and approaches. The census will take place within the staked and flagged areas of the site where ground disturbance will take place. The census will include identification of riparian tree and shrub species, counts of stems, and diameter at breast height for those stems greater than 24 inches in diameter within the construction footprint. The City will prepare a Riparian Mitigation and Monitoring Plan to include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. The plan will be written in sufficient detail for a CDFG 1603 Streambed Alteration Agreement. Mitigation will be on site, if possible, at a ratio of 2:1, namely 2 acres of riparian forest for every acre impacted by the construction of the proposed Ellis Creek Bridge. Mitigation sites will be preserved in perpetuity.~~

~~**Lead Agency**: City of Petaluma Water Resources and Conservation Department~~

~~**Implementing Agency**: City of Petaluma~~

~~**Timing**: **Start**: After certification of the EIR start of construction~~

~~**Complete**: Upon completion of construction~~

~~**Monitoring Agency**: City of Petaluma~~

~~**Validation**: Annual report~~

BIO-7 Create or Restore Wetlands and Waters of the U.S.

Description: The City shall prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. The Plan shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. Mitigation will be on site and in kind, if possible.

Compensatory mitigation for permanent impacts shall be provided at a ratio of ~~2~~1:1, that is, ~~2~~1 acre~~s~~ of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers or Regional Water Quality Control Board.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma and Design Engineer

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

TR-1b Install Signage to Reroute Employee and Visitor Trips

Description: The City shall install an informational sign on Lakeville Highway just west of the intersection with McDowell Blvd., indicating that the new wetlands park can be accessed by turning right on McDowell Blvd. In addition, the City shall install a sign as visitors leave the wetlands park to prohibit a right turn into Pine View between 4:00 and 6:00 PM on weekdays.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: Upon completion of construction

Complete: Throughout the life of the project

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Copy of signage

4 ENVIRONMENTAL ANALYSIS

This Chapter consists of 14 sections, each of which presents the analysis of the revised project within a particular environmental discipline. The analysis refers back to the original evaluation of impacts contained in the 2002 Certified EIR and identifies the change in impacts, if any, from the approved Project in the 2002 EIR to the proposed revised project. Each section also presents the evaluation criteria taken directly from the 2002 EIR. For ease of reference, the table numbers remain the same as the numbering used in the 2002 EIR.

Most of the information presented in the 2002 Certified EIR has not changed and is not repeated here. Please refer to the 2002 Water Recycling Facility and River Access Improvements EIR for descriptions of setting, discussion of methodology, and the complete identification and discussion of impacts.

4.1 LAND USE

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.1-2

Evaluation Criteria with Point of Significance – Land Use

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project be inconsistent with the land use plan map of an adopted General Plan?	Acres of land	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
2. Will the project be inconsistent with zoning?	Acres of land	Greater than 0 acres of land	Zoning regulations of Sonoma County; Petaluma
3. Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	a. Acres of MRZ-2 land developed in incompatible uses b. Acres of quarry site designated by the ARM plan developed in incompatible uses	a. Greater than 0 acres of land b. Greater than 0 acres of land	a. General Plan of Sonoma County and the Mineral Land Classification of the Division of Mines and Geology (1989). b. Sonoma County Aggregate Resources Management (ARM) Plan (1994).
4. Will the project introduce inappropriate uses in a Community Separator?	Acres of land within Community Separators developed in inappropriate uses	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
5. Will the project increase potential for conflict as a result of incompatible land uses?	a. Lineal feet of incompatible uses b. Number of housing units of incompatible use	a. Greater than 0 lineal feet. b. Greater than 0 housing units.	Sonoma County General Plan Petaluma General Plan
6. Will the project convert non-urban land to urban uses for Project facilities?	Acres of land converted	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
7. Will the project convert public open space for Project facilities?	Acres of land converted	Greater than 0 acres of land	Sonoma County General Plan Petaluma General Plan
8. Will the project result in loss of homes due to construction of facilities?	Number of homes or agricultural buildings lost	Greater than 0 homes or buildings	Uniform Relocation Assistance and Real Property Acquisition Act

Source: Parsons, 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: LU-1 and LU-2: Will the project impact land use based on evaluation criteria 1 and 2?

Analysis: *Less than Significant – No change in level of significance from 2002 Certified EIR*

Table 4.1-1 below lists the zoning and general plan designations for the various sites located within the project area.

Table 4.1-1

Zoning and General Plan Designation

Site	Jurisdiction	Zoning	General Plan
4400 Lakeville Highway	City of Petaluma	Agriculture, with flood combining district over portions of property (A-FP-C)	Public and Institutional
Parcel A	Sonoma County	Northern 1/3 – Diverse Agriculture, with flood and biotic resource combining districts over portions of the property (DA-F2) Southern 2/3 – Land Extensive Agriculture, with flood and biotic resource combining districts over portions of the property (LEA-F2)	Land Extensive Agriculture
Parcel B	Sonoma County	Land Extensive Agriculture, with flood and biotic resource combining districts over portions of the property (LEA-F2)	Land Extensive Agriculture

In the approved project, the main treatment facilities are located in the existing Pond No. 1 and the polishing wetlands are located on Parcel A. The approved project is compatible with both the general plan and zoning designations because the main treatment facilities were located in an area within Petaluma's jurisdiction and because the polishing wetlands (located within Sonoma County on Parcel A) considered as minor public facilities, which are permitted in agricultural districts with a Use Permit. The approved project requires a Use Permit to be obtained from the City of Petaluma.

The revised Water Recycling Project site plan places the main treatment facilities on Parcel A instead of the existing Pond No. 1 (please refer to Figure 2-2). Parcel A, located within Sonoma County's jurisdiction, is zoned one-third diverse agriculture (DA) and two-thirds Land Extensive Agriculture (LEA) with an F2 (floodplain) overlay zone and a Biotic Resource overlay zone along Ellis Creek. The General Plan Land Use Designation for Parcel A is Land Extensive

Agriculture. Under Sonoma County's agricultural district designation, minor public services or facilities (including but not limited to reservoirs, storage tanks and pumping stations) are permitted with a Conditional Use Permit. The main treatment facilities are not considered minor public services or facilities. However, the City intends to annex the parcels and change the General Plan Land Use designation and zoning to allow for public facilities on site prior to construction.

Also, it should be noted that Sonoma County is in the process of updating their General Plan. The Draft is scheduled to be available in Fall of 2004 (Scott Briggs, Sonoma County Planner, personal communication 2003). If the parcel is not yet annexed to the City of Petaluma at the time the County General Plan is adopted, the County intends to place a note on the updated General Plan Land Use Designation Map indicating that if the City of Petaluma purchases Parcels A and B, the designation would be changed to Public and Quasi-public Land Use (Mike Ban, City of Petaluma, personal communication, 2003).

IMPACT: LU-3: Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?

Analysis: *No Impact – No change in level of significance from 2002 Certified EIR*

The analysis of Impact LU-3 is the same for the revised project as for the approved project. There is no land classified as MRZ-2 or as a designated quarry area in the project's vicinity. Therefore, there is no potential for adverse impact due to inconsistency with established or potential mineral extraction.

Mitigation: No mitigation is necessary.

IMPACT: LU-4: Will the project introduce inappropriate uses in a Community Separator?

Analysis: *No Impact – No change in level of significance from 2002 Certified EIR*

The analysis of Impact LU-4 is the same for the revised project as for the approved project. The project site is not included in a Community Separator designation in the Sonoma County General Plan Open Space Element.

Mitigation: No mitigation is necessary.

IMPACT: LU-5: Would the project increase potential for conflict as a result of incompatible land uses?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

In the approved project, improvements to be built at the Lakeville site are similar to existing uses and were found to be compatible with the agricultural uses to the southeast and across Lakeville Highway. Polishing wetlands and recreational uses to be built on Parcels A and B are adjacent to Shollenberger Park, the

Oakmead/Northbay Business Park and agricultural uses across Lakeville Highway. These uses are designed to interface with Shollenberger Park, and would be compatible with the Business Park and agricultural uses.

The revised project places the administrative buildings and main treatment facilities on Parcel A instead of the existing Pond No. 1 (see Figure 2-1). This would relocate the operations building, the UV treatment facilities, and a small recycled water storage pond approximately 1,800 feet to the northwest and the main treatment facilities approximately 1,000 feet to the northwest. Although closer to the Business Park, the main treatment facilities would still be 1,100 feet to the southeast of the property line separating Parcel A from the Business Park. The Business Park is zoned M-L Light Industrial. The Petaluma Zoning Ordinance allows public and quasi-public facilities on lands zoned M-L (Section 14-207 of the Zoning Ordinance). Because public and quasi-public facilities are permitted on the M-L zone, the revised project facilities located adjacent to the business park are not considered to cause a substantial increase in the potential for conflict as a result of incompatible land uses.

IMPACT: LU-6: Will the project convert non-urban land to urban uses for Project facilities?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis of Impact LU-6 is similar for the revised project as for the approved project. Acquisition of Parcels A and B, which total about 293 acres, would change land use from agricultural to wetlands and recreational, with about 14% of the land used for more industrial type uses. The revised project site plan would still fulfill the goals of education, recreation, and habitat creation on the site, and would not function as an urban development.

The project would not encourage the conversion of other lands from agriculture to urban uses.

Mitigation: No mitigation is necessary.

IMPACT: LU-7: Will the project convert public open space for project facilities?

Analysis: *No Impact - No change in level of significance from 2002 Certified EIR*

The analysis of Impact LU-7 is the same for the revised project as for the approved project. No public open space would be used for project facilities.[1] In fact, the polishing wetlands and river access improvements to be created on Parcels A and B would be used for public recreation and education.

[1] The Sonoma County Opens Space and Preservation District and Coastal Conservancy are purchasing parcel A and B, with the exception of the top 40 acres of parcel A. Consequently, a conservation easement will be placed on the development of Parcel B.

Mitigation: No mitigation is necessary.

IMPACT: LU-8: Will the project result in loss of homes due to construction of facilities?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis of Impact LU-8 is the same for the revised project as for the approved project. Acquisition and reuse of Parcels A and B would result in the loss of one rental housing unit located on Parcel A. Measure PD-1, Uniform Relocation Assistance, adopted as part of this project, requires the City to develop and approve a relocation assistance program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies of 1970. The affected tenant, depending on eligibility, would be afforded various services and forms of compensation in accordance with the provisions of this act. With the implementation of this measure, the impact is found to be less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: LU-C1: Will the project have a cumulative potential to impact land uses?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified that would change the analysis of cumulative impacts. The minor changes in the impacts due to the revised project (that are described above) would not cause a change in the extent of cumulative impacts from the project.

Mitigation: No mitigation is necessary.

REFERENCES

Ban, Mike, Interim Director, City of Petaluma Water Resource and Conservation Department. 2003. Personal Communication. December 30.

Briggs, Scott, Sonoma County Planner. 2003. Personal Communication. December.

4. 2 AGRICULTURE

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.2-1

Evaluation Criteria with Point of Significance – Agriculture

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project cause loss of farmland?	Acres of agricultural land lost	Greater than 0 acres	CEQA State of California Department of Conservation Farmlands Mapping Unit Petaluma General Plan Sonoma County General Plan
2. Will the project cause Williamson Act contracts to be canceled?	Number of remainder parcels under Williamson Act contract which are less than 10 acres of status farmland	Greater than 0 remainder parcels smaller than contract criteria	California Land Conservation Act of 1965 Petaluma General Plan Sonoma County General Plan
3. Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Plants not locally grown or purchased from nurseries with approved inspection programs.	Greater than 0 plants	Sonoma County Agricultural Commissioner Sonoma County Viticulture Advisor

Source: Parsons, 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: AG-1: Will the project cause loss of farmland?

Analysis: *Significant - No change in level of significance from 2002 Certified EIR*

The Petaluma General Plan and the Sonoma County General Plan include objectives and policies requiring preservation of agricultural lands. Parcels A and B are zoned Land Extensive Agriculture in the Sonoma County General Plan. The intent of this zone is to enhance and protect lands best suited for permanent agricultural use and capable of relatively low production per acre of land. Under the approved project, the agricultural land on Parcels A and B (approximately 91 acres on Parcel A and approximately 58 acres on Parcel B) would be converted to a nonagricultural use to place polishing wetlands and river access improvements on the site. Under the revised project, the main treatment facilities would be located on Parcel A instead of Pond No. 1, but the acreage of impacts would

remain the same. Because agricultural land would be permanently converted to other uses, this impact is still considered significant.

Mitigation: Mitigation Measure AG-1, proposed for the approved Project, was not adopted by the City at certification and was addressed in the statement of overriding considerations. The City still declines to adopt Mitigation Measure AG-1.

After Mitigation: *Significant*

Approximately 149 acres of agricultural lands would be removed, which constitutes a significant impact. The Certified EIR identified Mitigation Measure AG-1, which would have required the City to maintain as much crop production on Parcels A and B as feasible. However, the City did not adopt this mitigation at project approval. Therefore, Mitigation Measure AG-1 is no longer included, and no other feasible mitigation has been identified.

IMPACT: AG-2: Will the project cause Williamson Act contracts to be canceled?

Analysis: *No Impact - No change in level of significance from 2002 Certified EIR*

The analysis of Impact AG-2 is the same for the revised project as for the approved project. No Williamson Act contracts exist on the proposed sites.

Mitigation: No mitigation is needed.

IMPACT: AG-3: Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis of Impact AG-3 is the same for the revised project as for the approved project. The project includes planting of wetland and riparian species, and there is a small vineyard northeast of the wetland site. If plants that provide breeding habitat for the glassy-winged sharpshooter were utilized in the wetlands or restoration efforts, the risk of increasing sharpshooter populations would increase.

Measure PD-2, Purchase Locally Grown or Inspected Plants, requires that the City shall purchase all plants for the wetlands and restoration efforts from locally grown stock or from a nursery that has an approved monitoring program for the glassy-winged sharpshooter. This measure, adopted as part of the project, will prevent an increase in the risk of sharpshooter populations, and therefore the impact is considered less than significant.

Mitigation: No mitigation is needed.

CUMULATIVE IMPACTS

IMPACT: AG-C1: Will the project cause cumulative impacts to agricultural resources?

Analysis: *Significant - No change in level of significance from 2002 Certified EIR*

The analysis of cumulative agricultural impacts is similar for the revised project as for the approved project. There are several past, present, and probable future projects along Lakeville Highway that have converted or are converting agricultural uses to various types of development. Although the projects are consistent with the City of Petaluma's General Plan, they are located in areas that were formerly agricultural land, and they have contributed to the ongoing loss of farmland in Sonoma County. Other cumulative projects have no effect on agriculture. Considerable farmland in the area has been lost in this area over the years, and conversion of Parcels A and B would contribute to this cumulative loss.

Mitigation: No feasible mitigation was identified.

After Mitigation: *Significant*

REFERENCES

No new references.

4.3 GEOLOGY, SOILS AND SEISMICITY

The proposed modifications to the site plan do not require revisions to the evaluation of Geology, Soils and Seismicity. The entire site was evaluated in the original EIR, and the rearrangement of facilities would not result in any new impacts. The slope and soil conditions are relatively the same on the Pond No. 1 site and the Parcel A site. The Lead Agency acknowledges, however, that the wording in the legend on Figures 4.3-2, 4.3-3 and 4.3-4 should now read "Proposed Wetlands and New Water Recycling Facility" for the area indicated with the blue boundary. Measures included in the Project to address liquefaction, ground shaking, and expansive and corrosive soils would still be applicable, and would address the impacts associated with the revised design.

4.4 GROUNDWATER

The proposed modifications to the site plan do not require revisions to the evaluation of Groundwater. The entire site was evaluated in the EIR, and the rearrangement of facilities would not result in any new impacts. The treatment facilities in the EIR were found to have less than significant impacts to groundwater because they are in completely contained structures. The relocated facilities would continue to be constructed in completely contained structures. The polishing wetlands would be relocated further to the southwest, and therefore further from existing groundwater users. Measures included in the Project to address groundwater quality would still be applicable. The Lead Agency acknowledges, however, that the wording in the legend on Figure 4.4-1 should now read "Proposed Wetlands and New Water Recycling Facility" for the area indicated with the blue boundary.

4.5 SURFACE WATER QUALITY

The proposed modifications to the site plan do not require revisions to the evaluation of Surface Water Quality because the modifications do not include changes to the quality or quantity of effluent. Measures included in the Project to address potential exceedance of narrative- or numeric-based criteria from project discharge or potential degradation of surface water quality would still be applicable.

4.6 HYDROLOGY

The proposed modifications to the site plan do not require revisions to the evaluation of the hydrology evaluation. The entire site was evaluated in the EIR, and the rearrangement of facilities would not result in any new impacts because project discharge would not change. Measures included in the Project to address potential flooding or streambank erosion would still be applicable.

4.7 PUBLIC HEALTH AND SAFETY

The proposed modifications to the site plan do not require revisions to the evaluation of Public Health and Safety. The entire site was evaluated in the original EIR, and the rearrangement of facilities would not result in any new impacts. Measures included in the Project to address potential exposure of the public or workers to hazardous materials, chemicals or disease vectors (i.e., mosquitoes) would still be applicable.

4.8 BIOLOGICAL RESOURCES

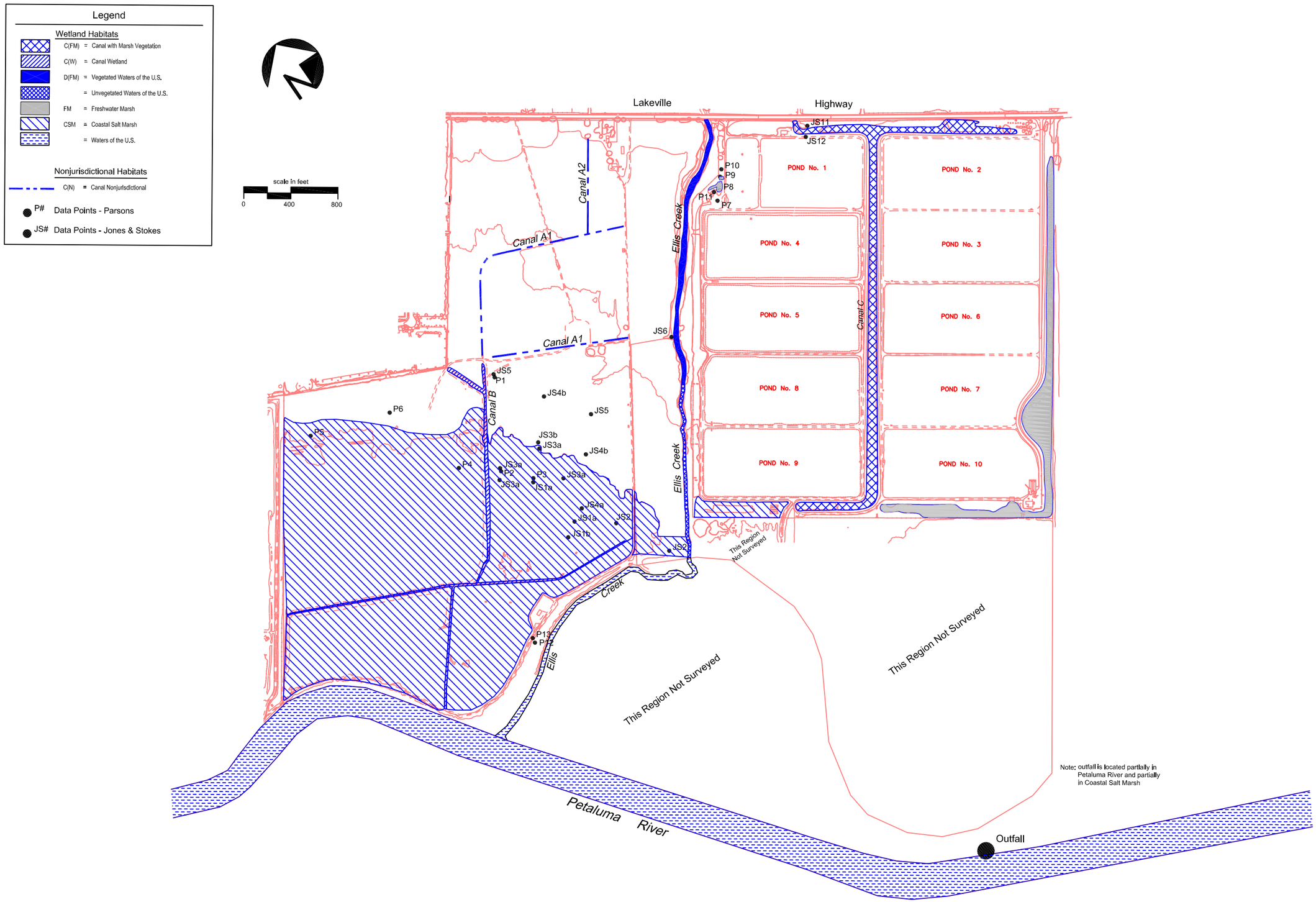
SETTING

Since certification of the Final EIR in August of 2002, two changes have occurred which affect the biological setting of the project. First, on March 18, 2003, the Sonoma County population of the California tiger salamander was elevated from a candidate species to an endangered species under the federal Endangered Species Act. The U.S. Fish and Wildlife Service has published a map of potential habitat within the County, and the project site is not within the designated potential habitat. Therefore, no further evaluation regarding California Tiger salamander is necessary in this addendum.

Second, on October 22, 2003, the U.S. Corps of Engineers visited the site to confirm the wetlands delineation prepared by Parsons and based on site visits conducted in 2002 and 2003 as well as a previous delineation prepared by Jones and Stokes in 1995. Upon review of the draft delineation, the Corps notified the City that they had visited the site in 1995, and had previously mapped wetlands on the site with substantially greater acreage than shown in the Jones and Stokes 1995 mapping, the 2003 draft delineation, or in the 2002 EIR. The additional acreages are located on Parcel A and the upper portion of Parcel B which have been farmed for more than 50 years. Because of these conditions the seasonal wetlands on Parcels A and B are considered to be low-quality, disturbed wetlands.

The wetlands delineation was revised based on this new information and was subsequently confirmed by the Corps on February 23, 2004. As a result the impacts estimated in the 2002 EIR for the approved project have increased from 0.52 to 11.5 acres. Figure 4.8-2 of the 2002 EIR and an updated version of this figure (Figure 4.8-2R) based on the confirmed wetlands delineation, are provided herein for comparison.

The first sentence under Wetlands and Waters of the U.S., on page 4.8-6 of the 2002 EIR, suggests that there are oxidation ponds at the Hopper Street facility; however, oxidation ponds only exist at the Lakeville Highway facility.



Source: Jones & Stokes, Valerius Environmental Consulting

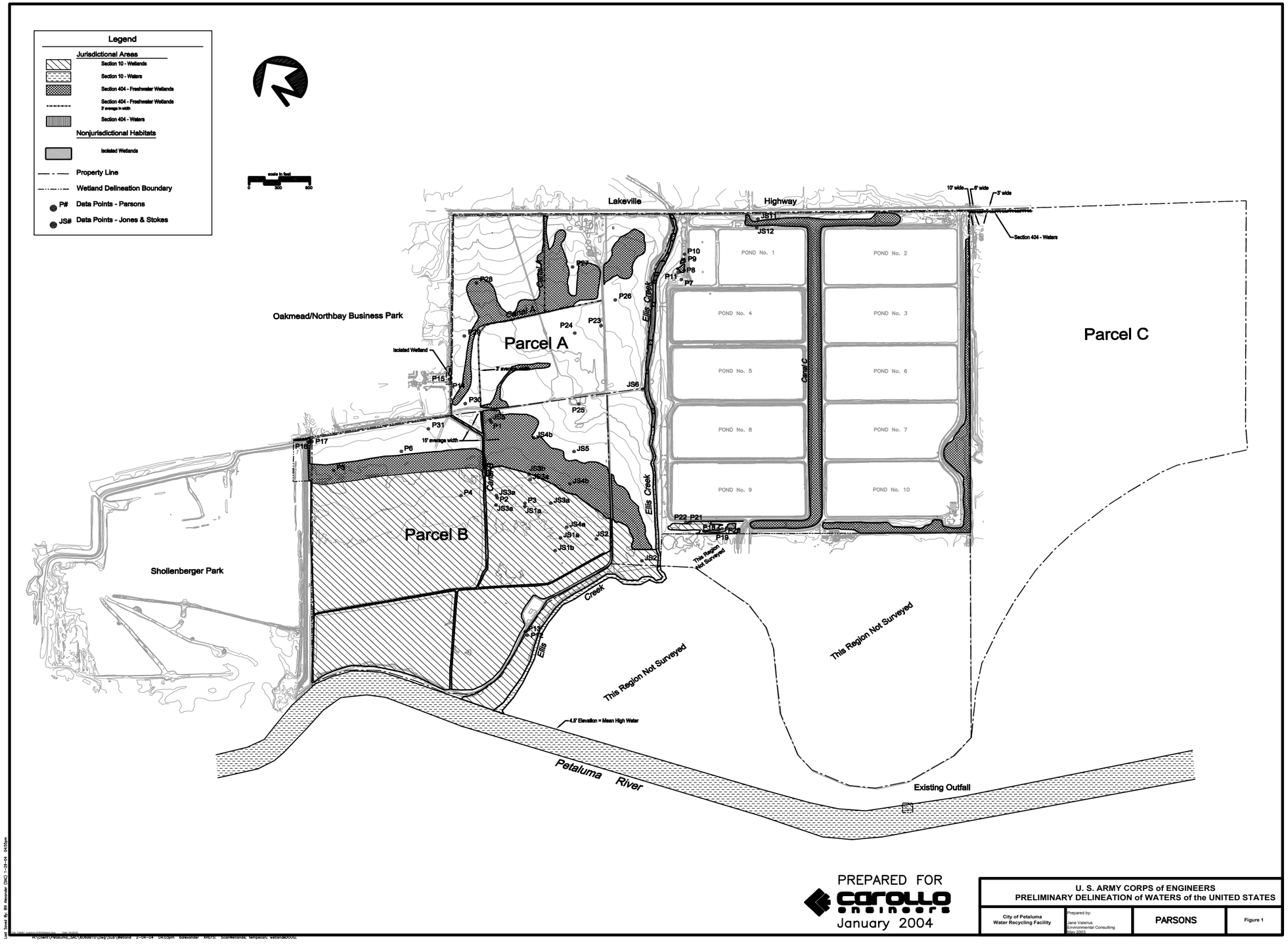
PARSONS

Figure 4.8-2

PLANNING-LEVEL WETLANDS and WATERS of the US

City of Petaluma
Water Recycling Facility EIR

File: 739461\graphics\EIR\Wetlond-11x17 Date: 05/22/02



PREPARED FOR
carollo engineers
January 2004

U. S. ARMY CORPS of ENGINEERS
PRELIMINARY DELINEATION of WATERS of the UNITED STATES

City of Petaluma Water Recycling Facility	Prepared by: Jane Valerius Environmental Consulting May 2003	PARSONS	Figure 1

Source: Parsons, Jane Valerius and Carollo Engineers 2004

PARSONS
Replacement Figure 4.8-2R

Wetlands and Waters of the US

City of Petaluma
Water Recycling Facility EIR Addendum

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4-8.5

Evaluation Criteria with Point of Significance – Biological Resources

Evaluation Criteria	As Measured By	Point of Significance	Justification
1. Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?	a. Number of individuals of a plant or wildlife species that would be lost b. Acres of occupied or designated critical habitat	a. Greater than 0 individuals b. Greater than 0 acres	FESA, CESA (Sections 2062 and 2067), CEQA (Article 5, Section 15065), and California Native Plant Protection Act (CDFG Code Sections 1900-1913); Petaluma General Plan; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
2. Will the project cause loss of active raptor nests, migratory bird nests, or wildlife nursery sites?	Number of active nesting or nursery sites	Greater than 0 active nest sites	CEQA, CDFG Wildlife Habitat Relationships model, Fish and Game Code
3. Will the project cause permanent loss of sensitive wildlife habitat?	Acres of sensitive wildlife habitat	Greater than 10 percent of each habitat type in the project area The 10 percent significance threshold is used here to define a "substantial" impact for species that are not rare, threatened, or endangered, pursuant to CEQA Appendix G, Item IV. (a).	CEQA, CDFG Wildlife Habitat Relationships model; Petaluma General Plan; Sonoma County General Plan OS-4 and RC-5
4. Will the project cause permanent loss of sensitive native plant communities?	Acres of sensitive native plant community (as defined by the California Natural Diversity Data Base) lost	Greater than 0 acres	CEQA, California Native Plant Protection Act, CDFG Interim Wildlife/Hardwood Management Guidelines, CNDDB, Sonoma County General Plan OS-4 and RC-5, Petaluma General Plan; Petaluma Watershed Plan
5. Will the project substantially block or disrupt major fish or wildlife migration or travel corridors[4]?	Number of corridors substantially blocked or disrupted	Greater than 0 corridors	CEQA; Petaluma General Plan Goals 6.3-5, 6.3-6 and Objectives 6.4-n, -o, -r, and -s; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5

Table 4-8.5

Evaluation Criteria with Point of Significance – Biological Resources

Evaluation Criteria	As Measured By	Point of Significance	Justification
6. Will the project cause permanent loss of aquatic habitat (i.e., streams)?	Linear feet of stream habitat	Greater than 0 linear feet of stream habitat	CEQA, with concurrence from Bill Cox CDFG fisheries biologist, Region 3 Yountville; Petaluma General Plan Goal 5.1-2; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
7. Will the project destroy wetlands or waters of the U.S.?	Acreage of permanent discharge to or placement of fill in potential jurisdictional wetlands or waters of the U.S.	Greater than 0 acre	Clean Water Act, 40 CFR 230 Section 404(b)(1) Guidelines, Corps, EPA, and State of California no net loss policies; Petaluma General Plan; Petaluma Watershed Plan; Sonoma County General Plan OS-4 and RC-5
8. Will the project expose organisms to hazardous levels of a) toxic or b) bioaccumulatory substances	a. Chronic and acute effluent toxicity tests b. Concentrations of constituents in secondary treat water	a. 100/NOEL = 1 (chronic) and median percent survival >90% or >70% 10% of the time (acute) b. Exceeds the CTR standard for protection of aquatic life or bioconcentration factor <30 or log octanol/water partition coefficient <3	a. SFRWQCB Basin Plan toxicity objective b. California Toxics Rule (CTR) and Franke et al. (1994)

Source: Parsons, 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: BIO-1: Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?

Analysis: *Significant – No change in level of significance from 2002 Certified EIR to Water Recycling Facility*

The Water Recycling Facility could cause the possible loss of individuals of an indeterminate number of rare species of fish and wildlife.

There is potential habitat for several special-status species (salmonid, California red-legged frog, and northwestern pond turtle) within Ellis Creek and the Ellis

Creek riparian area, which would be affected by placement of pipelines underground beneath Ellis Creek. Revised project impacts would be slightly less than the approved project and would result in 0.07 acres of temporary fill in the Ellis Creek streambed and 0.3 acres of temporary disturbance to riparian vegetation. Losses associated with the Ellis Creek bridge of 0.02 acres of permanent fill and 0.13 acres of permanent loss of riparian vegetation estimated in the EIR will no longer occur under the revised project because the bridge is no longer needed.

Tidewater goby and Sacramento splittail may be present in the tidally influenced portion of the creek and in the Petaluma River; impacts to this habitat may occur from underground pipelines across the tidal portion of Ellis Creek and the outfall replacement in the Petaluma River. Revised project impacts would be less than estimated for the approved project at 0.09 acres of temporary impact to the tidal portions of Ellis Creek or the Petaluma River.

Special-status plant surveys, conducted in 2003, found no rare plants on the Project site. The surveys covered Parcel A, B, and the Pond site and fulfill the requirements of Mitigation Measure BIO-1b of the EIR.

Significant – No change in level of significance from 2002 Certified EIR to Petaluma Marsh Acquisition Improvements

The Petaluma Marsh Acquisition improvements could also cause the possible loss of individuals of an indeterminate number of rare species of fish and wildlife, similar to that described above. There is potential habitat for several special-status species within Ellis Creek and the Ellis Creek riparian area, which would be affected by restoration activities and the dock in Ellis Creek. Revised project impacts would be 1.0 acre of temporary and 0.02 acres of permanent fill in Ellis Creek and 0.5 acres of temporary disturbance to riparian vegetation along Ellis Creek.

Regarding potential habitat for the tidewater goby and Sacramento splittail in the tidally influenced portion of the creek or the Petaluma River marsh, impacts may occur from restoration of the lower portion of Ellis Creek, and from the two docks in Ellis Creek and the Petaluma River. Revised project impacts would be 0.56 acres of temporary and 0.05 acres of permanent fill in the tidal portion of Ellis Creek or in the Petaluma River.

Mitigation: **BIO-1a. Aquatic Species Protection Program**

The City shall implement an Aquatic Species Protection Plan, as follows:

- A Worker Environmental Awareness Training Program for construction personnel shall be provided.
- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low

freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.

- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.
- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.
- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of 2:1 (2 acres of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.
- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. As an appropriate example, best management practices are described in the *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual* (November 2000). Refer to PD-8 for a potential list. These shall be implemented as necessary under the supervision of the construction manager. Detailed specifications shall be incorporated onto bid documents and construction drawings.
- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

BIO-1c. Wildlife Protection Program

The City shall implement rules at the public areas on Parcels A and B to require dogs to be leashed at all times. In addition, rules shall be established requiring the public to remain on established trails.

After Mitigation: *Less than Significant*

The measures described above will either avoid impacts to rare and endangered plant and wildlife species or compensate for any impacts by replacing or restoring them in kind and on site. Land is available within the project area for compensatory creation of riparian or wetlands habitats.

IMPACT: BIO-2: Will the project cause a loss of active raptor nests, migratory bird nests, or wildlife nursery sites?

Analysis: *Significant – No change in level of significance from 2002 Certified EIR*

A mixed species rookery, containing great egret, great blue heron, snowy egret (*Egretta thula*), and double-crested cormorants (*Phalacrocorax auritus*) has occupied a eucalyptus tree near Pond 8 of the water treatment facility in the past. In the last two breeding seasons the rookery has not been occupied. Riparian woodland along Ellis Creek may also provide suitable nesting habitat for these species as well as a variety of raptors and migratory birds. The revised site plan would affect these potential nesting areas to a similar extent as the approved site plan.

Mitigation: **BIO-2a. Active Raptor and Migratory Bird Nest Protection Program**

A qualified biologist shall conduct pre-construction surveys to determine if any active raptor or migratory bird nests occur within 500 feet of the project area at least two weeks prior to initiation of construction activities.

If active nests are located in the study area, construction exclusion zones shall be established around each active nest. Appropriate construction exclusion zones shall be established through consultation with CDFG. Construction activities shall be prohibited within exclusion zone until the end of the nesting season.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors. The monitor shall also monitor the nest to determine when the young have fledged and submit weekly reports to the CDFG and the City of Petaluma throughout the nesting season.

BIO-2b. Rookery Protection Program

A qualified biologist will conduct pre-construction surveys to determine if rookeries or other nests occur within 500 feet of the project area. A construction exclusion zone shall be maintained around each rookery between January 15 and June 15 to ensure that no construction activities occur within 500 feet of an active rookery (personal communication, Wilcox 2001).

If an active rookery is found, a qualified biologist shall monitor the rookery to evaluate potential disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the rookery.

After Mitigation: *Less than Significant*

Active raptor and migratory bird nests will be identified during pre-construction surveys, and appropriate construction exclusion zones will be established around active nests to avoid disturbance during the nesting season.

The historic rookery located near Pond 8 of the water treatment facility, and any other rookeries that may exist, will be protected during both the nesting and non-nesting seasons through the use of a construction exclusion zone. These mitigation measures would reduce project related impacts to active raptor and migratory bird nests and rookeries to a less-than-significant level.

IMPACT: BIO-3: Will the project cause permanent loss of sensitive wildlife habitat?

Analysis: *Less than Significant – No change in level of significance from 2002 Certified EIR*

Sensitive wildlife habitats are defined as habitats that provide high suitability for foraging and breeding for state or federal species of special concern and California fully protected species, and important resting, foraging, and breeding habitat for migratory birds and other native wildlife. Sensitive wildlife habitats identified within the proposed project area are valley foothill riparian, saline emergent wetland, Eucalyptus, and cropland. Because of the increased wetlands identified on site as a result of the U.S. Army Corps of Engineer's review of the wetlands delineation in 2003, permanent impacts to wetlands from the approved project, analyzed in the 2002 EIR, would now be approximately 11.5 acres instead of the 0.52 acre reported in the 2002 EIR (see discussion on page 4.8-1).

The sensitive wildlife habitats listed above that would be affected by the revised project are presented in Table 4.8-6.

Table 4.8-6

Project Impacts to Sensitive Habitats (Acres)

Structure or Activity	Riparian Forest (includes eucalyptus habitat)		Marsh and Aquatic (Wetlands and Waters of the U.S.)[1]		Cropland	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Water Recycling Facility						
Water Recycling Facility	0	0	.465	2.36	0	40
East road	0	0	0	0	0	0
Wastewater pipelines	0.35	0	.59	0	2	0
Polishing wetlands, access roads and parking lot	0	0	0.77	0.55	10	35
Roads and trails	0	0	0.005	0	0	0
Construction staging areas	0	0	0	0	10	0
Outfall	0	0	0.07	0	0	0
Subtotal	0.35	0	1.90	2.91	22	75
River Access/Marsh Acquisition Improvements						
Restoration of Ellis Creek and creation of habitat	0.5	0	1.0	0	0	1.0
2 docks	0	0	0	0.05	0	0
Marsh Restoration	0	0	0.15	0	0	0
Boardwalk trail to Ellis Creek	0	0	0	0.02	0	0
Storm Water & Mitigation Wetlands	0	0	0	0	5	15
Subtotal	0.5	0	1.15	0.07	5	16
Total	**0.85**	**0**	**3.05**	**2.98**	**27**	**91**

Source: Carollo 2004

[1] Please note that the Marsh and Aquatic Habitat columns include waters of the U.S. which are not vegetated and in some cases are not included in impact calculations or mitigation requirements.

Permanent impacts to riparian forest have decreased from 0.13 to none, because the bridge over Ellis Creek would no longer be needed. Permanent impacts to wetlands habitat have decreased from about 11.5 acres to 2.98 acres by relocating the headworks and polishing wetlands and situating the new Water Recycling Facility around the wetlands. Permanent impacts to cropland have increased from

46 to 91 acres due to the relocation of the main plant facilities from Ponds 1 to Parcel A. Approximately 30 acres of the cropland will be used for the polishing wetlands.

Permanent loss of wildlife habitat would still be small compared to the amount of wetlands and cropland habitat in the region. Therefore, impacts are found to be less than significant. In addition, the wildlife habitat currently provided by agriculture would be replaced with wildlife habitat provided by wetlands. These wetlands would continue to support nesting and foraging activities of wildlife populations.

Mitigation: No mitigation is necessary.

IMPACT: BIO-4: Will the project cause a permanent loss of sensitive native plant communities?

Analysis: *No impact – Level of significance is reduced from significant in 2002 Certified EIR*

The Ellis Creek Bridge is not included in the revised project; therefore the permanent disturbance estimated in the EIR would no longer occur.

IMPACT: BIO-5: Will the project substantially block or disrupt major fish or wildlife migration or travel corridors?

Analysis: *Significant - No change in level of significance from 2002 Certified EIR*

There are no known major terrestrial wildlife migration or travel corridors known on the project site.

The Petaluma River is a migration corridor for steelhead going to and from Adobe Creek, San Antonio Creek, and possibly the upper watershed of Ellis Creek. Construction-related activities could cause steelhead, which may use lower Ellis Creek as a migration corridor, to avoid passing through the area on their way to or from spawning and rearing areas higher in the watershed, which would be a significant impact. Increased sediment, turbidity, or accidental discharges of pollutants from construction equipment could also affect steelhead or other special-status fish species moving through the Petaluma River or Marsh downstream from the project site, which would also be a significant impact. Impacts to Ellis Creek and the Petaluma River are less with the revised project than the approved project.

Measure PD-8, Construction Erosion and Spill Control Measures, adopted as part of this project, requires the City develop and implement measures designed to prevent significant construction impacts to water quality.

Mitigation: **BIO-1a. Aquatic Species Program.**

After Mitigation: *Less than Significant*

Implementation of mitigation measures BIO-1a will ensure that steelhead could migrate up Ellis Creek during migration periods without impediment or peril caused by the underground installation of the wastewater pipelines across the creek.

IMPACT: BIO-6: Will the project cause permanent loss of aquatic habitat (i.e., streams)?

Analysis: *No impact – Level of significance is reduced from significant in 2002 Certified EIR for Water Recycling Facility*

The bridge over Ellis Creek is not included in the proposed revised project therefore the estimated impact in the EIR of 50 linear feet of permanent loss of aquatic habitat from placement of the bridge would not occur.

Significant – No change in level of significance from 2002 Certified EIR for Petaluma Marsh Acquisition Improvements

Docks proposed in the Petaluma River and Ellis Creek would still permanently affect approximately 75 feet and 10 feet of streambed respectively. The levee stabilization included in the River Access Improvements is not included in the Petaluma Marsh Acquisition improvements; therefore the estimated permanent loss of 1,300 linear feet of aquatic habitat, as described in the EIR, will not occur.

Mitigation: **BIO-1a**. **Aquatic Species Protection Program**

After Mitigation: *Less than Significant*

Mitigation Measure BIO-1a will require avoidance of impacts to aquatic habitat where feasible, and compensation for any loss if necessary. Compensation will consist of restoration or creation of habitat on site in kind at a ratio of 2:1 or at the ratio prescribed by the Corps of Engineers. This will reduce impacts to aquatic habitats to less than significant. Land is available within the project area or at Shollenberger Park for compensatory creation of riparian, wetlands or river habitats.

IMPACT: BIO-7: Will the Project destroy wetlands or other waters of the U.S.?

Analysis: *Significant – No change in the level of significance from Certified 2002 EIR*

Because of the increased wetlands identified on site as a result of the U.S. Army Corps of Engineer's review of the wetlands delineation, permanent impacts to wetlands from the approved Project (as analyzed in the 2002 EIR) would now expected to be approximately 11.5 acres instead of 0.52 acre as reported in the 2002 EIR (see discussion on page 4.8-1).

Under the revised project, the Water Recycling Facility is estimated to cause up to 1.90 acres of temporary disturbance and 2.91 acres of permanent fill or disturbance to jurisdictional wetlands or waters of the U.S. Even though the project will create polishing wetlands that will be used as habitat, the wetlands will be managed for wastewater treatment as well as habitat, and therefore will not qualify as mitigation for lost wetlands.

The Petaluma Marsh Acquisition improvements would cause up to 1.15 acre of temporary and 0.07 acres of permanent fill or disturbance to wetlands or waters or the U.S.

The combined impact for both the Water Recycling Facility and Marsh Acquisition improvements is 3.05 acres of temporary and 2.98 acres of permanent fill or disturbance to wetlands or waters or the U.S

Mitigation: **BIO-7. Create or Restore Wetlands and Waters of the U.S.**

The City shall prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. The Plan shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. Mitigation will be on site and in kind, if possible.

Compensatory mitigation for permanent impacts shall be provided at a ratio of 1:1, that is, 1 acre of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers or Regional Water Quality Control Board.[2]

After Mitigation: *Less than Significant*

The Conceptual Wetland Mitigation and Monitoring Plan will provide for revegetation of temporary impacts and compensatory mitigation of permanent impacts, thereby reducing impacts to a less-than-significant level. Land is available within the project area for compensatory creation of riparian or wetlands habitats at a 1:1 ratio.

IMPACT: BIO-8: Will the project expose organisms to hazardous levels of toxic or bioaccumulatory substances?

Analysis: *Significant – No change in level of significance from 2002 certified EIR*

The analysis included in the EIR remains the same for the revised project. The proposed revised project would not change the level of toxic or bioaccumulatory substances found in Petaluma's effluent. Mitigation Measure WQ-1e is still applicable.

[2] In the 2002 EIR measure BIO-7 included a 2:1 replacement ratio. After the October 2003 site visit with the Corps, the Corps indicated they would be willing to except a 1:1 ratio due to the low quality of wetlands that were to be impacted (personal communication, Philip Shannon, U.S. Army Corps of Engineers, October, 2003).

CUMULATIVE IMPACTS

IMPACT: BIO-C1: Will the project cumulatively impact biological resources?

Analysis: *Less than Significant - No change in level of significance from 2002 certified EIR*

No new cumulative projects have been identified in the vicinity of the project site. Cumulative biological impacts remain less than significant with the revised project.

Mitigation: No mitigation is necessary.

REFERENCES

Evans, Jules. 2003. Avian Use of Wetland Habitats Associated with the Petaluma Water Recycling Facility and the River Access Improvements Site. July 15, 2003.

Shannon, Phillip. 2003. Discussion during October 22, 2003 site visit and November 6, 2003 meeting.

Valerius, Jane. 2003. Petaluma Water Recycling Facility Project Special Status Plant Survey Report. December 12.

4.9 TRANSPORTATION AND CIRCULATION

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.9-3

Evaluation Criteria with Point of Significance – Transportation and Circulation

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will project traffic cause congestion along study area roadways?	Deterioration in intersection level of service along study area roadways.	For city streets where existing LOS is C or better, LOS of D or worse is significant. For city streets where existing LOS is D or E, deterioration to the next lower level is significant.	Petaluma General Plan, Transportation Element, Section 10.3, Policy 1
2. Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?	a. Miles of lane closures not in compliance with Standard Transportation Procedures.	Greater than 0 miles.	Sonoma County Public Works Department; California Department of Transportation, and Professional Judgment
3. Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Number of locations where there is ingress/egress of construction equipment onto a major roadway not in accordance with regulations[1].	Greater than 0 locations.	Sonoma County Public Works Department; California Department of Transportation
4. Will project construction traffic damage public or private roadbeds?	Number of miles of roadway which project does not restore to existing conditions or better.	Greater than 0 miles.	Sonoma County Public Works Department; California Department of Transportation
5. Will there be inadequate parking for project activities?	Any on-street parking.	Greater than 0 vehicles.	Code requirements for Sonoma County and City of Petaluma
6. Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Number of roadways traveled by project heavy vehicles on non-designated truck routes without a Transportation Permit.	Greater than 0 roadways.	Sonoma County Public Works Department, California Department of Transportation

Source: Parsons 2004

IMPACTS AND MITIGATION MEASURES

Construction Conditions

With the revised project, construction is estimated to begin in Summer 2005 and end in 2008. The main phase of construction, which requires construction equipment, materials and equipment to be hauled to the site, is scheduled to start in Summer 2005.

Because the revised project does not require filling in of the existing ponds, much less construction truck traffic would be generated. Slightly fewer vehicles would be traveling to and from the site during construction per day, but the initial site preparation would now require only 2 months instead of 8 months. The number of construction workers varies according to the construction activity and will range from 50 to 150 workers on-site at the same time. The most critical activity that will affect roadway traffic is hauling fill to the site. An estimated maximum of 120 trucks per day plus 100 vehicles trips per day for workers may be required.

The location of the construction staging area remains the same as described in the Transportation and Circulation section of the certified EIR.

Project Conditions

The project conditions, as described in the Transportation and Circulation section of the EIR, would be revised as follows:

- Improvements to the existing east and west gate would no longer be needed.
- The existing west gate would only be used for emergency access, and a new gate, further to the west would be added on Parcel A. The new west gate would include the same safety design elements as were to be included for the existing west gate: a right-turn lane added to Lakeville Highway, for east-bound right turns into the site, and an acceleration lane added for right turns out of the site, for east-bound traffic.
- The bridge over Ellis Creek would no longer be included as part of the access road from Oakmead/Northbay Business Park.
- None of the in plant-roads would be widened. Only improvements (repaving, not widening) to the East Road would remain.

Project traffic volumes remain the same as those identified in the EIR.

IMPACT: TR-1: Will the project traffic cause congestion along study area roadways?

Analysis: *Significant – No change in level of significance from 2002 Certified EIR for Construction*

Under the revised project, construction traffic, at its peak, would be reduced from 250 to 220 trips per day (personal communication, Hook 2003). This would

reduce the average delays but not improve the level of service at each of the intersections identified in Table 4.9-2. Therefore, this impact remains significant, but would occur only for 2 months instead of 8 months.

Mitigation: **TR-1a. Reroute Construction Worker Trips**

Before 9:00 AM and after 4:00 PM, and after the new access road is constructed, construction workers shall be required to enter and exit Lakeville Highway at McDowell Boulevard.

After Mitigation: *Less than Significant*

Rerouting the construction worker trips will improve all the study intersections except Lakeville Highway and McDowell Boulevard. The construction worker trips will exit U.S. 101 to Lakeville Highway (east) and turn right on Lakeville Highway and McDowell Boulevard. This intersection will operate at LOS C during the AM and LOS D during the PM peak period.

Table 4.9-5

Construction Intersection Levels of Service

			Construction Conditions	
	Intersections	**Peak**	**LOS**	**Average Delay (seconds)**
1	Lakeville Highway/Mc Dowell Blvd	AM	C	15.3
		PM	D	31.9
2	Lakeville Highway/Pine View Way	AM	D	29.6
		PM	F	>100
3	Lakeville Highway/Browns Lane	AM	D	34.6
		PM	D	36.5

Source: Parsons 2004

Analysis: *Significant – No change in level of significance from 2002 Certified EIR for Operation*

Under the proposed revisions the project traffic conditions do not change, therefore no new analysis is necessary. Mitigation measure TR1-b is still applicable.

Mitigation: **TR-1b. Install Signage to Reroute Employee and Visitor Trips**

The City shall install an informational sign on Lakeville Highway just west of the intersection with McDowell Blvd., indicating that the new wetlands park can be accessed by turning right on McDowell Blvd. In addition, the City shall install a sign as visitors leave the wetlands park to prohibit a right turn into Pine View between 4:00 and 6:00 PM on weekdays.

After Mitigation: *Less than Significant*

Signage at Lakeville and McDowell Blvd. will divert some trips from the Lakeville Highway intersections east of McDowell Blvd., thereby improving the operation of each of those intersections. The signage preventing wetlands park traffic from leaving via Pine View during the PM peak period will reduce the project's impact on that intersection to a level below significance, as the left turning movement out of Pine View is the critical movement causing the LOS F during the PM peak period.

IMPACT: TR-2: Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?

Analysis: *Less than Significant – No change in level of significance from 2002 Certified EIR*

The analysis of Impact TR-2 is the same for the revised project as for the approved project. Lane closures will not be necessary for construction. The City shall ensure safe working conditions during construction or near Lakeville Highway by appropriate use of flagmen or temporary traffic signals.

Mitigation: No mitigation is necessary.

IMPACT: TR-3: Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis of Impact TR-3 is the same for the revised project as for the approved project. If necessary, flagmen or temporary traffic signals will be implemented for large trucks entering the project site in order to ensure safe roadway conditions for motor vehicles.

Mitigation: No mitigation is necessary.

IMPACT: TR-4: Will project construction traffic damage public or private roadbeds?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Impact TR-4 is somewhat less for the revised project because of the shorter construction schedule. For either the approved or revised project, there are no restrictions for truck traffic on U.S. 101 and Lakeville Highway (S.R. 116) since it is a designated truck route. The roadbeds have been designed to handle the heavy loads associated with construction traffic.

Mitigation: No mitigation is necessary.

IMPACT: TR-5: Will there be inadequate parking for project activities?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

During construction, parking will be designated at the staging area on Parcel A only, and would no longer be provided on Pond No 1 and 4 as with the approved Project. Parking would be adequate for construction.

During operation, the project would provide parking on Parcel A for employees and visitors to the facility instead of Pond No. 1. The number of spaces provided remains the same as described in the EIR. Therefore, parking should be adequate for daily operations.

Mitigation: No mitigation is necessary.

IMPACT: TR-6: Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Impact TR-6 is somewhat less for the revised project because of the shorter construction schedule. For either the approved or revised project, U.S. 101 and Lakeville Highway (S.R. 116) are both designated truck routes suitable for heavy vehicles for construction activities. There are no restrictions for trucks or heavy vehicles on these routes.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: TR-C1: Will there be traffic congestion along study area roadways during the cumulative conditions?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified in the vicinity of the project site. The cumulative impact to transportation is still considered less than significant for the revised project.

Mitigation: No mitigation required is necessary.

REFERENCES

Hook, Ryan. 2003. Carollo Engineering. Email Correspondence. December 29.

4.10 AIR QUALITY

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.10-3

Evaluation Criteria with Point of Significance – Air Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will construction of the project generate emissions that expose people to high levels of dust and equipment exhaust?	Size of construction area, duration or construction, and proximity of receptors.	Application of appropriate mitigation measures recommended by BAAQMD.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pgs. 13-15).
2. Will project emissions cumulatively exceed allowable limits?	Emissions of Reactive Organic Compounds, Nitrogen Oxides, Sulfur Dioxide, and particulate.	Greater than 80 pounds/day for each pollutant.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16).
3. Will project expose sensitive receptors to substantial levels of toxic air contaminants?	Emissions of toxic air contaminants.	Probability of contracting cancer for ME1 exceeds 10 in one million or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the ME1.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 18).
4. Will project violate or contribute to violation of ambient air quality standard?	Carbon monoxide emissions and traffic impacts.	1) Daily carbon monoxide emissions greater than 550 pounds, 2) Substantial traffic impacts at intersections operating at Level of Service D, E, or F now and in the future, and 3) 10% increase in traffic on nearby arterial roadways.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 16-18).
5. Will project cause potential odors?	Complaints	Greater than ten odor complaints in a 90-day period or 1 confirmed or 3 unconfirmed complaints on an annual basis, averaged over 3 years.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans (pg. 18).

Source: Parsons, Illingworth & Rodkin 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: AQ-1: Will construction of the project generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Under the revised project, dust generation and equipment emissions would be less, given the shorter duration of the construction phase.

Measure PD-14, Construction Air Quality Controls, adopted as part of this project, requires the City to incorporate applicable control measures recommended by the BAAQMD in their CEQA guidelines. The BAAQMD considers air quality impacts associated with construction activities to be less than significant, if all these measures are implemented.

Mitigation: No mitigation is necessary.

IMPACT: AQ-2: Will project emissions cumulatively exceed allowable limits?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The emissions of the revised project during operation would be the same as for the approved project, although the facilities would be relocated about 1,000 feet to the northwest. The treatment facility is expected to emit minor emissions of VOCs, well below the Bay Area Air Quality Management District's significance thresholds for VOCs.

No stationary or point sources that would have substantial emissions of any criteria air pollutants have been identified. The proposed facility would be electric powered; therefore, emissions from combustion sources are not anticipated. However, there are standby diesel engine generators that may result in minor emissions of criteria air pollutants.

Mitigation: No mitigation is necessary.

IMPACT: AQ-3: Will the project expose sensitive receptors to substantial levels of toxic air contaminants?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The emissions of the revised project during operation would be the same as for the approved project, although the facilities would be relocated about 1,000 feet to the northwest. Exposure to significant levels of air toxic contaminants is unlikely since the closest sensitive receptors to this portion of the proposed treatment plant would be about 1/4 mile or further away. The proposed project would rely on ultraviolet (UV) light disinfection for approximately 4 mgd (this does not require the use of chlorine), so use of chlorine-based chemicals would actually be reduced from current levels. The impact remains less than significant.

Approved River Access Improvements – No Impact

Revised Petaluma Marsh Acquisition Enhancement and Access Improvements – No Impact

These improvements would have no emissions after construction.

Mitigation: No mitigation is necessary.

IMPACT: AQ-4: Will the project violate or contribute to violation of an ambient air quality standard?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis for Impact AQ-4 remains the same for the revised project as for the approved Project. This project would be considered to have a less-than-significant impact for localized carbon monoxide impacts, since traffic conditions associated with the project would be less than the screening criteria established by the BAAQMD. That is, the project would 1) result in daily carbon monoxide emissions less than 550 pounds, 2) traffic impacts would not be substantial at intersections operating at Level of Service D, E, or F now and in the future, and 3) traffic on nearby arterial roadways would increase by less than 10%. As a result, elevated carbon monoxide concentrations are not expected from this project

Mitigation: No mitigation is necessary.

IMPACT: AQ-5: Will the project cause potential odors?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Under the revised project, the new main treatment facilities would be on Parcel A. Relocation of the headworks to Parcel A to the northwest brings these facilities about 500 feet closer to the Business Park and residences northeast of Lakeville Highway. Most odor impacts from wastewater treatment facilities are associated with the headworks and sludge handling systems. The primary source of odors at wastewater treatment facilities is hydrogen sulfide, which is produced by anaerobic activity or treatment processes. Odors can be controlled to some degree, primarily by adding oxygen to the treatment process. A primary cause of odors is typically from upset conditions or equipment failure.

Existing land uses surrounding the area are primarily agricultural. About seven residences are included in these surrounding land uses: four located about 400 to 2,200 feet north, and three located 1,800 to 2,800 feet east of the main treatment facilities on Parcel A. These distances are measured from the closest boundary of the proposed treatment facilities.

- Headworks. Potential odors from the proposed facility would be primarily associated with the new headworks facility. Odor at this facility would be

controlled by enclosing the facility and providing biofilters for odor control. The headworks odor control should be sufficient to prevent substantial odors from impacting off-site locations.

- Sludge Handling Systems. The sludge handling systems are also a potential source of odors. However, the revised site plan would put these systems 1,000 feet from the nearest sensitive receptor in a direction that is typically downwind. The solids treatment would include thickening, anaerobic digestion, and dewatering. Digestion provides a reduction in volatile solids content of the sludge and therefore a reduction in the odors from solids storage. Odor control facilities consisting of biofilters would be provided for the thickening and dewatering facilities. In addition, the sludge dewatering facilities would also be housed in a building with odor control systems.
- Oxidation Ponds. No modifications have been made to the approved project that would change the analysis in the Certified EIR.
- Algae Removal. No modifications have been made to the approved approject that would change the analysis in the Certified EIR.

Operation of the proposed treatment facility would be subject to the BAAQMD Regulation 7 – Odorous Substances. Limitations of this regulation become effective when the BAAQMD receives 10 or more citizen complaints and deems these complaints objectionable in the normal daily activities of the complainants. The BAAQMD has a toll-free phone number for receiving complaints. If a BAAQMD inspector confirms an odor complaint, a notice of violation would be issued to the source facility. After issuance of three or more notices of violation, the BAAQMD begins to take action to require the operators to abate the situation.

Based on odor complaint records, the current oxidation ponds do not result in significant odors. The expansion of the existing facility including the wetlands could increase the potential for noticeable odors to affect nearby residences. However, substantial odors are not anticipated with this project because: 1) the treatment headworks would be equipped with odor controls, 2) the sludge handling systems would include the use of biofilters, and 3) oxidation ponds would primarily treat secondary effluent (as opposed to raw, primary, and secondary effluent currently being treated). Impacts of the revised project are still deemed to be less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: AQ-C1: Will the project have the potential to have a cumulative impact to air quality?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified. The cumulative air quality impacts are still found to be less than significant for the revised project.

Mitigation: No mitigation is necessary.

REFERENCES

No new references.

4.11 NOISE

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.11-2

Evaluation Criteria with Point of Significance - Noise

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will construction of the project expose the public to high noise levels?	Projected noise levels at property line or "yard" line[1]	Greater than L_{eq} of 60 dBA	California Office of Noise Control recommended construction noise limits
2. Will construction of the project cause high noise levels from construction traffic?	Projected traffic volume due to construction	Greater than 5 dBA increase in noise, L_{eq}	An increase of 5 dBA or more will be readily noticeable.
3. Will operation and maintenance of the project expose the public to high noise levels?	Projected noise levels at property line or "yard" line[1]	a. Greater than L_{50} of 45 dBA, OR	General Plan of Sonoma County
		b. Greater than 5 dBA increase in noise, L_{eq}	An increase of 5 dBA or more will be readily noticeable.

Source: Parsons, Illingworth & Rodkin 2004

Notes: 1 - The property or yard line of the affected receptor whichever is closer to the affected structure.

IMPACTS AND MITIGATION MEASURES

IMPACT: N-1: Will construction of the project expose the public to high noise levels?

Analysis: *Less than Significant – No change in level of significance from 2002 Certified EIR*

The revised project includes moving the main treatment facilities from Pond No 1 to Parcel A. The length of time required to construct the facilities is approximately 30 months (9 months less than the approved Project). Based on a spherical sound propagation of 6 dBA per doubling of distance, anomalous atmospheric sound attenuation, and an assumption that all construction operations could occur simultaneously, homes within 1,600 feet of the center of construction activity would be exposed to noise levels of 60 dBA. When construction is taking place at the northern portion of the site up to two residences will experience noise levels of 60 dBA. Seven residences were located within the 1,600-foot range

under the approved Project, so the impact is reduced under the revised project. Construction of the various Petaluma Marsh Acquisition improvements will be similar to that for the water recycling facility.

Measure PD-17, Construction Noise Mitigation, adopted as part of this project requires the City to schedule activities and use equipment to reduce construction noise as much as is feasible. With implementation of these measures as part of the project, construction noise is found to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: N-2: Will construction of the project cause high noise levels from construction traffic?

Analysis: *Less than Significant – No change in level of significance from 2002 Certified EIR*

Impact N-2 is somewhat less for the revised project because of the shorter construction schedule. Construction traffic to and from the Lakeville Highway site will use roadways that are already heavily traveled by truck traffic. The addition of construction related traffic is therefore not expected to cause a substantial change in traffic noise at noise sensitive receptors in the area. This impact is therefore considered to be less than significant.

Mitigation: No mitigation is necessary.

IMPACT: N-3: Will operation and maintenance of the Project expose the public to high noise levels?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis of Impact N-3 would be the same for the revised project as for the approved project. Similar equipment would be used, but it would be relocated 500-1,200 feet to the northwest. As discussed in the 2002 EIR, noise in the area is dominated by vehicles on the highway with the average noise level at Browns Lane, 1,000 feet north of Lakeville Highway, at 57 dBA during the day and 48 dBA at night. Measure PD-18, Operational Noise Mitigation, adopted as part of this project requires the City to utilize an acoustical engineer during the design process to ensure that the noise levels produced by mechanical equipment at the Lakeville facility do not exceed County standards for receptors in the County and City standards for those receptors in the City.

Analysis: *No Impact - No change in level of significance from 2002 Certified EIR*

These improvements will not cause an increase in noise level off site.

Mitigation**:** No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: N-C1: Will the project have a cumulative potential to disturb noise-sensitive receptors during or after construction?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified. Cumulative impacts to noise remain less than significant with the revised project.

Mitigation: No mitigation is necessary.

REFERENCES

No new references.

4.12 CULTURAL RESOURCES

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.12-1

Evaluation Criteria with Point of Significance - Cultural Resources

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?	Number of sites affected by Project facilities	Greater than 0 sites	36CFR800; CEQA Section 15064.5 and Appendix G; PRC Section 5020-5024, 21084.1 General Plan of Sonoma County, City of Petaluma General Plan
2. Will the project disturb unknown archaeological resources?	Sensitivity analysis	Greater than 0 projected locations	36CFR800; CEQA Section 15064.5 and Appendix G; PRC Section 5020-5024, 21084.1 General Plan of Sonoma County, City of Petaluma General Plan

Source: Parsons 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: CR-1: Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Under the revised project, the main treatment facilities would now be located on Parcel A. No known potentially eligible National or California Register properties, including archaeological, historical, architectural, and Native American/traditional heritage resources are present on Parcel A.

Under the approved Project the farm complex was to remain intact. Under the proposed revised project at least one collapsed outbuilding in the farm complex would be removed to accommodate the main treatment facility. As part of the

project, the City will implement PD-19, Protection of Historic and Archaeological Resources, in order to mitigate the potential impacts. The preferred mitigation to preserve cultural resources is avoidance of the site. Because avoidance is not feasible with the revised project, subsurface testing, evaluation for significance, and/or recordation will be completed for the portions of the farm complex on Lakeville Highway that would be affected.

Mitigation: No mitigation is necessary.

IMPACT: CR-2: Will the Project disturb unknown archaeological resources?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The analysis of Impact CR-2 would be the same for the revised project as for the approved project. The results of archival research indicate that there is a moderate likelihood of encountering subsurface archaeological resources within Parcels A and B. With the implementation of PD-20, Protection of Previously Undiscovered Historic and Archaeological Resources, work shall stop immediately if subsurface archaeological or historical remains are discovered during construction. A qualified professional archaeologist shall be consulted to develop, if necessary, further mitigation measures to reduce any archaeological impact to a less than significant level before construction continues.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: CR-C1: Will the project have a cumulative potential to disturb historical or archaeological resources?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified. Cumulative impacts to cultural resources remain less than significant for the revised project.

Mitigation: No mitigation is necessary.

REFERENCES

No new references.

4.13 VISUAL RESOURCES

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.13-1

Evaluation Criteria with Point of Significance – Visual Resources

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Sonoma County General Plan
2. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Sonoma County General Plan
3. Will the project be inconsistent with the Sonoma County Open Space Element or Petaluma General Plan regarding Scenic Corridors?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Sonoma County General Plan Petaluma General Plan
4. Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?	Proximity of project facilities to setback line.	Less than 200 feet pursuant to the County General Plan.	Sonoma County General Plan
5. Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Principles of visual management
6. Will the project cause an adverse effect on foreground views from one or more private residences?	Level of visual contrast, view obstruction, and degradation of visual quality.	Strong visual contrast; obstruction in viewed area from foreground or middleground; and loss or alteration of a specific scenic resource.	Principles of visual management

Table 4.13-1

Evaluation Criteria with Point of Significance – Visual Resources

Evaluation Criteria	As Measured by	Point of Significance	Justification
7. Will the project create a new light source?	High intensity light or glare towards private residences.	Greater than 0 residences affected.	CEQA case law

Source: Parsons 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: VR-1: Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?

Analysis: *No Impact - No change in level of significance from 2002 Certified EIR*

The Lakeville site is not within a designated Community Separator, and therefore does not have any impact upon the implementation of these General Plan policies.

Mitigation: No mitigation is necessary.

IMPACT: VR-2: Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?

Analysis: *No Impact - No change in level of significance from 2002 Certified EIR*

The analysis of Impact VR-2 would be the same for the revised project as for the approved Project described in the 2002 EIR. The nearest scenic landscape unit identified by Sonoma County is the hills south of Petaluma, and the Open Space Element contains policies for protecting those views. The project is not located in the hills and, as stated above, is at ground level, with relatively low structures. Thus, no views of either major or minor scenic landscape units are impacted.

Mitigation: No mitigation is necessary.

IMPACT: VR-3: Will the project be inconsistent with the Sonoma County Open Space Element or Petaluma General Plan regarding Scenic Corridors?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Both the City and County designate Lakeville Highway as a Scenic Corridor, and travelers along the highway currently have high-quality views of agricultural lands. The existing facilities are currently obscured to southeast-bound travelers due to the lower elevation of the roadway relative to the site, and dense stands of eucalyptus and poplar trees. For northwest-bound travelers, the existing facilities are visible due to the elevation of the road above the surrounding lands, and the absence of dense screening vegetation on the southern side of the site. The

existing oxidation ponds and buildings are industrial-type structures set within a relatively intact agricultural landscape.

Under the approved Project the main treatment facilities would be partially visible from portions of Lakeville Highway (as shown in Section 4.13 of the 2002 EIR). Constructed wetlands on Parcels A and B would convert current agricultural lands to wetlands. Fencing and road improvements associated with the wetlands could reduce the visual quality of views along Lakeville Highway, but Measure PD-21, Landscaping Design requires the City to provide landscaping to screen views of the site from travelers on Lakeville Highway.

The main treatment facilities under the revised project, now located on Parcel A, would be visible from Lakeville Highway from both the southeast-bound (see revised Figure 4.13-8 of this Addendum) and northwest-bound travelers. The visual simulation in Figure 4.13-8 shows landscaping as indicated in the Conceptual Landscape Plan (see Figure 2-3 in the Project Description of this Addendum) after approximately three years of growth. Until the landscape screening becomes more mature, the visual quality of views along Lakeville Highway would be reduced because both foreground and middleground views of Parcels A and B would be partially obstructed by the administration building and to a lesser extent by the treatment facilities. However, this is a brief and intermittent obstruction of the view, leaving much of the existing view corridor to the River intact. Measure PD-21, Landscaping Design will require the City to provide landscaping to screen views, thus reducing the visual contrast of the new buildings.

Mitigation: No mitigation is necessary.

IMPACT: VR-4: Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The Sonoma County General plan has a policy requiring a 200-foot minimum building setback from the center of the highway for structures along Sonoma County-designated scenic corridors. Lakeville Highway is designated as a scenic corridor. Under the revised project site plan all buildings will be set back 200 feet from Lakeville Highway.

Existing View - viewed from Lakeville Highway looking to the south

Simulation - viewed from Lakeville Highway looking to the south

Source: William Kanemoto & Associates 2004

City of Petaluma
Water Recycling Facility EIR Addendum

Visual Simulation
Main Treatment Facilities

PARSONS

Replacement Figure 4.13-8

IMPACT: VR-5: Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

As discussed above the existing facilities are visible to northwest-bound travelers on Lakeville Highway, which can be considered a high volume travelway and the City's main entry point from the southeast.

The main treatment facilities under the revised project, now located on Parcel A, would be visible from Lakeville Highway from both the southeast-bound and northwest-bound travelers, see Figure 4.13-1. Relocation of the treatment facilities to the northwest results in extending the views of the treatment plant somewhat longer for travelers on Lakeview Highway. The visual quality of views along Lakeville Highway would be reduced because both foreground and middleground views of Parcels A and B would be partially obstructed by the main treatment facilities. However, this is a brief and intermittent obstruction of the view corridor to the River. The visual impacts of the marsh enhancements remain the same as discussed in the 2002 EIR.

Measure PD-21, Landscaping Design will require the City to provide landscaping to screen views, thus reducing the visual contrast of the new buildings.

Mitigation: No mitigation is necessary.

IMPACT: VR-6: Will the project cause an adverse effect on foreground views from one or more private residences?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

The nearest private residences to the project site are two or three houses associated with surrounding agricultural operations. The houses are located north of Lakeville Highway 400 to 1,800 feet from the northern boundary of the existing oxidation ponds, and are elevated slightly above them. The main treatment facilities under the revised project, now located on Parcel A, would be visible, but Measure PD-21, Landscaping Design, adopted as part of this project, would require the City to provide landscaping to screen views of the site.

Mitigation: No mitigation is necessary.

IMPACT: VR-7: Will the project create a new light source?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Lighting of the facilities would be the same with the revised project, but relocated 500 to 1,200 feet to the northwest. Measure PD-22, Lighting Design, adopted as part of this project, requires the City to design lighting for the administration and maintenance buildings, treatment facilities and parking areas to utilize shielded, low-intensity light sources, resulting in a less than significant impact.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACT

IMPACT: **VR-C1: Will the project have a cumulative potential to impact visual and open space resources?**

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified. The cumulative impacts to visual resources remain less than significant for the revised project.

Mitigation: No mitigation is necessary.

REFERENCES

No new references.

4.14 PUBLIC SERVICES AND UTILITIES

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.14-1

Evaluation Criteria with Point of Significance – Public Services and Utilities

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?	• Ratio of service personnel or facilities to population; ratio of park acreage to population. • Change in response time. • Availability of water service.	• Greater than 0 change in the ratio. • Exceeds established response time standard. • Ability to meet water demand.	General Plan of Sonoma County, City of Petaluma General Plan
2. Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	Change in response times or distance away from the Project construction.	Greater than 0 change in the response time, or within 500 feet of construction.	General Plan of Sonoma County, Petaluma General Plan

Source: Parsons 2004

IMPACTS AND MITIGATION MEASURES

IMPACT: PS-1: Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

Fire: The City of Petaluma Fire Department requires a four-minute response time to emergencies. Petaluma Fire Chief Terry Krout reviewed the department response time map and determined that the four-minute response time ends at Browns Lane, which is located across Lakeville Highway on the northeast edge of the existing oxidation ponds (Ban, 2001). The approved Project main treatment facilities were located on the existing oxidation ponds, just outside the four-minute response time. The revised project main treatment facilities are now

located on Parcel A, which will be just within the four-minute response time. The project impact on fire response time is considered less than significant.

Police, Parks and Recreation, Sewer, and Solid Waste: No modifications have been proposed to the approved Project that would change the analysis in the Certified EIR.

Water: Under the approved project, new water service would be provided by extending the existing potable water line (that currently terminates at the Oakmead/Northbay Business Park) through Parcels A and B to the main treatment facilities at the oxidation ponds. While the existing Lakeville site is within both the urban limit line and the water service boundary, Parcels A and B are not. Under the revised project, the main treatment facilities are located on Parcel A, outside the Urban Growth Boundary. Since the City intends to apply for annexation of Parcels A and B prior to construction of project facilities this impact is considered less than significant.

IMPACT: PS-2: Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?

Analysis: *No Impact - No change in level of significance from 2002 Certified EIR*

The analysis of Impact PS-2 is the same for the revised project as for the approved project. The project itself is a wastewater treatment facility and because facility operations will not be halted during construction, there will be no impact to the treatment of sewage.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: PS-C1: Will the Project have a cumulative potential to impact public services and utilities?

Analysis: *Less than Significant - No change in level of significance from 2002 Certified EIR*

No new cumulative projects have been identified. Cumulative impacts to public services remain therefore less than significant for the revised project.

REFERENCES

No new references.

5 ALTERNATIVES TO THE PROPOSED PROJECT

The changes in impacts due to the proposed revisions to the project are minor and would not affect the relative comparison of alternatives presented in the 2002 Certified EIR.

6 CEQA-REQUIRED SECTIONS

GROWTH-INDUCING IMPACTS OF THE PROJECT

The growth inducing nature of the project has not changed due to the proposed revisions.

SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

Section 2100(b)(2)(A) of CEQA requires that an EIR identify any significant environmental effects that cannot be avoided if the project were implemented. Significant unavoidable impacts are identified in Section 4 of this EIR, as those impacts that remain significant after implementation of mitigation. Although the project has the potential to result in a number of significant environmental impacts, most can be avoided through the adoption of appropriate mitigation measures that will reduce those effects to a less-than-significant level. However, one significant unavoidable impact of the project remains:

- Impact **AG-1**: Loss of approximately 149 acres of farmland

This impact is also considered cumulatively significant and is the same as previously reported in the 2002 EIR, except the project description now includes an option to maintain some agricultural land in production. When the project was approved in August of 2002, a statement of overriding considerations was adopted, explaining the City's reasons that the polishing wetlands and public educational and recreational facilities were approved despite their significant impact on farmland. Mitigation Measure AG-1, proposed for the approved project, would have kept approximately 79 acres of farmland in production on Parcels A and B; in doing so, however, some butterfly habitat and trails would have been removed from the project. Even with this mitigation, the project would still cause significant and unavoidable impacts of farmland conversion. The statement of overriding considerations also explained the City's reasons for not adopting the mitigation. No new options for mitigation have been identified, the City still declines to adopt Mitigation Measure AG-1, and the statement of overriding considerations previously adopted is still applicable.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The 2002 EIR identified the Environmentally Superior Alternatives as Alternative 4, Hopper Street, and the proposed project, Extended Aeration, because they would have similar levels of environmental impacts and therefore both qualify as the Environmentally Superior Alternative.

The impacts of the proposed project modifications are minor and do not affect the relative comparison of alternatives. However, since approval of the project in August 2002, the Hopper Street site has been reduced in size due to approval of a homeless shelter, and is no longer large enough to accommodate the project. Therefore, the Environmentally Superior Alternative is now limited to the proposed project, Extended Aeration, as revised in this Addendum.

7 PREPARERS

LEAD AGENCY

The City of Petaluma, California, is the lead agency under CEQA for the preparation of the Petaluma Water Recycling Facility and River Access Improvements EIR Addendum.

Staff Member	Role
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Parsons, a subcontractor to Carollo Engineers, was retained to prepare the Petaluma Water Recycling Facility and River Access Improvements EIR Addendum.

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Terrie Zwillinger	Addendum

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William Kanemoto & Associates

Staff Member	Role
William Kanemoto	Visual Simulations

APPENDIX A

Parcel A Feasibility
April 15, 2004

Prepared by:
Carollo Engineers

1.0 INTRODUCTION

The main purpose of this memoranda is to review and document the evaluation of relocating the City of Petaluma Water Recycling Facility (WRF) project to Parcel A. The Parcel A location is adjacent to the City oxidation ponds and has been identified as the location for the polishing treatment wetlands and public amenities associated with the Petaluma Marsh Acquisition, Enhancement and Access project.

After a formal value engineering review of the 50% design for the new facility was completed in December 2002, the City requested that Carollo Engineers (Carollo) evaluate the feasibility of locating the WRF on Parcel A, instead of the existing Pond No. 1 location. In prior studies and reviews, the plant location was constrained to the pond site. The City was interested in this alternative due to the high cost of construction on the Pond No. 1 site. A feasibility study was prepared to determine the potential cost savings for the Parcel A site.

2.0 PARCEL A SITE COST SAVINGS

The feasibility of locating the WRF on Parcel A instead of the existing Pond No. 1 location was suggested as part of the project review by the City of Petaluma. The City was interested in this alternative due to the high cost of construction on the Pond No. 1 site. In addition, locating the WRF on Parcel A would reduce the loss of treatment capacity during construction and provided space for future expansion to meet more stringent regulatory requirements. The Parcel A site was originally identified as the location for the polishing treatment wetlands and public amenities associated with the Petaluma Marsh Acquisition, Enhancement and Access project.

The relocation of the WRF to the Parcel A location was suggested to reduce the construction cost and reduce the time until project start-up. The estimated total construction cost saving is approximately $5.25 million based on the initial study. The estimated savings does not include the cost of land acquisition. The major unknown cost is the cost for liquefaction remediation, a contingency is included for remediation and will be refined after the additional geotechnical investigation is completed. The construction cost savings includes the items noted below:

- The flow diversion project is not required. This includes the bypassing of wastewater around the aerated lagoon and Pond No. 1 so that the plant could be built on Pond 1. However, a shorter bypass line and additional new aerators will still be needed for the new plant.

- The temporary loss of treatment (volume) in the Aerated Lagoon, and Pond Nos. 1 and 4 during the construction phase of the project is eliminated. This reduces the potential administrative costs and potential cost of discharge violations.
- The permanent loss of storage capacity in the Aerated Lagoon, Pond No. 1 and portion of Pond No.4 is eliminated. This decreases the need to add future ponds for storage. Only Pond Nos. 9 and 10 are modified during construction and converted to vegetated treatment wetlands.
- The site work cost is reduced. Only 60 percent of the fill is required, north road improvements are minimized, and recycled water reservoir construction fill is reduced.
- Fill consolidation period for Ponds 1 and 4 is eliminated, thereby reducing construction time by 6 to 12 months.
- Electrical improvement costs are reduced based on reduced power distribution system for Parcel A.
- Access road across Parcel A from the southeast corner of Northbay/Oakmead Business Park is reduced and the bridge across Ellis Creek is eliminated.

The estimated added costs to the project from relocation to Parcel A include:

- Headworks cost increased slightly due to higher elevation relative to grade.
- Relocated west gate entrance costs may be higher than proposed east gate improvements.
- An estimate of the cost for liquefaction remediation is included based on conceptual geotechnical evaluation. This assumes that the solids facilities are located in an area of potential liquefaction, to the southwest corner of the site. This is based on very limited information and may change substantially once preliminary and detailed studies are completed. Thus, a $1.08 million allowance has been added to the WRF cost for the Parcel A site.

3.0 SUMMARY

The results of Carollo's review of the Parcel A feasibility was presented to the City of Petaluma, California in September 2003. The construction costs saving for relocating the WRF to Parcel A is estimated at 5.25 million and the construction period required is reduced by 6 to 12 months. The City has decide to pursue this option and is now preparing an EIR addendum to for moving the WRF to Parcel A.

city of
Petaluma, California

water recycling

FACILITY AND RIVER ACCESS IMPROVEMENTS

Volume 3
FINAL
Environmental Impact Report
State Clearing House #2001052089

July 2002

carollo engineers

PET702R1-6069.PSD/CDR

CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND RIVER ACCESS IMPROVEMENTS FINAL ENVIRONMENTAL IMPACT REPORT

VOLUME 3

July 24, 2002

Prepared by Parsons

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1 INTRODUCTION

The Final EIR consists of the Draft EIR and Appendices in Volumes 1 and 2, and the Comments, Responses to Comments, and Replacement Pages for the Draft EIR in Volume 3.

The comments include written comments received during or shortly after the public review period and oral comments made at the two public hearings on May 13, and May 20, 2002. The Replacement Pages include changes to the Draft EIR made in response to written and oral comments as well as changes initiated by the EIR authors.

CERTIFICATION AND PROJECT SELECTION PROCESS

The Petaluma City Council will hold a meeting on August 5, 2002 (tentative date) at the Petaluma City Council Chambers, 11 English Street, to consider certification of the Final EIR. The meeting will start on or around 7:00 p.m. In order to certify the Final EIR, the Council must find that:

1) the Final EIR has been completed in compliance with CEQA; and

2) the Final EIR was presented to the decision making body of the lead agency and that the decision making body reviewed and considered the information contained in the Final EIR prior to selection of a Project (CEQA Guidelines Section 15090).

If the City certifies the Final EIR, the City will also consider approval of the Project at that time. At the time of project approval, the decision-making body, that is the Petaluma City Council, must consider the information presented in the Final EIR. The decision makers must balance the benefits of the project against its unavoidable environmental risks. If the benefits outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered "acceptable." If the City Council makes such a decision, it must support the action by writing the specific reasons for approval; this is called a Statement of Overriding Considerations and it must be included in the record of project approval (CEQA Guidelines Section 15093).

PUBLIC INVOLVEMENT DURING THE FINAL EIR PHASE

The public comment period for the Draft EIR began on April 15, 2002 with the distribution of the Draft EIR by the City of Petaluma to public agencies and individuals who had expressed an interest. The formal public comment period closed on May 29, 2002. However, comments received after the close of the public comment period, through May 30, 2002, have been considered in the preparation of the Final EIR. On May 13, and May 20, 2002, public hearings on the Draft EIR were held before the Petaluma City Council.

The Notice of Availability of the Draft EIR was mailed on April 15, 2002 to various federal, state and local agencies and interest groups. In addition, the notice was published in the Petaluma Argus Courier and the Press Democrat. The Notice of Availability of the Final EIR

was mailed on July 19, 2002 to various federal, state and local agencies and interest groups. In addition the notice was published in the Petaluma Argus Courier and the Press Democrat.

Copies of the Draft EIR were distributed to federal and state agencies, local governments, elected officials, and libraries. Copies of the Draft EIR were made available at the City of Petaluma.

ANALYSIS OF PUBLIC RESPONSE

During the 45-day public comment period, the City of Petaluma received 14 comment letters, which included 167 comments on the Draft EIR. A total of 19 members of the public and City Council presented 64 comments during the public hearings. Every comment was counted regardless of whether it duplicated a comment made in a previous comment letter or at the public hearings. The comments made at the public hearing were summarized from notes taken during the hearings. The comment letters and associated comments were received from individuals, agencies, and organizations as shown in Table 1-1.

Table 1-1

Type of Commentor

	Letters		Comments	
Commentor	**Number**	**Percentage**	**Number**	**Percentage**
Federal Agencies	0	0	0	0
State Agencies	5	15	44	19
Regional Agencies	1	3	41	18
Local Agencies	1	3	1	<1
Individuals, Organizations	7	21	81	35
Public Hearing Speakers	19	58	64	28
Total	33	100	231	100

CONSIDERATION OF RECIRCULATION

If significant new information is added to an EIR after public review, the lead agency is required to recirculate the revised document (CEQA Guidelines Section 15088.5). "Significant new information" includes, for example, a new significant environmental impact or a substantial increase in the severity of an impact. New information is not considered significant unless the document is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect that the proponent has declined to implement. No new information has been

submitted to indicate a new significant impact or substantially more severe impact. Therefore, there is no need to recirculate a revised Draft EIR.

ORGANIZATION OF THE FINAL EIR

The Final EIR consists of five sections, which include the responses to comments, both written and oral, received on the Draft EIR, as well as other material which is related to the responses to comments. These five sections are:

Chapter 1 – Introduction. This chapter provides an introduction and summarizes the CEQA instructions to the lead agency for preparation of responses to substantive public comments on the Draft EIR.

Chapter 2 – Master Responses. This chapter includes Master Responses that address issues that were frequently cited in the comments on the Draft EIR.

Chapter 3 – Responses to Comments. Copies of the comment letters and the comments from the two public hearings, and the responses to comments are included in this chapter. All comments received during the comment period are responded to in this Chapter. The range of possible responses includes requiring specific mitigation measures, modifying alternatives, supplementing analyses, making factual corrections, and explaining why comments do not warrant further response.

Chapter 4 – Revisions by the EIR Authors. Editorial revisions to the Draft EIR made by the EIR authors are identified to correct typographical errors or internal inconsistencies within the document. Minor revisions to the Project Description and environmental analysis chapter are provided.

Chapter 5 – Replacement Pages. Replacement pages represent the edits to the Draft EIR caused by the response to comments. The pages have been designed for insertion into the Draft EIR making the revised Draft EIR a stand-alone document. Replacement pages are formatted in revision fashion: strikeouts indicate deleted text and underlines indicate additional text.

LIST OF COMMENTS RECEIVED

A list of the comments received is shown below in Tables 1-2 and 1-3. Table 1-2 lists comment letters received during the review period which are numbered from A to N; Table 1-3 lists oral comments received at the public hearing which are numbered from PH 1 to PH 32.

Table 1-2

Comment Letters Received on the Draft EIR

Letter	Agency/Organization	Last Name	First Name	Letter Date
State Agencies				
A	State Water Resources Control Board	Gouveia	Patricia	5/13/2002
B	California Historical Resources Information System	Thorne	K.	5/20/02
C	California Department of Toxic Substances Control	Cook	Barbara	5/22/02
D	California Department of Transportation	Finney	Jean	5/30/02
E	California Office of Planning and Research	Roberts	Terry	5/30/02
Regional Agencies				
F	California Regional Water Quality Control Board, San Francisco Bay Region	Barsamian	Loretta	5/29/02
Local Agencies				
G	Petaluma City Schools	Wong	Carl	5/22/02
Individuals				
H		Garvey	Terence	5/13/02
I		Brazil	Vasco	5/20/02
J	Sustainable Petaluma Network	Hess	Scott	5/20/02
K		Schell	Karen	5/20/02
L	Shollenberger Park	Dyer	Norris	5/21/02
M	Community Clean Water Institute	Sandler	Michael	5/22/02
N		Brazil	Vasco	5/2/9/02

Table 1-3

Oral Comments Received on the Draft EIR

Commentor	Agency/Organization	Last Name	First Name	Hearing Date
1	Petaluma City Council	Moynihan	Bryant	May 13, 2002
2	Petaluma City Council	Maguire	Matt	May 13, 2002
3	Petaluma City Council	Torliatt	Pamela	May 13, 2002
4	Petaluma City Council	Moynihan	Bryant	May 13, 2002
5	Petaluma City Council	Healy	Mike	May 13, 2002
6	Petaluma City Council	O'Brian	Mike	May 13, 2002
7	Petaluma City Council	Torliatt	Pamela	May 13, 2002
8	Petaluma City Council	Cader-Thompson	Janice	May 13, 2002
9		Garvey	Terence	May 13, 2002
10		Gold	Stan	May 13, 2002
11		Levin	Mark	May 13, 2002
12		Reilly Torres	Diane	May 13, 2002
13	Petaluma City Council	Torliatt	Pamela	May 13, 2002
14	Petaluma City Council	Thompson	Clark	May 13, 2002
15	Petaluma City Council	Maguire	Matt	May 13, 2002
16	Petaluma City Council	Thompson	Clark	May 13, 2002
17	Petaluma City Council	Cader-Thompson	Janice	May 13, 2002
18	Petaluma City Council	Torliatt	Pamela	May 13, 2002
19	Petaluma City Council	Thompson	Clark	May 13, 2002
20	Petaluma City Council	Moynihan	Bryant	May 13, 2002
21	Petaluma City Council	Cader-Thompson	Janice	May 13, 2002
22		Moore	Gerald	May 13, 2002
23		Rose	Jim	May 20, 2002
24		Yearsley	David	May 20, 2002
25		Cartright	Geoffrey	May 20, 2002
26		Tuttle Brown	Patricia	May 20, 2002
27		Brazil	Vasco	May 20, 2002
28		Gold	Stan	May 20, 2002
29		Keller	David	May 20, 2002
30	Petaluma City Council	Maguire	Matt	May 20, 2002
31	Petaluma City Council	Torliatt	Pamela	May 20, 2002
32	Petaluma City Council	O'Brien	Mike	May 20, 2002

2 MASTER RESPONSE

INTRODUCTION

Review of the comments made on the Draft EIR showed that some comments were made frequently, demonstrating a common concern that was widespread among both those submitting written comments and those speaking at the public hearing. To allow presentation of a response that addresses all aspects of these related comments, a Master Response has been prepared. This Master Response is intended to allow a well-integrated response addressing all facets of a particular issue, in lieu of piece-meal responses to each individual comment, which may not have portrayed the full complexity of the issue. The use of a Master Response is in no way intended to minimize the importance of the individual comments.

MASTER RESPONSE 1 – STATEMENTS OF OPINION FOR OR AGAINST THE PROJECT, A SPECIFIC PROJECT COMPONENT OR A PROJECT ALTERNATIVE

Comment Summary: In many cases, comments include an opinion regarding approval of the project, or which project alternative should be selected for implementation.

Response Summary: Comments regarding approval or implementation of a project alternative are not comments on the Draft EIR, but comments on approval of the project, a process that will occur after the EIR is complete.

A Final EIR need only respond to comments on the Draft EIR (CEQA Guidelines 15132). However, these recommendations for or against a particular project alternative are valuable input to the process of approving a project. These comment letters have been forwarded to the Petaluma City Council. If this Final EIR is certified as adequate, the Council will consider the recommendations in these comment letters as well as the information presented in the EIR, and make its decision regarding selection of a project.

3 RESPONSE TO COMMENTS

This chapter contains copies of the written comments received by the City through May 29, 2002 and the responses to these comments. It also contains summaries of the oral comments received at the public hearings on May 13, and May 20, 2002, and the responses to these comments.

Responses to comments are individually numbered in sequence corresponding to the numbering assigned to comments.

When changes to the Draft EIR are necessitated, the change is indicated by indented text. Text that has been added to the document is indicated in underline font, while text that has been deleted is indicated with ~~strikethrough~~ font. Changes to text within a table have been lightly shaded to indicate the edits.

COMMENT LETTER A – STATE WATER RESOURCES CONTROL BOARD, DIVISION OF CLEAN WATER PROGRAMS, PATRICIA GOUVEIA, ENVIRONMENTAL SERVICES UNIT (MAY 13, 2002), RECEIVED MAY 15, 2002

Response to Comment A-1

The City appreciates the Board's response to the Draft EIR and looks forward to working with the Board through the financing portion of the project.

Response to Comment A-2

The City will provide a copy of the Final EIR and the Resolution certifying the EIR and making CEQA findings, including the required Statement of Overriding Considerations as soon as they are available. All comments received during the review period and the responses to those comments will be included in the Final EIR. A copy of the adopted mitigation monitoring plan will be provided upon completion. A copy of the Notice of Determination filed with the Governor's Office of Planning and Research will be sent after filing. Prior notices of hearings and meeting regarding environmental review of the project are included in this response to comments. Notices for future meetings and hearings will be provided as they occur.

Response to Comment A-3

The City appreciates the Board's role in sending copies of the environmental document to applicable federal agencies and in forwarding any comments that are received.

Response to Comment A-4

The City is aware that a Section 7 clearance from the U.S. Fish and Wildlife Services is needed prior to loan commitment.

Response to Comment A-5

The project will not disturb areas other than Parcels A and B, except for a small landscaped area within the Oakmead Northbay Business Park where the new access road connects to the Cypress Drive cul-de-sac and a small area in Caltrans right-of-way just east of the East gate. The original record search maps with site locations in the project vicinity will be provided to Ms. Hirn.

Response to Comment A-6

Copies of correspondence with the Native American Heritage Commission and local historical societies are included in this response to comments. Thank you for the correct contact for initiating the Section 106 process. Copies of letters received during the scoping process are included in the Scoping Report, which has been forwarded to the Division on July 8, 2002. When the City has certified the EIR and approved a project, the City will contact Ms. Hirn regarding initiation of the Section 106 process.

Response to Comment A-7

The City of Petaluma will ensure that its environmental document meets the Board's guidelines as well as the requirements for the State Revolving Fund loan program.

Response to Comment A-8

Although the design of the river access improvements is at a conceptual level, environmental impacts of the improvements have been evaluated in the EIR.

Response to Comment A-9

The Scoping Report (published August 2001) with comments from the public and interested agencies was forwarded to the Division on July 8, 2002.

Response to Comment A-10

The following will be added to the EIR on page 4.8-56 under BIO-1a Aquatic Species Protection Program:

> Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. As an appropriate example, best management practices are described in the *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual* (November 2000). Refer to Measure PD-8 for a potential list. These shall be implemented as necessary under the supervision of the construction manager. Detailed specifications shall be incorporated onto bid documents and construction drawings.

Response to Comment A-11

Pre-construction biological surveys will be conducted so that mitigation measures can be adequately outlined in order to obtain a Section 7 clearance from the U.S. Fish and Wildlife Service prior to receiving a loan commitment from the Board.

Response to Comment A-12

The following list of Best Management Practices taken from the *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual* (November 2000) is added to Measure PD-8, Construction Erosion and Spill Control Measures, as examples of types of measures that can be implemented to control erosion.

Measure PD-8, page 3-21, is changed as follows:

> The City shall develop and implement measures designed to prevent significant construction impacts to water quality. Examples of possible measures include ~~revegetation of temporarily disturbed sites, development and implementation of a~~

~~Storm Water Pollution Prevention Plan, protection of waterways from toxic discharge, and concrete waste management.~~ the following:

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
Temporary Soil Stabilization	
SS-1	Scheduling
SS-2	Preservation of Existing Vegetation
SS-3	Hydraulic Mulch
SS-4	Hydroseeding
SS-5	Soil Binders
SS-6	Straw Mulch
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats
SS-8	Wood Mulching
SS-9	Earth Dikes/Drainage Swales & Ditches
SS-10	Outlet Protection/Velocity Dissipation Devices
SS-11	Slope Drains
Temporary Soil Stabilization	
SC-1	Silt Fence
SC-2	Desilting Basin
SC-3	Sediment Trap
SC-4	Check Dam
SC-5	Fiber Rolls
SC-6	Gravel Bag Berm
SC-7	Street Sweeping and Vacuuming
SC-8	Sandbag Barrier
SC-9	Straw Bale Barrier
SC-10	Storm Drain Inlet Protection
Wind Erosion Control	
WE-1	Wind Erosion Control
Tracking Control	
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash
Non-Storm Water Management	
NS-1	Water Conservation Practices
NS-2	Dewatering Operations

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
NS-3	Paving and Grinding Operations
NS-4	Temporary Stream Crossing
NS-5	Clear Water Diversion
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting
NS-7	Potable Water/Irrigation
NS-8	Vehicle and Equipment Cleaning
NS-9	Vehicle and Equipment Fueling
NS-10	Vehicle and Equipment Maintenance
Waste Management and Materials Pollution Control	
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Source: Caltrans 2000

Response to Comment A-13

Refer to Response to Comment A-12.

Response to Comment A-14

The comment refers to a statement in the cumulative impacts analysis section on pages 4.5-39. The EIR authors believe the commentor has mis-read the EIR, for it does not state that "establishment of TMDLs for nutrients, sediments, and pathogens would not effect the project discharge." The EIR states that promulgation of TMDLs "could have implications for the City's discharge to the area." The potential impact is not quantified in the EIR because the TMDL has not yet been promulgated.

Response to Comment A-15

The analysis reflected in Section 4.6 represents a greater level of detail than the mapping described on page 4.1-4. As explained in the analysis for Impact H-3 on pages 4.6-5 and 4.6-6, the 100-year flood plain is located below the 7-foot contour. Project facilities are either located above this elevation or the impact is less than 0.1 feet (the threshold of significance).

Response to Comment A-16

There is no record of the reconnaissance wetland and wildlife survey conducted on April 11, 2001, aside from that presented in the EIR. Results of the wetland field visits on July 31, 2001, February 19, 2002, and February 28, 2002 will be recorded in the Wetlands Delineation that is currently being completed. When complete, a copy will be sent to the Division.

Response to Comment A-17

Yes, additional bird surveys will be conducted prior to construction. Because surveys were incomplete, impacts to bird populations, as reflected in Impacts BIO-1 and BIO-2 are identified as significant.

Response to Comment A-18

The report referred to has been finalized. The EIR is revised as follows:

On Page 4.8-9:

> In recent collections near downtown Petaluma, Fawcett (~~*Report in prep.*~~ Tetra Tech, 2001) found 17 fish species, …

On Page 4.8-69 add the following reference:

> Tetra Tech, Inc. 2001. Biological Monitoring and Recovery for Western Pond Turtle, Sacramento Splittail, and California Red-Legged Frog. Petaluma River Section 205 Flood Control Project. Final Report. Prepared for U.S. Army Corps of Engineers.

Response to Comment A-19

Refer to Response to Comment A-17.

Response to Comment A-20

The new access road connection to the cul-du-sac on Cypress Drive, is discussed in the Project Description on page 2-17 and shown in Volume 2, Appendix A, Figure ES-3. The connection is adjacent to the project site, in an open area, approximately 250 feet west of the Parcel A western boundary. There are no biological, wetlands, or cultural resources in the area, and so impacts were not specifically discussed.

The following changes are made in the EIR:

On page 2-8, under "Acquisition of Land and Annexation":

> The City proposes to purchase 262 acres of land known as Parcels A and B, as shown on Figure 2-4. This land is currently unincorporated, and the City intends to annex the land at an undetermined time in the future. The City will also attempt to purchase an

easement or fee title for the connection between the new access road on Parcel A and the cul-de-sac on Cypress Drive.

On page 4.8-3 under "Ornamental Landscape":

> This community type is comprised primarily of eucalyptus (*Eucalyptus globulus*) stands, but also contains English ivy (*Hedera helix*) and other ornamental species including Lombardy poplars (*Populus nigra*) on the north side of the existing oxidation ponds. The two principal eucalyptus stands are located along the edge of the business park adjacent to Parcels A and B and along the western edge of the oxidation ponds. Lawn and small ornamental trees are in the area northwest of Parcel A where the new access road will connect to the cul-de-sac on Cypress Drive. Species observed included red-winged blackbird, California towhee (*Pipilo crissalis*), house finch, European starling (*Sturnus vulgaris*), Anna's hummingbird (*Calypte anna*), and Bullock's oriole (*Icterus bullockii*).

Response to Comment A-21

The following change is made to the Project Description, page 2-17 under Site Access:

- Construction safety. The City will use flagmen or temporary traffic signals on Lakeville Highway, when necessary.

Response to Comment A-22

If alternatives are chosen for the project that include Parcel C, additional environmental analysis will be necessary.

COMMENT LETTER B – CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM, K. THORNE, FOR LEIGH JORDAN, COORDINATOR (MAY 20, 2002), RECEIVED MAY 22, 2002.

Response to Comments B-1 and B-2

The project area is adjacent to Site C-757 which is located on Parcel C. Because the project includes ground disturbing activity along the boundary of Parcel C at the location of Site C-757, and there is a potential that Site C-757 extends subsurface into the area of ground disturbance on the City's property, evaluation of the portion of Site C-757 on the City's property should be completed before any ground disturbing activity takes place. The following changes are made in the EIR:

Under Impact CR-1, page 4.12-11, add at the top of the page:

> Prehistoric site (C-757) is located on Parcel C adjacent to the south access road along the border of the oxidation ponds and may still exist subsurface on the oxidation pond property.

Under Measure PD-19, Protection of Historic and Archaeological Resources, on page 3-34:

> In order to preserve cultural resources, the City shall perform subsurface testing, evaluation for significance, and/or recordation for the ~~three~~ four sites, when avoidance is not feasible. The Hopper Street facility, the communication facility, Site C-757 (to the extent it is located on City property), and the farm complex on Lakeville Highway shall be recorded, mapped, and photographed by a qualified professional architectural historian to Department of Parks and Recreation (DPR) standards on current DPR 523 series forms. The Hopper Street facility shall be evaluated for significance to the NRHP. All site records and evaluation documentation shall be submitted to the State Historic Preservation Office for Section 106 compliance prior to any construction activities on the site.

Response to Comment B-3

The communication facility on Parcel B and the farmhouse complex on Parcel A have been evaluated for historical significance by an architectural historian (Kelly Heidecker). These buildings were evaluated using significance criteria of the National Register of Historic Places and the California Register of Historic Resources. The properties were recommended as ineligible for listing in either register. These results are identified under Impact CR-1 on page 4.12-11 of the Draft EIR, and are recorded in more detail in a technical report to be submitted to the Northwest Information Center upon completion.

Response to Comment B-4

Historical resources are evaluated on page 4.12-11 of the Draft EIR. Project Description Measure PD-19, Protection of Historic and Archaeological Resources, requires a qualified archaeologist to assess the status of the sites and provide project specific recommendations.

Response to Comment B-5

Historic resources identified were evaluated according to standards and guidelines for significance and eligibility in both the California Register of Historic Places and the National Register of Historic Places. Also, Project Description Measure PD-19, Protection of Historic and Archaeological Resources, requires use of these standards.

Response to Comment B-6

The local Native American tribes and individuals have been contacted regarding this project and to date no comments have been received from any Native American tribes or individuals.

A letter requesting background information of prehistoric, historic and ethnographic land use, was sent to Debbie Pilas-Tredway of the Native American Heritage Commission on April 13, 2001.

Ms. Pilas-Tredway responded with a letter containing Native American individuals that may have knowledge or interests in the project. Each of these individuals was also sent a letter requesting any information they may have about historic, prehistoric or ethnographic land use within the project area. The individuals sent letters are: Grant Smith (Coast Miwok, Pomo), Kathleen Smith (Coast Miwok, Pomo), The Federated Indians of Graton Rancheria (Coast Miwok) and Tim Campbell, Cultural Resources Officer of the Federated Indians of Graton Rancheria.

Response to Comment B-7

The pedestrian survey of the property has identified no less than eight historic resources located within the proposed project area. Five buildings are associated with the residential ranch house, railroad grade, livestock ramp and World War II era radar facilities. Resources were evaluated by an architectural historian, but none appear to meet eligibility requirements of the National Register or the California Register. This recommendation requires concurrence by the California State Historic Preservation Officer.

Response to Comment B-8

If archeological resources are encountered during the project, work in the immediate vicinity of the finds will be halted until a qualified archaeologist has evaluated the situation as described in Measure PD-20, Protection of Previously Undiscovered Historic and Archaeological Resources.

COMMENT LETTER C – CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL, BARBARA J. COOK, P.E. (MAY 22, 2002), RECEIVED MAY 31, 2002

Response to Comment C-1

The City appreciates the Department of Toxic Substances Control's interest and responsiveness in providing comments on the DEIR.

Response to Comment C-2

The City recognizes the importance of conducting the Phase II Site Assessment early in the project because of the potential impacts that contamination could have on health and safety, and on construction schedule and costs. As indicated in the Draft EIR, the Phase II Site Assessment will be performed after certification of the EIR and prior to the start of demolition of the Hopper Street facilities. This schedule will allow adequate time for the construction manager to evaluate the Phase II sampling results and to incorporate procedures, as needed, to address any soil or groundwater contamination issues in the project construction management plan.

Response to Comment C-3

A Phase II Site Assessment is proposed as part of the project (as indicated in Measure PD-9). It will be conducted according to generally accepted engineering practices and is expected to adequately characterize the site and identify any soil or groundwater contamination that might require remediation. However, given that all site investigations rely on the collection of discrete samples—limited in time and space—no site investigation can completely assure that all environmental contamination has been characterized. For this reason, visual monitoring for contamination during construction is included as part of the project (Measure PD-10). The visual survey is not intended to replace the Phase II Site Assessment.

Response to Comment C-4

Information in the case file at the Sonoma County Department of Health Services, Environmental Health Division indicates that diesel fuel was released to soil and groundwater from an underground storage tank at the Petaluma Corporation Yard at 840 Hopper Street. The file indicates that the effects of the leak were localized and remediated by excavating and disposing of contaminated soils. As part of a site investigation, five monitoring wells were installed on site. The last reported sampling event for the wells occurred on December 19, 1995 during which diesel was detected in one of the five wells at a concentration of 0.2 milligrams per liter (the other four wells were reported as "non-detect" for diesel). No other petroleum hydrocarbons or components of fuels (e.g., benzene, toluene, xylene, or ethylbenzene) were detected in the wells. Based on these results, the site was closed by the Sonoma County Environmental Health Division on November 12, 1996. The monitoring wells have subsequently been destroyed. Based on this information, it is unlikely that contamination from this site, if any remains, would be affected by dewatering during demolition.

Response to Comment C-5

Based on communication with persons familiar with the farming practices on Parcels A and B for the past 20 years, no pesticides have ever been applied to the property (Mike Ban, personal communication July 2002).

Response to Comment C-6

The City appreciates the DTSC's offer to assist with site characterization and cleanup. If soil or groundwater contamination is detected during the Phase II Site Assessment the DTSC will be notified and invited to attend relevant meetings.

COMMENT LETTER D – CALIFORNIA DEPARTMENT OF TRANSPORTATION, JEAN C. R. FINNEY, DISTRICT BRANCH CHIEF (MAY 30, 2002), RECEIVED JUNE 3, 2002.

Response to Comment D-1

The City appreciates the efforts of the Department of Transportation in providing responses to the Draft EIR.

Response to Comment D-2

The City considered two options for the East gate improvements, both of which include a left turn lane within the Facility for vehicles waiting to turn left onto Lakeville Highway. The two options are shown in Appendix D, Traffic Master Plan, see Figure 11. A more detailed design and capacity calculation for the left turn lane is not available at this time and will be provided in the construction plans and specifications. The alternatives are currently under review for right-of-way constraints. Alternative 2 is the preferred alternative.

Response to Comment D-3

The design of the right-turn lane, as well as the acceleration and deceleration lanes and tapers at both entrances, will conform to the specifications in the Highway Design Manual. The design details will be addressed as part of the encroachment permit application.

Improvements to existing drainage may be required to construct the right-turn acceleration lane. These include, but are not limited to, extension of the culvert and or storm drain to the edge of the right-of-way and relocation of the head wall and guard rail.

Response to Comment D-4

South McDowell Blvd. connects to Lakeville Highway at two locations. The easternmost intersection, sometimes called South Mc Dowell Blvd. extension, is controlled by a stop sign. The intersection is operating at a low level of service, either LOS D, based on the traffic counts conducted for the Project's Traffic Master Plan, or LOS E, based on the Kaiser-Permanente Clinic Traffic Impact Study (W-Trans 2002). Estimated trip distribution data show that the project will add only through movements to the intersection, causing approximately a 3-second additional delay in the PM peak hour, not a large enough impact to change the level of service. The cumulative analysis on page 4.9-15 of the Draft EIR indicates that the intersection will function at LOS F, with or without the project.

The westernmost intersection is a signalized intersection. It is the most direct route for westbound traffic from the site. Under Mitigation Measure TR-1a, the Contractor would direct his employees to utilize the western South McDowell Blvd./Lakeville Highway intersection for left-turn traffic. The signalized intersection is operating at LOS C, based on the Kaiser-Permanente Clinic Traffic Impact Study (W-Trans 2002), and addition of project trips is not expected to cause the level of service to deteriorate. This signalized intersection is clearly the best intersection along Lakeville Highway to direct project traffic to, because it is operating well

currently and will take traffic off the remainder of Lakeville Highway between the plant and the intersection.

Response to Comment D-5

Cumulative capacity impacts will be considered in the operational analyses for this turning movement.

Response to Comment D-6

The City will review the funding process for this aspect of road improvement and consider the option of requiring each developer to contribute “fair share” fees to mitigate capacity impacts at this intersection.

Response to Comment D-7

The City will submit an encroachment permit application for any work or traffic control measures proposed within the State right-of-way.

COMMENT LETTER E – GOVERNOR'S OFFICE OF PLANNING AND RESEARCH, STATE CLEARINGHOUSE, TERRY ROBERTS, DIRECTOR, STATE CLEARINGHOUSE (MAY 30, 2002), RECEIVED JUNE 3, 2002

Response to Comment E-1

The City appreciates the efforts of OPR in submitting the Draft EIR to selected state agencies for review and in forwarding their comments. These comments will be incorporated in the Final EIR, along with appropriate responses.

COMMENT LETTER F – CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN FRANCISCO BAY REGION, LORETTA K. BARSAMIAN, EXECUTIVE OFFICER (MAY 29, 2002), RECEIVED MAY 29, 2002.

Response to Comment F-1

The City appreciates the efforts and responsiveness of the Board in providing comments from both staff and Tetra Tech, Inc.

Response to Comment F-2

Though proactive and preventative maintenance of the City's wastewater collection system is an important component of the City's approach to managing the community's wastewater, it is not a part of the objectives for the Water Recycling Facility project. The City of Petaluma continues to upgrade its wastewater collection system, but it is not a part of the project, is not dependent upon the project, nor is the project dependent upon such upgrades. The City would be pleased to provide information regarding its wastewater collection system to the Regional Board staff upon request.

Response to Comment F-3

The use of the lowest ambient background concentrations is, in most cases, a less conservative approach than using the median background concentration. Generally the higher the ambient background concentration, the more that the likely addition of wastewater will result in an exceedence of a water quality objective. The water quality impacts evaluation was conducted using a combination of conditions that, in the professional judgment of the EIR authors represented worst case conditions that could occur simultaneously, which is not necessarily the hypothetical worst-case. For some parameters, the most conservative estimate was used (drought scenario, most stringent of the water quality criteria, maximum effluent concentration) while for others a less conservative estimate was used (median ambient concentrations, 10th percentile hardness for hardness dependant criteria).

Use of the lowest ambient background concentration (generally a less conservative approach suggested by the commentor) for those constituents for which a significant impact was identified (nickel, chromium, and dioxin/furan congeners) would still result in a significant impact for these constituents and would not alter the conclusion of less than significant for other constituents. The ambient background concentration for dioxins/furan congeners is unknown, but even assuming a background concentration of zero, discharge of the maximum TEF-normalized concentration of one congener would still result in an exceedence of the evaluation criterion for 2,3,7,8-TCDD. Thus, using the lowest ambient background concentration as suggested by the Regional Board would not alter the conclusions of the EIR.

Response to Comment F-4 through F-8

The City is glad to discuss the details of the monitoring plan for polishing wetlands, but believes that the discussion is more appropriate as part of its application for a new NPDES permit for the Water Recycling Facility. The details of the monitoring plan are neither an evaluation of impacts

nor a suggestion for avoidance or reduction of impacts. Therefore the Regional Board's comments on monitoring details of the polishing wetlands are not addressed here. The City will prepare an Operations and Management plan as well as a detailed monitoring program when the NPDES permit requirements are determined.

A description of the proposed facility is included in the Carollo Engineers Predesign Report, TM No. 4. – Algae Removal Facilities, February 2002. A management plan for the wetlands will be prepared for review by the Regional Board and Marin/Sonoma County Mosquito and Vector Control District as permitting of the project progresses.

Response to Comment F-9

Refer to Responses to Comments F-11 through F-40.

Response to Comment F-10

The EIR authors agree and acknowledge that the Reasonable Potential Analysis may change when the actual NPDES permit is issued.

Response to Comment F-11

The EIR authors appreciate the comments regarding the adequacy of the EIR and the design of the new Water Recycling Facility.

Response to Comment F-12

Each of the "action" alternatives will increase the permitted average dry weather flow of the treatment facilities from 5.2 mgd to 6.7 mgd, allowing the population of the City of Petaluma and community of Penngrove to continue to grow in accordance with their adopted general plans. Under the No Project Alternative, no new NPDES permit would be issued, and population growth would be restricted. Therefore, the No Project Alternative is the same as the current conditions (which were used as the baseline for impact evaluation).

The EIR authors disagree with the statement that the comparison of alternatives is limited. The EIR presents a detailed analysis and comparison of the alternatives, particularly with respect to key criteria. Regarding a comparison of the surface water quality impacts between the No Project Alternative and the Project, please refer to Table 5-4 on page 5-17 of the Draft EIR. As shown in Table 5-4, the No Project Alternative would have a significant impact on surface water quality, whereas the Project's impact is less than significant after mitigation.

Response to Comment F-13

A cost benefit analysis comparing UV disinfection to sodium hypochlorite was completed in the original Project Report (Carollo Engineers, November 2000). Subsequently, it was determined that UV disinfection was not a feasible technology to meet a river discharge limit of 23 MPN reliably without filtration and therefore was not recommended for river discharge. Disinfection process alternatives were reviewed for tertiary recycled water process in the Predesign Report (Carollo Engineers, February 2002). UV disinfection was recommended for urban unrestricted

use recycled water. The UV disinfection will follow the tertiary filtration process for production of recycled water.

Response to Comment F-14

A cost/benefit analysis is outside the scope of the EIR.

Response to Comment F-15

The Project's treatment processes have been carefully selected in order to meet receiving water quality objectives (including pathogens) without the use of tertiary treatment, that is filters. Filters are not needed to meet receiving water quality objectives. The addition of filters for discharge would unnecessarily add financial burden of $2 to 2.5 million in capital costs and $150-300,000 in annual operations and maintenance costs to the project and the residents of Petaluma.

Response to Comments F-16 and F-17

The proposed facility will provide better treatment than the existing plant. The proposed treatment system is based on a blend of extended aeration secondary and oxidation pond effluents. The proposed extended aeration secondary clarifier treatment process is used extensively throughout the wastewater industry and will be designed to achieve a 30 mg/l BOD and 30 mg/l TSS limit. In addition, the oxidation ponds will receive higher quality secondary effluent than the current ponds which receive a blend of raw sewage, primary effluent and secondary effluent. This will improve pond effluent quality; plus the pond effluent will receive additional wetlands treatment for algae solids removal to meet a 30 mg/l TSS limit. The performance of the treatment wetlands is based on data from the City of Arcata, California wastewater treatment facility and other densely vegetated wetlands. Therefore, the proposed process will meet a more restrictive solids limit than the current 45 mg/l TSS limit.

In addition, the existing secondary treatment/pond system currently provides metals removal. The proposed system will provide a blend of pond and secondary effluent that will perform similar to the existing system. The performance of the polishing wetlands is based on documented wetland performance for wetlands with similar configurations.

The use of existing data as a measure of future plant performance is justified based on the improved treatment capacity provided in the new facility. Full secondary treatment is provided prior to river discharge or pond storage. In addition, nitrification will be provided by the secondary process. Therefore the effluent ammonia will be reduced from the current pond effluent.

Response to Comment F-18

The commentor states that the maximum values for receiving water quality data presented in Table 4.5-1 of the EIR are inconsistent with water quality data available through the Reasonable Potential Analysis.

There are several reasons for differences in the numbers.

- Data for summer-season samples (8/94, 8/97, 7/98) are not included in the EIR dataset, because discharges will not occur during that period.
- 2/00 data were not available when the draft Antidegradation report (from which the EIR derived the receiving water quality summary) was completed. However, the value for ammonia mentioned by the commentor does not change the conclusions in the EIR regarding un-ionized ammonia.
- 5/93 and 4/99 data (and only those two sample dates) were erroneously excluded from the summary. Table 4.5-1 is revised below to reflect the additional 5/93 and 4/99 data. In some cases, the median or minimum values were also changed with the addition of 5/93 and 4/99 data. However, none of these changes altered the conclusions in the EIR.

- Pages 4.5-5 through 4.5-7 are amended as follows:

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Mercury (TR)	µg/L	0.004	~~0.009~~ 0.010	~~0.0470~~ 0.0881	0.013	0.046	0.126				0.0089	0.0142	0.018
Mercury (D)	µg/L	0.000	0.001	0.003	0.001	0.002	0.035						
Selenium (TR)	µg/L	~~0.113~~ 0.089	0.170	0.330	0.060	0.225	0.410						
Selenium (D)	µg/L	0.100	0.150	0.240	0.104	0.171	0.310						
Arsenic (TR)	µg/L	0.003	~~0.010~~ 0.014	0.058	0.012	0.045	0.140						
Arsenic (D)	µg/L	1.190	~~1.430~~ 1.420	~~1.950~~ 2.33	1.830	2.240	3.280						
Cadmium (TR)	µg/L	0.026	0.040	0.098	0.049	0.092	0.170						
Cadmium (D)	µg/L	0.010	0.029	0.092	0.010	0.045	0.100						
Chromium (TR)	µg/L	2.580	4.50	~~24.83~~ 40.7	4.570	39.59	55.96						
Chromium (D)	µg/L	0.110	~~0.195~~ 0.190	2.470	0.130	0.310	8.790						

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Copper (TR)	µg/L	2.200	~~4.100~~ 4.787	~~10.04~~ 14.3	2.860	11.04	20.75				5.27	7.6	11.5
Copper (D)	µg/L	1.200	1.550	2.540	2.200	3.349	4.770				2.14	5	10.6
Lead (TR)	µg/L	0.300	~~1.480~~ 2.08	~~4.410~~ 6.46	1.190	4.800	7.380						
Lead (D)	µg/L	0.002	~~0.021~~ 0.017	0.253	0.007	0.015	0.991						
Nickel (TR)	µg/L	2.600	~~6.300~~ 7.32	~~22.90~~ 30.35	5.600	28.58	41.30				10.2	16.9	24.5
Nickel (D)	µg/L	1.000	~~1.630~~ 1.57	3.730	1.700	6.505	37.40				5.06	11.6	26.8
Silver (TR)	µg/L	0.003	~~0.010~~ 0.014	~~0.058~~ 0.059	0.012	0.045	0.140						
Silver (D)	µg/L	0.001	0.002	~~0.004~~ 0.005	0.001	0.003	0.012						
Zinc (TR)	µg/L	2.330	~~7.400~~ 10.55	~~19.67~~ 35.0	6.720	27.31	46.36						
Zinc (D)	µg/L	0.200	~~0.649~~ 0.594	1.30	0.200	0.579	8.40						
Ammonia	mg/L as N	0.0	~~0.03~~	0.13	~~0.00~~ 0.02	~~0.05~~	~~0.26~~	0.1	0.73	1.9	0.3	0.675	1.1

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
			0.06			0.11	0.42						
Un-ionized ammonia	mg/L as N							0.0004	0.003	0.0072	0.002	0.00575	0.011
NO_3	mg/L as N										0.9	1.2	1.5
NO_2	mg/L as N										0.07	0.10	0.16
PO_4	mg/L as P										0.8	1.0	1.4
TSS	mg/L	7.2	~~34.2~~ 62.7	~~148.4~~ 242	32.0	~~217~~ 211	414				28	60	120
Temperature	°C	10.3	~~12.7~~ 12.9	~~16.0~~ 18.0	11.4	14.4	22.5	6.1	12.4	19	12.8	15.4	19
pH	--	7.5	7.8	8.3	7.1	7.8	9.0	7	7.4	7.6	7.2	7.5	7.8
Salinity	ppt	0.5	~~6.6~~ 8.1	22.9	0.3	5.3	22.3	0.2	10.8	38.0	0.7	5.6	15.4
Conductivity	µmhos/cm							338	16,800	59,400			
Hardness	mg/L							86	1661	4720	310	838	1600
DO	mg/L	0.8	9.5	10.6	1.4	~~8.1~~ 8.4	10.2	5.0	7.2	9.4			

Response to Comment F-19

The EIR analysis did not rely on data collected in the vicinity of the discharge to formulate conclusions about potential impacts for the EIR. Constituents with numeric criteria were evaluated by comparing the maximum concentrations in effluent to the evaluation criteria. For those constituents that exceeded their evaluation criteria, further analysis was conducted to take into account receiving water concentrations. As stated in the EIR on page 4.5-21: "For this analysis, the initial receiving water concentrations are assumed to be the median concentrations found in San Pablo Bay at the mouth of the Petaluma River which are similar to the median concentrations at other stations in the receiving water." Thus data collected in the vicinity of the discharge were not relied on to formulate conclusions about potential impacts.

Response to Comment F-20

The most stringent of the salt and fresh water criteria was used for the water quality impacts analysis.

Response to Comment F-21

The water quality impacts evaluation was conducted using a combination of conditions that in the professional judgment of the EIR authors represented worst case conditions that could occur simultaneously, which is not necessarily the hypothetical worst-case. Using the minimum hardness in conjunction with maximum wastewater volume, maximum wastewater concentration, and the most restrictive criterion (fresh or saltwater, Basin Plan or CTR) results in conditions that are unlikely to occur.

Response to Comment F-22

As noted in the paragraph prior to Table 4.8-4 of the EIR: "The effluent concentrations in Table 4.8-4 differ from those in Table 4.5-2 in Section 4.5, because Table 4.8-4 reflects all discharge data for 1997 through 2001 whereas Table 4.5-2 reflects only October through May concentrations during river discharge."

Response to Comments F-23 through F-27 and F-29

Refer to Response to Comments F-16 and F-17.

Response to Comment F-28

Data for the listed constituents in Petaluma's effluent have been collected and are addressed in the EIR. See page 4.5-14 and Table 4.5-5.

Response to Comment F-30

Although wetlands treatment is likely to improve effluent quality, the more conservative approach of using current effluent quality without assuming any improvement through wetlands treatment was used to evaluate impacts. The use of existing data as a measure of future plant

performance is justified based on the improved treatment capacity provided in the new facility. Full secondary treatment is provided prior to river discharge or pond storage.

Response to Comment F-31

While evaluation of the existing discharge is important in relation to the current NPDES permit, the purpose of this EIR is to evaluate the proposed Water Recycling Facility. There is no need to determine whether or not current effluent meets water quality based effluent limitations in order to evaluate the environmental impacts of the proposed facility, nor is it the purpose of this EIR to establish a source control program for the current discharge situation.

Neither the City nor the EIR authors know, at this time, what effluent limits will be in place after project implementation. Depending on what data set the Regional Board uses for its Reasonable Potential Analysis and subsequent effluent limits, there might not be any effluent limits for copper, chromium, nickel, and dioxin/furan congeners. Therefore, we chose to use promulgated water quality criteria as the trigger for implementing a source reduction program.

Response to Comment F-32

Refer to Response to Comments F-16 and F-17.

Response to Comment F-33

The *Technical Support Document for Water Quality-Based Toxics Control* (U.S. EPA, 1991) suggests a general rule for exceedence frequency of once per three years for toxic pollutant water quality criteria based on literature on ecosystem recovery from disturbance. Having a mitigation trigger of just one exceedence does not allow for the possibility of ecosystem recovery from disturbance. Having a mitigation trigger of three consecutive samples will enable determination of whether the problem is ongoing. The large investment in source control that would be necessary is only warranted after the problem is documented to be an ongoing, not an intermittent one.

Response to Comment F-34

Chapter 3 of the EIR states that the water quality related monitoring and mitigation will begin after certification of the EIR, not after five years as stated by the commentor.

Response to Comment F-35

Regarding the mitigation triggers for bis(2-ethylhexyl)phthalate, aldrin, dioxin/furan, acrolein, and acrylonitrile, refer to Response to Comment F-31.

Regarding the question of how many exceedences, refer to Response to Comment F-33.

Regarding when testing should begin, refer to Response to Comment F-34.

Response to Comment F-36

Compliance with Basin Plan requirements for total coliform bacteria is well within technical feasibility. The EIR is based on the assumption that the treatment plant will be designed and constructed appropriately. The NPDES permit and other enforcement mechanisms available to the Regional Board assure that the limits will be met. Relative to existing coliform in the effluent, during the spring turnover period, the existing facility can occasionally see higher peaks in effluent total coliform concentrations. This occurs because there is an incomplete nitrification process occurring in the ponds, which results in an artificially high chlorine demand. The byproducts of the incomplete nitrification process consume the chlorine, which reduces the amount of chlorine available to the coliform kill. The new facility design will alleviate this condition, because it provides complete rather than partial nitrification.

Response to Comments F-37 through F-39

The commentor is correct in that the 2001 toxicity data were inadvertently left out of the effluent summary. The 2002 data were not available at the time the report was written. Both the 2001 and 2002 data indicate chronic toxicity. An evaluation of the effluent data indicates that high ammonia concentrations are the likely cause of the apparent toxicity. The EIR is revised as follows:

Pages 4.5-8 through 4.5-9:

Table 4.5-2

Existing Effluent Quality[a] (October-May, 1997-2001)
(all values in µg/L unless noted)

Constituent	# samples	Min or Detection Limit	Median or 30-day Average	Instantaneous Max	Lowest of CTR[b] or Basin Plan Criteria
Conventional Constituents					
Chronic Toxicity (100/NOEL)	~~4~~ 5	NA	1	~~1~~ 1.2	1

Page 4.5-38:

> Chronic toxicity was conducted ~~four~~ five times through 2001. In ~~all~~ four of the five tests, 100 percent wastewater produced no observed effect for both larval survival and larval growth tests. However, in 2001 and again in 2002 (2002 data recently received and not reported in Table 4.5-2) chronic toxicity was observed, with 100/NOEL greater than 1. During both these toxicity tests, effluent ammonia concentrations were elevated (10 to 14 mg-N/L during both tests). Although not promulgated for the State of California, the EPA has guidelines for ammonia toxicity that update Basin Plan objectives. The

concentrations of ammonia in the chronic toxicity tests exceeded the EPA's recommended chronic criterion for ammonia (fish early life stages present) and are the likely cause of the observed toxicity. However, with implementation of the project, ammonia toxicity is not expected to have a significant impact on the receiving waters for two reasons:

With the particular treatment processes being constructed as part of the project, final effluent discharged to the river is expected to have greatly reduced ammonia concentrations (less that 8 mg-N/L).

The toxicity tests evaluate toxicity in 100 percent wastewater although dilution will occur. Using mass balance calculations (maximum effluent concentration of 8 mg-N/L, median receiving water concentration of 0.11 mg-N/L and maximum percent wastewater of 33.4 percent), the predicted concentration of ammonia in the receiving water is 2.7 mg-N/L. With the usual temperature (13-14 °C) and pH (7.8) conditions in the receiving water, the EPA chronic criterion for ammonia (fish early life stages present) is 3.2 mg-N/L so the discharges to the receiving water are not expected to exhibit ammonia toxicity.

Therefore, the impact of the project on acute and chronic toxicity in the receiving water is expected to be less than significant.

Response to Comment F-40

The environmental importance of nutrients is in their potential biostimulatory effect. The project impact on biostimulatory substances is discussed on page 4.5-35.

COMMENT LETTER G – PETALUMA CITY SCHOOLS, CARL WONG, ED.D., SUPERINTENDENT, (MAY 22, 2002), RECEIVED MAY 28, 2002

Response to Comment G-1

The City appreciates the interest in the proposed project and the appreciation expressed by the Petaluma City Schools. However, the support for the project is a statement of opinion regarding approval of the project, not the adequacy of the Draft EIR. Please Refer to Master Response 1, located in Chapter 2 of this document, regarding statements of opinion for or against the project.

COMMENT LETTER H – TERENCE M. GARVEY (MAY 13, 2002)

Response to Comment H-1

The potential for recycled water to rehabilitate the Napa salt ponds is not a form of treatment, but of disposal of recycled water, and therefore does not meet the City's objectives for the Water Recycling Facility, which are focused solely on treatment.

Response to Comment H-2

Comments regarding cost are not comments on the adequacy of the EIR. Project objectives focus on treatment and do not include changes in recycled water disposal methods.

Response to Comment H-3

The impact of nutrients on the receiving waters was described on page 4.5-35 of the EIR under Biostimulatory Substances. In addition, as described on page 2-14 of the EIR Project Description, polishing wetlands are a part of the preferred alternative. These wetlands, located adjacent to the existing oxidation ponds, are expected to provide further reduction of metals, nutrients and organics. It should be noted that any wastewater that is released into the Cargill Salt Ponds will eventually reach the Napa River and be discharged into the Bay and Ocean as well.

Response to Comment H-4

The wastewater treatment facility will be designed to treat all influent wastewater in accordance with the City of Petaluma's NPDES permit. This includes winter flows.

Response to Comment H-5

The comment is correct that discharge is expected to increase, because the capacity of the Water Recycling Facility will increase from 5.2 mgd to 6.7 mgd, average dry weather flow.

Response to Comment H-6

This is not a comment on the adequacy of the EIR. Discharge through the Napa salt ponds or any other means, is a function of disposal, not treatment. The City's objectives for the Water Recycling Facility focus on treatment and do not include objectives relative to the disposal of recycled water.

Response to Comment H-7

Refer to Response to Comment H-2.

Response to Comments H-8 through H-10

Present river discharge currently averages 7 mgd and will continue at this level for the proposed project. River discharge flows will receive complete secondary treatment during the entire

discharge period. Current pond operation requires that several ponds remain nearly full for treatment. Current pond volumes and usable volumes were reviewed in the Predesign Report. The future system does not require the ponds for treatment; therefore, the usable volume of the ponds increases for the proposed Water Recycling Facility (Predesign Report, Carollo Engineers, February 2002, pg. 9A-10).

The Project proposed in the Draft EIR does not preclude the City of Petaluma from providing recycled water for agricultural irrigation. The Water Recycling Facility will produce secondary and tertiary recycled water, both of which are suitable for agricultural irrigation.

Response to Comment H-11

The amount of usable storage contained in the existing wastewater treatment facility is similar to the amount of usable storage contained in the Project. Though the existing wastewater treatment facility has more oxidation ponds, the amount of usable storage contained in the existing oxidation ponds is reduced by the location of the transfer structures and the need to preserve the treatment capability of the oxidation ponds during the dry weather months.

Response to Comment H-12

Spray irrigation is not a part of this project.

Response to Comment H-13

The range of potential hazards associated with the decommissioning of the Hopper Street plant has been identified in Impact PHS-2 on pages 4.7-8 and 4.7-9 of the Draft EIR. A preliminary cost estimate conducted by the City in 1995 estimated it would cost approximately $1.4 million to decommission the Hopper Street plant. Escalating this cost to 2008 dollars, which is when decommissioning is anticipated to occur, places this cost at approximately $1.8 million. This cost estimate will continue to be refined and updated as the ultimate use of the Hopper Street site is determined.

Response to Comment H-14

The recycled water reservoirs will be designed to provide 1 to 2 days of hydraulic detention time. They can be operated from nearly full to empty and will minimize algae growth.

Response to Comment H-15

The proposed new monitoring well is down gradient from the polishing wetlands. The gradient appears to be uniformly flowing toward the river, and no lateral movement of the groundwater has been observed. Therefore a monitoring well directly down gradient from the ponds should have the highest probability of detecting impact, should any occur.

Response to Comment H-16

The plant effluent will meet secondary treatment requirements at all times. Currently the ponds provide secondary treatment. In the future, effluent from the new facility will be a blend of

secondary effluent from the plant and treated secondary effluent stored in the ponds. It is expected that water quality will improve, but to be conservative, the water quality evaluation used existing effluent water quality values.

Response to Comment H-17

The EIR authors apologize for the missing pages that were inadvertently left out of Appendix B, Inundation Analysis. The missing pages of the report have been included in Chapter 5 of this Final EIR.

Response to Comment H-18

The comment is correct; Carollo Engineers' name was misspelled on the title page for Appendix D, Traffic Master Plan.

Response to Comment H-19

The EIR authors appreciate the opinion regarding the formatting of the table of contents, but have decided not to revise it, as it is functional the way it is.

COMMENT LETTER I – VASCO BRAZIL (MAY 20, 2002)

The comment letter references several exhibits. The exhibits have not been submitted to the City. On July 1, 2002, a letter was sent to Mr. Brazil asking him to submit the referenced exhibits, but none have been received as of July 23, 2002.

Response to Comment I-1

The City appreciates all comments on the Draft EIR. All comments will be reviewed, regardless of the length, and responses offered in this Final EIR.

Response to Comment I-2

The affect of the project on sewage rates is not within the scope of an EIR. The comment does not address the adequacy of the Draft EIR.

Response to Comment I-3

The commentor noted that the Tolay fault was located on a different alignment than shown in the Draft EIR. The commentor references a map, Exhibit A dated 7/12/79 that indicates the fault goes directly under pond 1 and most likely pond 4, 5 and 9. The commentor has not included Exhibit A map with the comment letter. The authors of the EIR did research maps originating during the 1970's. Since that time, more recent maps from the U.S. Geologic Survey (USGS, 1999) and California Department of Mines and Geology (CDMG 1996) have been published indicating that the fault passes approximately one-half mile east of the project site, as shown on Figure 4.3-1 of the Draft EIR.

The Tolay fault has been considered an inactive fault since 1982. As noted on page 4.3-2 of the Draft EIR, although the fault has had significant movement in the last two million years, the fault was removed from the Alquist-Priolo earthquake fault zone in 1982 for lack of evidence of movement in the last 11,000 years.

Response to Comment I-4

The Tolay fault is not considered active and is not located under the Ponds at the Lakeville site. Please see Response to Comment I-3.

Response to Comment I-5

The commentor is correct in the statement that Liquefaction Protection, Measure PD-3, and Seismic Design to Resist Ground Shaking, Measure PD-4, will be required for all new water recycling facilities.

Response to Comment I-6

The Tolay fault is not considered active and is not located under the ponds at the Lakeville site. Please see Response to Comment I-3.

Response to Comment I-7

The Tolay fault is not considered active and is not located under the Ponds at the Lakeville site. Please see Response to Comment I-3.

Response to Comment I-8

This is not a comment on the adequacy of the Draft EIR. The Project Engineer would like to note, however, that any new water recycling facilities located in Pond 10 will be pile supported.

Response to Comment I-9

Payments by the City to the commentor in the 1980's are not germane to the evaluation of potential impacts from the new Wastewater Recycling Facility. An EIR is required to evaluate the changes caused by the Project relative to existing conditions only. As the EIR indicates under Impacts GW-1 and GW-2, on pages 4.4-6 and 4.4-7, impacts of new facilities are less than significant relative to both groundwater quality and mounding.

Based on the ongoing geotechnical investigation for the Water Recycling Facility, groundwater in both dry weather and wet weather has a relatively gradual gradient toward the river and no evidence of lateral movement. Previous groundwater sampling reported in the EIR (B&C 1995) indicated "no evidence" that "any of the ponds are leaking." Their report also recommended monitoring. The addition of a down gradient well and post construction groundwater monitoring recommended in the EIR will provide the recommended monitoring.

Response to Comment I-10

The City has no information about the depth of the well on the commentor's property.

Response to Comment I-11

Groundwater levels seem to fluctuate 2 or 3 feet between wet weather and dry weather, although they seem consistent from on-site to off–site. We have limited groundwater data and certainly no historic data. A hand dug well may or may not provide an accurate picture of groundwater elevation. Refer to Response to Comment I-9.

Response to Comment I-12

The Division of Safety of Dams standards are not applicable to dams or projects of this small size. However, the Sonoma County Code does apply, and it incorporates the seismic standards for embankments included in 1997 Uniform Building Code. These codes will be adhered to for all new developments and project structures. In addition, the following phrase regarding the Tolay fault in the comment is incorrect: "… an area quake fault line was omitted." There was no

omission; knowledge of the Tolay fault advanced in recent decades and the alignment is now known to pass approximately one-half mile east of the project site, as shown on Figure 4.3-1 of the Draft EIR.

Response to Comment I-13

This comment does not address the adequacy of the Draft EIR.

Response to Comment I-14

The Tolay fault passes approximately one-half mile east of the project site, as shown on Figure 4.3-1 of the Draft EIR, and not under the oxidation ponds. Please refer to Response to Comment I-3.

Response to Comment I-15

This comment does not address the adequacy of the EIR. There was no Exhibit B attached to the comment letter.

COMMENT LETTER J – SCOTT HESS, SUSTAINABLE PETALUMA NETWORK (MAY 20, 2002)

Response to Comment J-1

The City appreciates the interest and encouragement expressed. Please refer to Master Response 1, located in Chapter 2 of this document, regarding statements of opinion for or against the project.

COMMENT LETTER K – KAREN SCHELL (MAY 20, 2002

Response to Comment K-1

Please refer to Master Response 1, located in Chapter 2 of this document, regarding statements of opinion for or against the project.

COMMENT LETTER L – NORRIS DYER, DOCENT, SHOLLENBERGER PARK (MAY 21, 2002)

Response to Comments L-1

The City appreciates the statement in support of the Draft EIR. Please refer to Master Response 1, located in Chapter 2 of this document, regarding statements of opinion for or against the project.

COMMENT LETTER M – MICHAEL SANDLER, COMMUNITY CLEAN WATER INSTITUTE (MAY 22, 2002)

Response to Comment M-1, M-2 and M-3

Please refer to Master Response 1, located in Chapter 2 of this document, regarding statements of opinion for or against the project.

COMMENT LETTER N – VASCO BRAZIL (MAY 29, 2002)

The comment letter references several exhibits, but the exhibits have not been submitted to the City.

Response to Comment N-1

The City appreciates the commentor's interest in providing additional comments on the Draft EIR.

Response to Comment N-2

The Water Recycling Facility and River Access Improvements are public uses, not industrial uses, and are consistent with agricultural zoning and General Plan land use designations, as expressed in the general plan and zoning ordinance category descriptions. There are several objectives for this project, including the development of an economically and ecologically sustainable water recycling facility to accommodate growth anticipated by the City's General Plan, and the production of tertiary recycled water in accordance with California Title 22.

Response to Comment N-3

This comment is an opinion regarding adoption of a project alternative. Please refer to Master Response 1.

Response to Comment N-4

No, the City will not attempt to mitigate agricultural impacts by attempting to create additional agricultural land in a different location. This mitigation measure was considered but rejected as infeasible, as any land which is not currently in production is likely in that condition for a good reason. A different mitigation measure, AG-1 Maintain Maximum Acreage of Agricultural Production, has been recommended, however, which reduces impacts to agricultural land to the extent feasible.

Response to Comment N-5

The comment agrees with the conclusion of the Draft EIR, wherein impact AG-1 concludes that the impact upon agricultural land is significant, both before and after mitigation.

Response to Comment N-6

The Draft EIR concludes in Impact LU-5 on page 4.1-8, that the project is compatible with the adjacent Business Park use, in that the Water Recycling Facility is in the same location as the existing oxidation ponds, and the new development on Parcels A and B is open to the public, recreational in nature, and uses only disinfected secondary treated recycled water.

Response to Comments N-7 through N-9

The City of Petaluma has carefully evaluated several alternatives, including Alternative 4 – Hopper Street, which includes treatment facilities at the Hopper Street site, and several alternatives for algae removal. Alternative 4 – Hopper Street and the Preferred Alternative - Extended Aeration with Wetlands both qualify as the Environmentally Superior Alternative.

Impact LU-5 in the Draft EIR concludes that decommissioning of the Hopper Street Plant is beneficial, because it furthers the goal of the Petaluma General Plan to extend Caulfield Lane. This beneficial impact is not a comparison of the proposed project to the alternative of expanding and upgrading the Hopper Street site. To the extent the commentor is expressing a preference for adoption of the Hopper Street Alternative, please refer to Master Response 1.

The Tolay fault does not lie under the existing oxidation ponds at the Lakeville site. Recent maps from the U.S. Geologic Survey (USGS, 1999) and California Department of Mines and Geology (CDMG 1996) show the fault passing approximately one-half mile east of the project site, as shown on Figure 4.3-1 of the Draft EIR. Therefore, the EIR found both Alternatives to have a less-than-significant impacts after mitigation relative to earthquake safety.

Response to Comment N-10

The EIR authors do not agree that the Hopper Street site is safer or environmentally superior to the Lakeville Highway site, as discussed in Response to Comments N-7 through N-9. However, the following excerpt regarding the environmentally superior alternative, can found on page 1-12 of the Draft EIR.

> Alternative 4, Hopper Street, and the proposed project, Extended Aeration, would have similar levels of environmental impacts and therefore both qualify as the Environmentally Superior Alternative.

The preliminary cost estimate on page 5-12 of the Draft EIR identifies the total annualized cost (plus annual operation and maintenance cost) of the preferred project at $10.2 million with wetlands and Alternative 4, Hopper Street at $11.9 million. The commentor is incorrect that the Hopper Street Alternative costs less.

Response to Comment N-11

Impact LU-6 on page 4.1-9 of the Draft EIR evaluates whether the project converts non-urban land to urban uses, and finds that the water recycling and recreational improvements are related to habitat creation and agriculture, not to urban developed land, and therefore, finds this impact to be less than significant.

Response to Comment N-12

Impact VR-5 on pages 4.13-15 and -16 of the Draft EIR evaluates the impact of the improvements on Parcels A and B on views from Lakeville Highway, Shollenberger Park, and the Petaluma River. On page 4.13-8, there is a visual simulation of the wetlands, trails, and new access road on Parcels A and B taken from Lakeville Highway at the corner of the Oakmead

Northbay Business Park. Chain link fences along Lakeville Highway will not be required; the access road is at grade through the parcels until it reaches Ellis Creek at the boundary of the existing oxidation pond site; and the pond berms are at such a distance that they will not obstruct views. Therefore, the proposed improvements on Parcels A and B were not found to have significant visual impacts on the traveling public along Lakeville Highway.

Response to Comment N-13

No specific comment on Impact LU–C1, cumulative land use impacts, is made, therefore no response is offered.

Response to Comment N-14

The impact of converting the agricultural land on Parcels A and B to a non-agricultural use is considered a significant impact, as identified in Impact AG-1 on pages 4.2-5 and -6 of the Draft EIR. If the City decides to implement the project, a statement of overriding considerations should be adopted, explaining why the polishing wetlands and public educational and recreational facilities were adopted as part of the project despite their significant impact on farmland.

Response to Comment N-15

The commentor is correct that the loss of agricultural land is a significant cumulative impact. The Draft EIR identifies this impact as AG-C1 on page 4.2-6 and-7 of the Draft EIR.

Response to Comment N-16

The commentor noted that the Tolay fault was located on a different alignment than shown in the Draft EIR. The commentor's referenced map (dated July 12, 1979) shows the fault going directly under pond 1 and most likely pond 4, 5 and 9. However, more recent mapping from the U.S. Geologic Survey (USGS, 1999) and California Department of Mines and Geology (CDMG 1996) has repositioned the fault to approximately one-half mile east of the project site, as shown on Figure 4.3-1 of the Draft EIR. These references were used to determine the location of the Tolay fault and are considered to be a more accurate representation of the actual fault geology beneath the surface.

The Tolay fault has been considered an inactive fault since 1982. As noted on page 4.3-2 of the Draft EIR, although the fault has had significant movement in the last two million years, the fault was removed from the Alquist-Priolo earthquake fault zone in 1982 for lack of evidence of movement in the last 11,000 years.

Response to Comment N-17

It is not within the scope of this EIR to redefine the state legislation that determines the responsibilities of state and local agencies relative to earthquake safety.

Response to Comment N-18

The Lakeville Highway site is located in a zone identified as high liquefaction potential (refer to Figure 4.3-4 on page 4.3-11 of the Draft EIR), however based on ongoing geotechnical site investigations (including over 20 borings up to 60 feet in depth), liquefaction could only occur in some small areas of the site. A thin sand lens was encountered at a great depth (30-35 feet) and presents only a minor risk from liquefaction. The existing oxidation pond levees are relatively flat (4:1 slope) and remain stable during an earthquake according to the post-liquefaction analysis.

New improvements on the site will be subject to Measure PD-3 requiring specific construction methods to counteract the site's susceptibility to liquefaction.

Response to Comment N-19

Refer to Response to Comment N-18.

Response to Comment N-20

Although highly unlikely, if an earthquake, or other natural or man-made disaster, were to cause raw sewage flows to enter the Petaluma River, substantial contamination of the River water quality would occur, most likely for several weeks, until the damage could be repaired. However, if a large enough earthquake were to occur such that wastewater management systems throughout the region were impacted, it is very likely that roads, communication systems, structures, and industrial processes would also be impacted, all of which could result in the degradation of the Petaluma River and other consequences. Each of the alternatives analyzed for sewage treatment are located along the Petaluma River, and would have similar risks of water quality degradation in the case of a massive disaster.

Response to Comments N-21 and N-22

Please refer to Response to Comment I-9.

Response to Comment N-23

Groundwater was not analyzed for the presence of phosphate, because phosphate is not an indicator of the presence of wastewater. Phosphate is not an indicator of the presence of wastewater because phosphorus in water (including wastewater) adsorbs to soil instead of remaining dissolved in water.

Response to Comment N-24

The owner of the drinking water well is not germane to identification or mitigation of the environmental impact.

Response to Comment N-25

Refer to Response to Comment N-23.

Response to Comment N-26

The mitigation measures proposed for the drinking water well have been successful for other well systems, and there is no indication that they would not be feasible and successful at this location. Each of the three listed options could be successful, so if one method becomes undesirable from some reason, two backup measures are available to fulfill the mitigation obligations.

Response to Comment N-27

Please refer to Response to Comment I-9.

Response to Comment N-28

The TMDL mentioned has not yet been formulated or published, and it is beyond the scope of this EIR to project its impact upon agricultural lands.

Response to Comment N-29

This is not a comment regarding the adequacy of the Draft EIR.

Response to Comment N-30

The 1985 NWI is the National Wetlands Inventory from the U.S. Fish and Wildlife Service published in 1985. The NWI produces information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats. In 1982, the NWI produced the first comprehensive and statistically valid estimate of the status of the Nation's wetlands and wetland losses. Regulatory agencies use the maps to help in advanced wetland identification procedures, and to determine wetland values and mitigation requirements.

Response to Comment N-31

The City appreciates the comment, however no decision has yet been made regarding hunting or fishing using facilities on Parcels A or B. These issues will be decided during the course of design, and if these recreational uses were adopted, suitable enforcement of hunting and fishing regulations would need to be provided for.

Response to Comment N-32

Trip generation projections for the project are shown in Table 4.9-4 of the Draft EIR on Page 4.9-9, and estimate 250 trips per day, including 200 trips per day for visitors. There is no reliable methodology for estimating visitor trips to such a facility, but the EIR authors believe that 200 trips a day is a conservative estimate, and that trip generation will likely be substantially less on average. The impact of these trips has been evaluated at the intersection of Lakeville Highway and Browns Lane. Although Browns Lane is not a driveway, it serves very few homes and can reasonably be used to identify traffic impacts for individual driveways in the vicinity. The impact evaluation at Browns Lane shows that the Level of Service for the turning movement with the longest delay does not change due to either construction or operation of the project. The

Level of Service is currently D in the AM peak hour and E in the PM peak hour. Addition of project traffic does not change this level of service, and therefore, the impact was found to be less than significant. The addition of 125 vehicles throughout the day on Lakeville Highway, distributed in both a northwest and southeast direction, is not expected to create substantial changes in the functioning of a roadway which currently carries approximately 23,000 vehicles on an average day (Caltrans, 2001).

Response to Comment N-33

The comment's assessment of wind direction is consistent with the wind rose provided in Figure 4.10-1 on page 4.10-2 of the Draft EIR. Potential odors from the new facility are evaluated at length in Impact AQ-5 on pages 4.10-14 through -17. Because of the odor control methods and structures included in the design of the new facility as required by Measure PD-16, Odor Control, odor impacts are not expected to become significantly worse than the existing conditions.

Response to Comment N-34

The EIR authors agree that odors are likely to be more of a problem for the Hopper Street Alternative because of the site's proximity to residences and other urban uses.

Response to Comment N-35

This is not a comment on the adequacy of the Draft EIR.

PUBLIC HEARING COMMENT 1 – BRYANT MOYNIHAN, MAY 13, 2002

Response to Comment PH 1-1

Comment Summary: Why aren't the significant impacts to agriculture discussed in the Land Use Section of the Draft EIR?

Impacts regarding agriculture are discussed in two sections of the EIR:

- Impacts relative to agricultural General Plan categories and zoning, and compatibility of land uses is discussed in the Land Use section. These impacts are found to be less than significant.

- Impacts relative to loss of agricultural land are evaluated in the Agriculture Section and are found to be significant even with mitigation.

PUBLIC HEARING COMMENT 2 – MATT MAGUIRE, MAY 13, 2002

Response to Comment PH 2-1

Comment Summary: Are the impacts caused by the construction of meanders of Ellis Creek discussed?

The impacts of all the river access improvements, including restoration of meanders along Ellis Creek, as described on pages 2-18 and 2-19 of the Project Description, are discussed in Chapter 4 of the Draft EIR, Environmental Analysis.

Response to Comment PH 2-2

Comment Summary: The EIR needs to discuss the quality of the agricultural land on parcels A and B discussed in the Final EIR.

The Agriculture section discusses the classification of Parcels A and B as Farmland of Local Importance. The Soils Survey indicates that soils on Parcel A are relatively productive (Class II) whereas soils on Parcel B are poor (Class IV). The following information is inserted into the EIR:

On page 4.2-3 prior to the Williamson act paragraph:

> ***Resource Conservation Service Soil Capability Classification***
>
> Soils on Parcel A are primarily Clear Lake clay; soils on Parcel B are primarily Reyes silty clay. Clear Lake clay is a Class II productivity soil and Reyes silty clay is Class IV.

Capability Unit IIs-5 (CeA Clear Lake clay)

In this unit are soils of the Clear Lake series and the land type "Alluvial land, clayey". Some of these soils are moderately well drained and others are drained and on the edge of basins. Slopes are drained and on the edge of basins. Slopes generally are less than 2 percent, but along the edge of the larger basins they are less than 1 percent. The surface layer is clay loam to silty clay, and wide cracks form as it dries. The Clear Lake soils are more than 60 inches deep. They have thick layers of fine gravel at a depth below 20 to 40 inches in places.

The total available water capacity varies in Alluvial land, clayey, and is 8 to 10 inches in Clear Lake soils. Infiltration is rapid, and moisture is absorbed rapidly until the cracks in the surface close; after that infiltration is slow or very slow. Fertility varies.

The soils and land type in this unit are better suited to field and forage crops and to certain row crops than to other crops. They are also suited to prunes, pears, and grapes.

Alluvial land, clayey, and Clear Lake soils are slow to warm in spring. Crops on them generally respond to nitrogen fertilizer. Preparing a seedbed is difficult because hard clods form unless the soils are worked at the right moisture content. Returning all crop residue to the soil helps to improve tilth and structure.

Capability Unit IVw-9 (RmA – Reyes silty clay)

Reyes silty clay, 0 to 2 percent slopes, is the only soil in this unit. This poorly drained soils is in low areas, where the surface is undulating and irregular. Generally layers of peat that range from thin to thick occur throughout the profile. In places small stringers or organic material extend from the surface to a depth of several feet. Erosion is not a hazard.

Reaction in the lower layers of this soil and in unreclaimed areas is pH 4 to 5.5. In places where the soil is drained and reclaimed and the soil is cultivated and allowed to dry and oxidize, reaction is pH 3.5 to 5.0. Some salt is in the soil in places, but fresh water from winter rains reduces or neutralizes the harmful effects of excess salt. Fertility is moderate. Runoff and permeability are slow. The water table generally is within a few feet of the surface.

This soils is suited only to small grains and forage plants that tolerate salts and acidity. The chief crop generally is oats grown for hay, though occasionally the oats are threshed for grain. This soil is fairly well suited to narrow-leaf trefoil. Growth of safflower is fair.

If this soil is drained, care is needed to reduce the water table only to the minimum depth suitable for shallow-rooted crops. This soil is difficult to rewet once it dries.

PUBLIC HEARING COMMENT 3 – PAMELA TORLIATT, MAY 13, 2002

Response to Comment PH 3-1

Comment Summary: Where is the nearest well exactly? Whose property is the well on?

The nearest well is across Lakeville Highway, just west of Ellis Creek, on the Matteri property.

Response to Comment PH 3-2

Comment Summary: Is the Draft EIR a supplemental EIR or a subsequent EIR? What is the difference? Is this a stand-alone document, or will more environmental analysis be needed for any part of the project?

The document is a Subsequent EIR. It is not based on an earlier document, as is a Supplemental EIR. This is a stand-alone document that covers the entire project as now designed.

Response to Comment PH 3-3

Comment Summary: Has anyone sent a letter to the County regarding the City's intent of replacing the agricultural land on Parcel A and B? They are in the process of updating their General Plan. A letter should be sent to the County so that it can be part of the General Plan record.

A letter regarding the proposed use of the property was sent by the City of Petaluma to the County of Sonoma Permit and Resource Management Department on May 20, 2002.

Response to Comment PH 3-4

Comment Summary: How many gallons of tertiary-treated wastewater are the polishing wetlands designed to handle? Did we cover the impacts of expansion in the Draft EIR? How long does the additional environmental review take if the Council decides to expand the treatment beyond 4 mgd?

Polishing wetlands will treat disinfected secondary and pond effluent blend, not tertiary effluent. The polishing wetland treatment design capacity is 8 mgd.

Tertiary treatment effluent will be used for urban reclamation only. The tertiary treatment facilities evaluated in the EIR are designed to process 4 mgd, although the design can be easily expanded to included an additional 4 mgd. It is likely that the expansion could be approved through the preparation of a CEQA Addendum, which could take as little as 2 weeks.

Response to Comment PH 3-5

Comment Summary: It is unclear if the Draft EIR is covering one project or two. What does the entire project include? How do we move forward as one project?

The Draft EIR is covering one project. The project includes all the elements in the Project Description, including the river access improvements. The river access improvements are discussed in each of the environmental analysis sections.

PUBLIC HEARING COMMENT 4 – BRYANT MOYNIHAN, MAY 13, 2002

Response to Comment PH 4-1

Comment Summary: The river access improvements are discussed on page 2-18. It appears that it is a separate project from the wastewater expansion. Please clarify that it is one project.

For the purposes of environmental review, the Water Recycling Facility and the River Access Improvements are considered one project. When the time comes for implementation, it will be the City's discretion whether to implement the water recycling facility and river access improvements as one phase or as separate phases.

PUBLIC HEARING COMMENT 5 – MIKE HEALY, MAY 13, 2002

Response to Comment PH 5-1

Comment Summary: Do Parcels A and B need to be annexed? What is happening with the annexation process of Parcels A and B? What will happen if the property owners do not agree with the annexation? Will the project still go forward? Is annexation included in the EIR?

Annexation is included in the project description and is evaluated in the Draft EIR. Annexation of the parcels will be at the discretion of the City of Petaluma, if and when the City purchases the parcels.

PUBLIC HEARING COMMENT 6 – MIKE O'BRIAN, MAY 13, 2002

Response to Comment PH 6-1

Comment Summary: What is the scope of the EIR? Is it correct that the EIR covers a larger project than we will likely build, so that if we scale back the project we will still be covered and no new EIR will need to be completed?

The scope of the EIR is the project as described in the Project Description. If the project is scaled back, it is covered by the EIR, and no new document will be needed.

PUBLIC HEARING COMMENT 7 – PAMELA TORLIATT, MAY 13, 2002

Response to Comment PH-7-1

Comment Summary: What is happening with the land acquisition, appraisal process?

Property value information is expected from the appraiser on June 30, 2002.

PUBLIC HEARING COMMENT 8 – JANICE CADER-THOMPSON, MAY 13, 2002

Response to Comment PH 8-1

Comment Summary: Has Caltrans evaluated the project?

Caltrans received a copy of the Initial Study and the Draft EIR. They have submitted comments on the Draft EIR; refer to Letter D.

PUBLIC HEARING COMMENT 9 – TERENCE GARVEY, MAY 13, 2002

Response to Comment PH 9

Comment Summary: I am reading my comment letter, which was submitted in writing.

Please refer to Responses to Comment Letter H.

PUBLIC HEARING COMMENT 10 – STAN GOLD, MAY 13, 2002

Response to Comment PH 10-1

Comment Summary: I support the resolution of January 7th and have a concern regarding the lack of information between the Council and the public. An example is that the Council authorized the Preferred Alternative, but the annexation process is just getting underway now – five months later. I recommend that staff issue a monthly progress report that would be available to the public. This should be an open process.

This is a comment on the communication between the City and the public, but not a comment on the adequacy of the Draft EIR.

PUBLIC HEARING COMMENT 11 – MARK LEVIN, MAY 13, 2002

Response to Comment PH 11-1

Comment Summary: I am the owner of two parcels with several commercial buildings in the Northbay/Oakmead business park. I am concerned about the odors that will be emitted from the treatment plant and wetlands. The treatment plant on Anderson Drive in San Rafael smells badly. I would like additional analysis done on the potential odors in order to fully understand the impacts. I think they are a significant impact. The EIR air quality section says impacts are unknown. Residential uses will be affected by the smells also. More study is needed.

The business park is to the north-northwest of the project site, the opposite direction of the primary wind flow. There are very short durations that the winds will blow from the project towards the business park. Further, to be impacted by the project, an upset condition has to occur creating conditions for odors to be omitted. Controls are built into the plant to reduce the

duration of upset conditions. Therefore, it is very unlikely that the commercial area will be downwind when odors are generated.

In order to avoid or reduce potential odors, the City has adopted a number of design measures into the project description. Measure PD-16 describes that the design will include odor control to reduce the potential for odor complaints. The plant headworks, solids treatment and handling process areas will include odor control. Because of these additional controls, odor problems at the oxidation pond site are expected to decrease relative to existing conditions.

PUBLIC HEARING COMMENT 12 – DIANE REILLY TORRES, MAY 13, 2002

Response to Comment PH 12-1

Comment Summary: Will the SOLA wells be affected?

The City of Petaluma is not aware of any wells owned by Sola Optical located within ¼ mile of the site.

Response to Comment PH 12-2

Comment Summary: Ponds? When the ponds are cleaned out, what steps are being taken to ensure mosquitoes will not be a problem?

It is not clear from the question whether the commentor is referring to mosquito problems in the dewatered pond or mosquito problems in the location that receives the water from the ponds. In the first case, the dewatered pond will not support mosquito larvae. In the second case, the water recycling facility and river access improvement will be subject to requirements of the Marin/Sonoma Mosquito and Vector Control District and the Vector Biology and Control Branch of the California Department of Health Services which are responsible for overseeing the mosquito prevention programs within the project area. Page 4.7-10 of the EIR discusses impacts of the project on potential exposure of the public to disease vectors (i.e., mosquitoes).

Response to Comment PH 12-3

Comment Summary: How will rates be affected?

This is not a comment on the adequacy of the EIR.

Response to Comment PH 12-4

Comment Summary: Are the requirements of the Regional Water Quality Control Board met?

The City of Petaluma will need Waste Discharge Orders from the Regional Water Quality Control Board, and will comply with these requirements.

PUBLIC HEARING COMMENT 13 – PAMELA TORLIATT, MAY 13, 2002

Response to Comment PH 13-1

Comment Summary: What is the process for decommissioning Hopper Street? Have soil samples been taken at Hopper Street? Is decommissioning part of the EIR?

Soil samples have not been taken; that will occur as one of the mitigation measures at the time the Hopper Street facility is decommissioned. Decommissioning is part of the project description and has been evaluated in the EIR.

Response to Comment PH 13-2

Comment Summary: A stakeholders meeting with staff should occur once a month.

This is a comment on communications between the City Council and staff and not on the adequacy of the Draft EIR.

Response to Comment PH 13-3

Comment Summary: Is the project on the agenda with the Open Space District?

This is not a comment on the Draft EIR.

Response to Comment PH 13-4

Comment Summary: Regarding the odor issues, we need to address existing odors and where the odors are coming from. The existing ponds on the river may create objectionable odors when the tide goes out.

The sources of odor from the existing facility ponds as well as the processes for controlling odor are discussed in the Air Quality section of the Draft EIR. The potential for odor impacts from the new facilities is also addressed in the Air Quality section.

The existing oxidation ponds treat secondary, primary, and raw effluent. Oxidation ponds for the proposed treatment facility would primarily treat secondary effluent, reducing the potential for substantial odors. The new project will enable more control of the water flow to the ponds, and therefore fewer periods of potential for odor. The current wetlands do occasionally smell during low tide; this is a feature of a wetlands type area.

PUBLIC HEARING COMMENT 14 – CLARK THOMPSON, MAY 13, 2002

Response to Comment PH 14-1

Comment Summary: There are odors at the site now. The slough smells.

The EIR Air Quality section acknowledges that the existing ponds, as well as agricultural activities and the slough, have the potential to create objectionable odors as part of the existing

conditions. This is one of the reasons that odors from the Water Recycling Facility are expected to decrease relative to today's odors.

PUBLIC HEARING COMMENT 15 – MATT MAGUIRE, MAY 13, 2002

Response to Comment PH 15-1

Comment Summary: We need a periodic progress report, it does not have to be monthly but maybe quarterly.

This comment addresses a communication issue between the Council and planning staff and is not a comment on the adequacy of the Draft EIR.

Response to Comment PH 15-2

Comment Summary: Please add the quality of the agricultural production on Parcels A and B.

Refer to Response to Comment PH 2-2.

PUBLIC HEARING COMMENT 16 – CLARK THOMPSON, MAY 13, 2002

Comment Summary: A monthly update is a good idea. A quarterly stakeholders meeting should take place for the Council and the public.

This comment addresses a communication issue between the Council and planning staff and is not a comment on the adequacy of the Draft EIR.

PUBLIC HEARING COMMENT 17 – JANICE CADER-THOMPSON, MAY 13, 2002

Response to Comment PH 17-1

Comment Summary: I would like to move forward with a letter to Supervisor Kerns and the Open Space District regarding the plans for Parcels A and B.

This comment addressed communications between the City of Petaluma and other public agencies and does not address the adequacy of the Draft EIR.

PUBLIC HEARING COMMENT 18 – PAMELA TORLIATT, MAY 13, 2002

Response to Comment PH 18-1

Comment Summary: The Board of Supervisors might like to see us send the water to the Napa salt ponds, but we should keep control of it. We should reuse our wastewater within the City, as it could offset potable water supplies.

Disposal options are not part of the project objectives for the Water Recycling Facility.

PUBLIC HEARING COMMENT 19 – CLARK THOMPSON, MAY 13, 2002

Response to Comment PH 19-1

Comment Summary: It would be good to meet with the Board of Supervisors on this issue.

This comment addressed communications between the City of Petaluma and other public agencies and does not address the adequacy of the Draft EIR.

PUBLIC HEARING COMMENT 20 – BRYANT MOYNIHAN, MAY 13, 2002

Response to Comment PH 20-1

Comment Summary: Having attended a tour of the Napa salt pond project area, sending the wastewater to the salt ponds would possibly allow zero discharge to the Petaluma River for 20 years. I support the federal funding which would be good for ratepayers.

The disposal of wastewater at the Napa salt ponds is not an alternative considered in this Draft EIR because it is an option for disposal of treated wastewater, rather than treatment of wastewater. The project objectives focus on development of alternatives for treatment by building a new Water Recycling Facility.

PUBLIC HEARING COMMENT 21 – JANICE CADER-THOMPSON, MAY 13, 2002

Response to Comment PH 21-1

Comment Summary: What will it cost to construct the pipeline for the wastewater to the salt ponds? The Geysers project cost twice the estimate.

Design and cost estimating for the Napa salt pond disposal option is not part of the scope of the Draft EIR. The salt pond project is not consistent with the project objectives.

Response to Comment PH 21-2

Comment Summary: Can the polishing wetlands be used for storage? How many gallons can they hold? How long could you store wastewater in the ponds?

The polishing wetlands do not provide additional storage. The treatment wetlands provide 2 to 3 feet of additional storage (70 to 105 acre-feet of storage).

PUBLIC HEARING COMMENT 22 – GERALD MOORE, MAY 20, 2002

Response to Comment PH 22-1

Comment Summary: It is a good EIR document; very thorough. I appreciate inclusion of the polishing wetlands and wetlands park and improvements in the lower wetlands area. I hope the

Council will support the park. Mitigation for the loss of agriculture on Parcels A and B is not necessary; the remaining crop will go for wildlife food.

The City appreciates the comments on the Draft EIR's thoroughness. Please refer to Master Response 1 regarding statements of opinion for or against this project or adoption of a particular mitigation measure.

PUBLIC HEARING COMMENT 23 – JIM ROSE, MAY 20, 2002

Response to Comment PH 23-1

Comment Summary: I commend the thorough analysis of the EIR and the good technologies proposed. I appreciate that Petaluma will be utilizing its unique river resources. I would be enthusiastic about a partnership to create educational opportunities with the JC and Petaluma city schools.

The City appreciates the comments on the Draft EIR's thoroughness. Please refer to Master Response 1 regarding statements of opinion for or against this project.

PUBLIC HEARING COMMENT 24 – DAVID YEARSLEY, MAY 20, 2002

Response to Comment PH-24-1

Comment Summary: I am very pleased with EIR, and give compliments to the team that produced it. I do not want the Council to reduce any of the amenities; the trail along the river is wonderful. I appreciate diverse habitat with ecostructure for many species, and support creating islands in the marshes for increasing diversity. The document shows lots of vision – I hope it is approved in its entirety.

The City appreciates the comments on the quality of the Draft EIR. Please refer to Master Response 1 regarding statements of opinion for or against this project.

PUBLIC HEARING COMMENT 25 – GEOFFREY CARTRIGHT, MAY 20, 2002

Response to Comment PH 25-1

Comment Summary: If the Sonoma County Water Agency wants to acquire Petaluma's water rights, including those to recycled water, what would Petaluma lose?

The use of water by the Sonoma County Water Agency is not within the scope of this project and therefore was not analyzed in the Draft EIR.

PUBLIC HEARING COMMENT 26 – PATRICIA TUTTLE BROWN, CHAIRPERSON OF BICYCLE COMMITTEE, MAY 20, 2002

Response to Comment PH 26-1

Comment Summary: I favor the EIR, especially the public access components. I think the levee should continue all around Parcel B along the River. Many valuable educational opportunities are being offered. I support a modest path (without vehicular use) so that people can be with the plants and experience nature. I support a bridge over the levee breach in order to maintain a continuous path, and believe habitat areas on concrete islands are important to go with an educational component.

Please refer to Master Response 1 regarding statements of opinion for or against this project.

Response to Comment PH 26-2

Comment Summary: I think the educational resource center should be in the farmhouse to promote indigenous farm architecture and have watchman's quarters for protection of early morning users. Use of the farmhouse would be better than building a new building.

The City appreciates the comments about use of the farmhouse. Please refer to Master Response 1 regarding statements of opinion for or against this project or portions of the project.

PUBLIC HEARING COMMENT 27 – VASCO BRAZIL, MAY 20, 2002

Response to Comment PH 27-1

Comment Summary: There are two corrections in the EIR: Lakeville Highway does not go all the way to Highway 37, it becomes Lakeville Road, and one page is missing from the Appendix. I request my 1st Amendment right to speak to the City Council about my views even if I am in disagreement. I am looking after the interests of ratepayers as well as those of the environment.

The EIR authors appreciate the correction. The following changes are made in the EIR:

Under Setting, on page 4.9-1:

> The Lakeville site is located on Lakeville Highway, State Route 116, in Petaluma, California. Lakeville Highway extends from ~~is an 11-mile highway connecting State Route 37 to~~ Highway 101 in Sonoma County to the southeast, where it becomes Lakeville Road before joining Highway 37. Lakeville Highway is a 2-lane highway with a speed limit of 55 mph that widens to a 4-lane highway west of Pine View Way reducing the speed limit to 45 mph. Lakeville Highway is a designated truck route where trucks constitute 8.9% of traffic volumes.

The City appreciates the commentor's diligence in providing comments and will respond to each of them.

Response to Comment PH-27-2

Comment Summary: I wish to make the Council aware of a Harding Lawson earthquake map dated 7/12/79 which shows an earthquake fault under several existing ponds in the wastewater treatment facility. The current EIR claims no active faults are under the project, but how could this be since according to the Harding Lawson report the Tolay fault goes under the existing ponds?

Refer to Response to Comment I-3.

Response to Comment PH 27-3

Comment Summary: The existing oxidation pond site is not a good place to spend $100 million to construct a new site. The earthquake-related mitigation measures are only being required on new construction, but do not address fault under existing ponds.

Refer to Response to Comment I-3.

Response to Comment PH 27-4

Comment Summary: I wish to draw the Council's attention to Exhibits B and C. Exhibit B is a two-page damage claim for seepage from the ponds. Exhibit C is a letter from an insurance company with a check for $2,400 for loss of agricultural crops, so there must be leakage. An old well 30 feet from the fence is now always full, even though it wasn't prior to the ponds being built. Why is this so, if the ponds don't leak?

Refer to Response to Comment I-9.

Response to Comment PH 27-5

Comment Summary: The existing ponds were built without use of DSOD seismic safety standards and ignore the fault. The ratepayers are being ignored; the Tolay fault problem should have identified at the beginning of the process, not now. The EIR is inadequate.

Refer to Response to Comment I-3 and I-12.

PUBLIC HEARING COMMENT 28 – STAN GOLD, MAY 20, 2002

Response to Comment PH 28-1

Comment Summary: I commend the EIR for thoroughness. I have hardly come across a document that does not have organized opposition, but this one doesn't. I attribute this to the fact that it offers something for everyone. It has an educational component as well as appealing to business because of the increase in traffic that will come to downtown and the City because of increased tax revenue. I encourage the Council to keep all the amenities.

The City appreciates the comments on the thoroughness of the EIR. Please refer to Master Response 1 regarding statements of opinion for or against this project.

PUBLIC HEARING COMMENT 29 – DAVID KELLER, MAY 20, 2002

Response to Comment PH 29-1

Comment Summary: I wish to thank the team for bringing the Draft EIR this far. I think it helps move wastewater treatment into the 21st century and move treatment technology toward zero discharge; and I appreciate the polishing wetlands.

The City appreciates the comments on the quality of the EIR. Please refer to Master Response 1 regarding statements of opinion for or against this project.

Response to Comment PH 29-2

Comment Summary: The runoff from the parking lot needs to be addressed. I want runoff from parking lots and streets to be addressed citywide.

The EIR authors agree that runoff from parking lots and streets needs to be addressed. The following changes are made:

Under Table 4.5-4 on page 4.5-13:

Table 4.5-4

Evaluation Criteria with Point of Significance – Surface Water Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project discharge cause numeric-based criteria to be exceeded?	Concentration	Varies	U.S. EPA (California Toxics Rule) criteria; Basin Plan criteria
2. Will the project discharge cause narrative-based criteria to be exceeded?	Varies	Varies	Basin Plan narrative criteria
3. Will the project ~~construction~~ result in a substantial degradation of surface runoff quality?	Compliance with local and state storm water quality regulations requiring implementation of effective Best Management Practices	Any failure to implement effective, reasonable and appropriate measures	State of California General NPDES Permits for Discharges of Storm Water Associated with Construction and Industrial Activities. CEQA Checklist

Under Impact WQ-3, on page 4.5-38:

WQ-3: Will the project ~~construction~~ result in a substantial degradation of surface runoff quality?

Water Recycling Facility and River Access Improvements - Less than Significant

Construction activities, particularly the proposed polishing wetlands and filtration/disinfection facilities that will be located at the Lakeville Highway site that is near Ellis Creek have the potential to cause discharge of pollutants to waterways through erosion and accidental spills. In addition, replacement of the outfall and levee stabilization have the potential to cause temporary sediment disturbance during construction in the Petaluma River. Runoff from parking lots and streets during operation of the project also has the potential of contributing contaminants to stormwater runoff entering Ellis Creek and the Petaluma River. Measure PD-8, Construction Erosion and Spill Control Measures, adopted as part of this project, requires the City develop and implement measures designed to prevent significant construction and operational impacts to water quality. With implementation of this measure, impacts will be reduced to less than significant.

Under Table 3-2, on page 3-7:

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
Measures Included in the Project				
PD-1 Uniform Relocation Assistance	City of Petaluma	City of Petaluma		
PD-2 Purchase Locally Grown or Inspected Plants	Design Engineer	City of Petaluma		
PD-3 Liquefaction Protection	Design Engineer	City of Petaluma		
PD-4 Seismic Design to Resist Ground Shaking	Design Engineer	City of Petaluma		
PD-5 Standard Engineering Methods for Expansive Soils	Design Engineer	City of Petaluma		
PD-6 Standard Engineering Methods for Corrosive Soils	Design Engineer	City of Petaluma		
PD-7 Groundwater Monitoring and Management	City of Petaluma	City of Petaluma		
PD-8 ~~Construction~~ Erosion, Stormwater Runoff, and Spill Control Measures	Construction Manager and Design Engineer	City of Petaluma & San Francisco Bay RWCB		

Under PD-8, page 3-21:

PD-8 ~~Construction~~ Erosion, Stormwater Runoff, and Spill Control Measures

Description: The City shall develop and implement measures designed to prevent significant ~~construction~~ impacts to water quality. Examples of possible measures include revegetation of temporarily disturbed sites, development and implementation of a Storm Water Pollution Prevention Plan, protection of waterways from toxic discharge, and concrete waste management.

In addition, stormwater runoff from the new water recycling facilities shall be diverted into the wastewater treatment system. Stormwater runoff from the visitors parking lot on Parcel A, if paved, shall be treated either by diversion into the wastewater treatment system or installation of an oil and grease separator at the bottom of the lot.

Construction within the Petaluma River or the lower portions of Ellis Creek shall be performed from a barge and with divers when appropriate. Excavation underwater shall be done with pressurized water.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager and Design Engineer

Timing: **Start:** Prior to start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and San Francisco Bay Regional Water Quality Control Board

Validation: Storm Water Pollution Prevention Plan

Under Measures Included in the Project Design on Page 2-8:

PD-8 ~~Construction~~ Erosion, Stormwater Runoff, and Spill Control Measures

Response to Comment PH 29-3

Comment Summary: The public will invest in education, recreation, tourism, wildlife habitat, and environmental protection through this project. It ought to be paid for through the utility rates; it would be if it were a privately-operated plant. It is a multi-purpose facility with long-term rewards.

An analysis of funding sources for the project are not part of the scope of the EIR.

Response to Comment PH 29-4

Comment Summary: I think public access as a full circuit trail is important. Information from the S.F. Bay trail shows that human activity on a wildlife trail does not impair the habitat.

Please refer to Master Response 1 regarding statements of opinion for or against this project.

PUBLIC HEARING COMMENT 30 – MATT MAGUIRE, MAY 20, 2002

Response to Comment PH 30-1

Comment Summary: The City has sent a letter to Pete Parkinson at County PRMD asking them to incorporate Parcels A and B in their General Plan Update to be consistent with the polishing wetlands and river improvements.

This comment is not a comment on the adequacy of the draft EIR.

PUBLIC HEARING COMMENT 31 – PAMELA TORLIATT, MAY 20, 2002

Response to Comment PH 31-1

Comment Summary: Are there current problems with the Matteri well? Will there be monitoring of the well on the Matteri property?

The nearest well is across Lakeville Highway on the Matteri property. It will be monitored before and after construction to determine if there are any changes that are deemed deleterious to public health. The City of Petaluma is not aware if there are any current problems with the well.

Response to Comment PH 31-2

Comment Summary: Will any more EIR work be needed to carry out the levee stabilization on Parcel B and the two pedestrian bridges?

No, the EIR covers these components of the project, so long as the design does not change.

Response to Comment PH 31-3

Comment Summary: Since the exact size and location of the path that will facilitate interaction with wildlife is not determined, will the eventual choice require more environmental analysis?

An analysis of the maximum environmental impacts of the path have been included in the EIR. An eventual choice will not require more environmental analysis unless there is a relocation of the path.

Response to Comment PH 31-4

Comment Summary: We now need the money to acquire Parcels A and B; let's make sure it is included in the budget.

A discussion of funding for the project is outside the scope of the Draft EIR.

PUBLIC HEARING COMMENT 32 – MIKE O'BRIEN, MAY 20, 2002

Response to Comment PH 32-1

Comment Summary: We need to answer the questions regarding the earthquake fault. The project engineers are directed to find out if there is an active fault, what was the magnitude of the last earthquake and what information does the USGS have on it.

Refer to Response to Comment I-3. The Tolay Fault has not been active in recent history and the magnitude of the last earthquake on it is unknown.

4 REVISIONS BY THE EIR AUTHORS

The following changes to the Draft EIR were generated by the EIR authors because of typographical errors, clarification of wording, correction of references, or minor additions to to the Project Description and evaluation. None of these changes constitute new information leading to new significant impacts or substantial increases in the severity of significant impacts.

Insert as the second paragraph under Solids Handling on Page 2-12

> Anaerobic digestion is an alternative to aerobic digestion. Anaerobic digestion facilities would consist of three covered tanks: two 15 ft. in diameter and one 55 ft. in diameter. A digester control building will be included. Digester gas produced in the process would be used in boilers to heat the sludge. The process has the following advantages: solids quantity for disposal is reduced 35 percent, odors are completely contained, and energy usage and operating costs are reduced by 80 percent. Anaerobic digestion facilities will be located in Pond No. 4 in the same location as the aerobic digesters.

Insert as the last sentence under Administration Buildings on page 2-14:

> Administration Building #2 may be postponed to a future phase.

Insert under the second bullet of Site Access on page 2-17:

- Improvements to the existing east gate entrance. A right-turn lane will be added to Lakeville Highway, for east-bound right turns into the site, and an acceleration lane will be added for right turns out of the site, for east-bound traffic. Left turns out of the site at the east gate ~~would~~ may be improved with the addition of a left turn bay. The eastbound turn lane will require drainage improvements within the right-of-way, and a retaining wall relocated to the edge of the right-of-way.

Insert at the end of the first paragraph under River Access Improvements on page 2-18:

> The river access improvements are designed in concept, as shown in Figure 2-7, however project level design has not yet occurred. These improvements are therefore evaluated at a conceptual or program level. Some of these improvements may be postponed to a future phase.

Correct Table 4.8-6 on page 4.8-59:

Table 4.8-6

Project Impacts to Sensitive Habitats (Acres)

Structure or Activity	Riparian Forest		Marsh and Aquatic (Wetlands and Waters of the U.S.)[1]		Cropland	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Water Recycling Facility						
Ellis Creek Bridge	0.19	0.13	0.03	0.02	0	0
Fill at headworks	0	0	0	0.1	0	0
North road, including culvert	0	0	0.2	0.2	0	0
East road	0	0	0.3	~~0~~ 0.20	0	0
Wastewater pipelines	0.03	0	1.6	0	2	0
Polishing wetlands, access roads and parking lot	0	0	0	0	25	45
Roads and trails to the Petaluma River	0	0	0	0	0	0
Construction staging areas	0	0	0	0	15	0
Outfall	0	0	0.8	0	0	0
Subtotal	0.22	0.13	2.93	~~0.32~~ 0.52	42	45
River Access Improvements						
Restoration of Ellis Creek and creation of habitat	0.03	0	1.0	0	0	1.0
2 docks	0	0	0	<0.01	0	0
Levee stabilization	0	0	0	.15	0	0
Retrofit radar antenna structures	0	0	0	.04	0	0
Boardwalk trail to Ellis Creek	0	0	0	<0.01	0	0
Subtotal	0.03	0	1.00	0.21	0	1.0
Total	**0.25**	**0.13**	**3.93**	**~~0..53~~ 0.73**	**42**	**46**

Correct text under Impact BIO-4 on page 4.8-60:

> The site also includes several different kinds of marsh, wetlands, and aquatic habitats; project impacts are 3.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent fill or disturbance.

Correct text under Impact BIO-7 on page 4.8-62:

> The Water Recycling Facility will cause up to 2.93 acres of temporary and ~~0.32~~ 0.52 acres of permanent fill or disturbance to jurisdictional wetlands or waters of the U.S.

Insert under Project Conditions on page 4.9-8:

> In addition, the following improvements are proposed:
>
> - Lakeville Highway will be widened to accommodate a new acceleration and deceleration lane
> - The East Gate will allow right ~~and left~~ turn in and out; a left turn bay may be added

Insert under Impact VR-3 on page 4.13-12:

> Both the City and County designate Lakeville Highway as a Scenic Corridor, and travelers along the highway currently have high-quality views of agricultural lands. The existing facilities are currently obscured to southeast-bound travelers due to the lower elevation of the roadway relative to the site, and dense stands of eucalyptus and poplar trees. The new facilities will be partially visible from portions of Lakeville Highway, see Figure 4.13-7 for the visual simulation of the administration buildings. If Administrative Building #2 is delayed, the Solids Handling Building in Pond #4 may be visible at approximately the same height as the Administration Building. Aerobic or anaerobic digestion tanks, also in Pond #4 would be obscured by the Solids Handling Building.

On page 4.13-15:

> Measure PD-~~19~~ 21, Landscaping Design, adopted as part of this project will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway.

On page 4.13-16:

> Measure PD-~~19~~ 21, Landscaping Design, adopted as part of this project will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway.

Correct text in Table 5-4 on page 5-18:

TABLE 5-4

Alternative Impact Comparison

Impact	Project	No Project	1-Advanced Facultative Ponds	2-Aerated Lagoons	3-Primary Clarifiers/Ponds	4-Hopper Street
BIO-7. Will the project or alternatives cause loss of wetlands or waters of the U.S.?	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss.	No impact	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss, plus likely loss of some wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss.

5 REPLACEMENT PAGES

INTRODUCTION

This volume contains the replacement pages to be inserted into the Draft EIR in response to comments.

Textual edits associated with the replacement pages are primarily related to specific agency and public comments made on the Draft EIR. In addition, there are edits that were made as result of section author review.

ORGANIZATION

The replacement pages are presented by section, as they would appear in the Draft EIR. Text that has been added to the document is indicated in <u>underline</u> font, while text that has been deleted in indicated with ~~strikethrough~~ font. The headers and footers are in the same format as the Draft EIR, but have been modified to indicate the new date which reflects the release of the Final EIR. If the addition of new text resulted in additional pages, these new pages are numbered with a lower case letter (i.e., Page 4.9-15a, Page 4.9-15b). Changes to text within a table have been lightly shaded to highlight the edits.

PD-1	Uniform Relocation Assistance
PD-2	Purchase Locally Grown or Inspected Plants
PD-3	Liquefaction Protection
PD-4	Seismic Design to Resist Ground Shaking
PD-5	Standard Engineering Methods for Expansive Soils
PD-6	Standard Engineering Methods for Corrosive Soils
PD-7	Groundwater Monitoring and Management
PD-8	~~Construction~~ Erosion, Stormwater Runoff, and Spill Control Measures
PD-9	Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons
PD-10	Monitor Soil and Groundwater During Construction for Evidence of Hazardous Waste at Hopper Street
PD-11	Containerize and Test Suspect Soil and Groundwater Prior to Disposal at Hopper Street
PD-12	Inspect and Test for Lead-based Paint and Asbestos Containing Materials (ACM) in any Buildings at 950 Hopper Street that will be demolished
PD-13	Mosquito Prevention
PD-14	Construction Air Quality Controls
PD-15	Permitting and Control of Toxic Air Contaminants
PD-16	Odor Control
PD-17	Construction Noise Mitigation Measures
PD-18	Operational Noise Mitigation Measures
PD-19	Protection of Historic and Archaeological Resources
PD-20	Protection of Previously Undiscovered Historic and Archaeological Resources
PD-21	Landscaping Design
PD-22	Lighting Design
PD-23	Fire Protection

Acquisition of Land and Annexation

The City proposes to purchase 262 acres of land known as Parcels A and B, as shown on Figure 2-4. This land is currently unincorporated, and the City intends to annex the land at an undetermined time in the future. The City will also attempt to purchase an easement or fee title for the connection between the new access road on Parcel A and the cul-de-sac on Cypress Drive.

Discharge

The plant's permitted discharge capacity will be increased from an average dry weather flow of 5.2 mgd to 6.7 mgd.

Demolition of Hopper Street Facility

After the new facility is operational, the Hopper Street plant will be demolished. Future uses of this site are not included in this project and, therefore, requirements for site decommissioning have not been prepared. These can be identified once the City has decided on a future use. The existing pond influent pump station will remain on site.

Oxidation Ponds

Oxidation ponds provide both storage and biological treatment using oxygen supplied primarily from algae. The oxidation ponds also provide significant metals reduction. In the future, the oxidation ponds will primarily store secondary-treated effluent to meet the discharge prohibition and balance the recycled water program. In addition, the oxidation ponds will provide treatment for wet weather peak flow and polishing of the effluent flow for metals during the river discharge season. The storage volume provided by the oxidation ponds is sufficient for effluent management based on the monthly water balance. The berm will be raised from elevation 20 feet to 23.5 feet around the Extended Aeration Basins No. 1, 2 and 3.

Algae Removal

Algae, which is generated in the oxidation ponds as part of the treatment process, will need to be removed in order to meet discharge and reuse requirements. Algae removal can be provided by either a wetlands treatment system or dissolved air flotation (DAF) thickeners. These two options for algae removal were evaluated as subalternatives in the project report and the predesign report. The wetlands alternative was selected as the preferred alternative. The DAF alternative is discussed in the Alternatives section – Chapter 5.

Wetlands can be designed to remove algae if dense vegetation is provided. The densely vegetated treatment wetlands system would consist of approximately 25 to 30 acres in the existing oxidation Ponds No. 9 and 10 (see Figure 2-4). These ponds will contain secondary-treated water that has not been disinfected, and they will not be open for general public access. This wetlands system is not to be confused with the polishing wetlands proposed on Parcels A and B.

Solids Handling

Solids handling provides for treatment and handling of the solids generated in secondary treatment (waste-activated sludge). The solids treatment will include thickening, aerobic digestion, and dewatering. Thickening of the solids will reduce the size of digestion facilities and improve the process stability. Digestion provides a reduction in volatile solids content of the sludge and therefore a reduction in the odors from solids storage. Aerobic digestion will be in a three-stage process with the first stage in a concrete tank and the following two stages in lined, earthen lagoons. Dewatering provides for removal of water from the sludge prior to hauling off-site for reuse or disposal. All solids handling facilities will be located in Pond No. 4, as shown in Figure 2-4. Odor control facilities will be provided for the thickening and dewatering facilities.

<u>Anaerobic digestion is an alternative to aerobic digestion. Anaerobic digestion facilities would consist of three covered tanks: two 15 ft. in diameter and one 55 ft. in diameter. A digester control building will be included. Digester gas produced in the process would be used in boilers to heat the sludge. The process</u>

has the following advantages: solids quantity for disposal is reduced 35 percent, odors are completely contained, and energy usage and operating costs are reduced by 80 percent. Anaerobic digestion facilities will be located in Pond No. 4 in the same location as the aerobic digesters.

Tertiary Filtration

Tertiary treatment includes chemical and physical treatment, i.e. filtration, to remove solids or organics remaining after secondary treatment. The goal of the

Figure 2-4 for the location of the reservoirs. A recycled water pump station will be located adjacent to the reservoir.

Administration Buildings

Three new buildings for administration, operation, maintenance and the laboratory will be included in the project. The area around them will include landscaping and demonstration gardens. See Figure 2-6 for the conceptual landscape plans. Landscaping includes revegetation of the existing poplar trees with columnar maple or a similar species; the poplars currently serve as a visual buffer between Lakeville Highway and the oxidation ponds. A drinking water pipeline will be brought out to the Project site for the new administration and operations buildings and for public access features (i.e., restrooms) at the polishing wetlands. The pipeline will be laid along the shoulder of the new access road from the business park, across Parcel A and will hang under the bridge across Ellis Creek into the plant site. Administration Building #2 may be postponed to a future phase.

Polishing Wetlands

Up to 45 acres of land adjacent to the existing oxidation ponds (Parcels A and B), as shown on Figure 2-4, will be developed into polishing wetlands. These wetlands will treat disinfected secondary effluent and will be open for public access and education. The polishing wetlands will provide further reduction of metals, nutrients and organics. The effluent from the polishing wetlands will be returned to the plant site for reuse or discharge. The polishing wetlands will be constructed above the 7-foot elevation to avoid any impacts to existing jurisdictional wetlands in addition to being above the 100-year floodplain zone. Signage will be included around the polishing wetlands to meet Title 22 requirements. Facilities on Parcel A and B will provide a buffer between the existing business park and the Water Recycling Facility.

The polishing wetlands will have public education, recreation and landscape features, as shown in Figure 2-4, including:

- Trees planted along new access road and outer wetland cell berms to provide buffer.
- Agricultural fields between wetland cell berms and the business park as habitat with host plants for butterflies.
- Trails around the polishing wetlands, trails along the existing berms down to the old communications building and trails to the Petaluma River on existing road ways and trails.
- A trail link to Shollenberger Park with native plantings along the trail.

Site Access

Currently, there are two entrances into the Lakeville site from Lakeville Highway (State Route 116): east gate and west gate. Due to the speed and volume of traffic on Lakeville Highway, the site will require improved site access and includes the following:

- A new access road through the Oakmead/Northbay Business Park. A new road will be built from the cul-de-sac off Cypress Drive and proceed across Parcels A and B to the polishing wetlands and then the treatment plant. This access will be primarily for staff and public. The road will require a bridge across Ellis Creek near Pond No. 1, as shown in Figure 2-4. The bank on the east side of Ellis Creek is lower than the west side. The construction of the bridge will involve fill on the east side of the bank up to elevation 23.5 feet. The fill will extend from the existing road at the west corner of Pond No. 1 to the perimeter of the stream bank. There will be a 3:1 slope at the edges of the fill covered with rip-rap and other erosion protection features.

- Improvements to the existing east gate entrance. A right-turn lane will be added to Lakeville Highway, for east-bound right turns into the site, and an acceleration lane will be added for right turns out of the site, for east-bound traffic. Left turns out of the site at the east gate ~~would~~ may be improved with the addition of a left turn bay. The eastbound turn lane will require drainage improvements within the right-of-way, and a retaining wall relocated to the edge of the right-of-way.

- In-plant road improvements. Two in-plant roadways will be improved for the project. The east road section will be increased to handle truck traffic. The north road will be widened and the road section improved to provide a safer roadway for daily use. The north road improvements will also include a box culvert across the drainage swale to connect the west and east side of the plant.

- Construction safety. The City will use flagmen or temporary traffic signals on Lakeville Highway, when necessary.

Staging Area and Construction Zones

There will be a fenced staging area located on Parcel A adjacent to the farmhouse. The staging area will be approximately 15 acres and will have a 100-foot setback from Ellis Creek. There will be temporary construction zones established around the following construction areas:

- North access road improvements. There will be a 10 foot wide temporary construction zone on the northern side of the existing road.

- A temporary construction zone will be established around the polishing wetlands and access road.

Construction and Operation Schedule

Construction is expected to start in late 2003 with operation in early 2007.

Cost

The Water Recycling Facility cost is estimated at $85.1 million. Annual operating costs are estimated at $4.9 million.[1]

River Access Improvements

The river access improvements are designed in concept, as shown in Figure 2-7, however project level design has not yet occurred. These improvements are therefore evaluated at a conceptual or program level. Some of these improvements may be postponed to a future phase.

- Restoration on Ellis Creek and creation of habitat including (the numbers in parentheses correspond to the legend on Figure 2-7):

  - Creation of seasonal ponds (for red-legged frogs) (7).

  - Planting of riparian vegetation species.

  - Development of more diverse creek structure: riffles, runs, pools, or sinuosity (meanders).

  - Creation / placement of in-stream habitat features, e.g. woody debris, overhanging cover, or drop structures/plunge pools.

  - Biotechnical bank stabilization projects.

- Two pedestrian bridges; each approximately a 100-foot span to bridge the levee breaches along the Petaluma River (20).

- A dock on the Petaluma River, near the bridges, to accommodate boat access (approximately 5 ft wide by 50 ft. west into the River and 75 ft long south along the River) (21).

- Levee stabilization is proposed along the Petaluma River on Parcel B to prevent further erosion and widening of the levee breaches (18).

- Retrofit four existing concrete structures (old radar antenna structures) located in tidal mudflats to provide wildlife habitat/use (24).

- A retrofit of the existing abandoned naval radio building to provide public viewing access to the existing tidal wetlands (22).

[1] Construction costs are based on December 2004 dollars (mid-pt. of construction) using a San Francisco ENR Construction cost index of 7925. Costs include engineering, legal, administration, and construction contingency. Costs do not include Hopper Street Plant demolition, land acquisition, levee stabilization, easements, or right of way. Operation and maintenance estimate includes equipment replacement, chemical use, power, labor, solids handling, and wetlands maintenance based on December 2004 dollars.

Table 3-2

Mitigation Monitoring Checklist

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
Measures Included in the Project				
PD-1 Uniform Relocation Assistance	City of Petaluma	City of Petaluma		
PD-2 Purchase Locally Grown or Inspected Plants	Design Engineer	City of Petaluma		
PD-3 Liquefaction Protection	Design Engineer	City of Petaluma		
PD-4 Seismic Design to Resist Ground Shaking	Design Engineer	City of Petaluma		
PD-5 Standard Engineering Methods for Expansive Soils	Design Engineer	City of Petaluma		
PD-6 Standard Engineering Methods for Corrosive Soils	Design Engineer	City of Petaluma		
PD-7 Groundwater Monitoring and Management	City of Petaluma	City of Petaluma		
PD-8 ~~Construction~~ Erosion, Stormwater Runoff, and Spill Control Measures	Construction Manager and Design Engineer	City of Petaluma & San Francisco Bay RWCB		
PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons	City of Petaluma	City of Petaluma		
PD-10 Monitor Soil and Groundwater During Demolition/ Construction for Evidence of Hazardous Waste at Hopper Street	Construction Manager	City of Petaluma		
PD-11 Test Suspected and Properly Dispose of Soils and Groundwater at Hopper Street	City of Petaluma	City of Petaluma		

PD-8 ~~Construction~~ Erosion, Stormwater Runoff, and Spill Control Measures

Description: The City shall develop and implement measures designed to prevent significant ~~construction~~ impacts to water quality. Examples of possible measures include ~~revegetation of temporarily disturbed sites, development and implementation of a Storm Water Pollution Prevention Plan, protection of waterways from toxic discharge, and concrete waste management.~~ the following:

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
Temporary Soil Stabilization	
SS-1	Scheduling
SS-2	Preservation of Existing Vegetation
SS-3	Hydraulic Mulch
SS-4	Hydroseeding
SS-5	Soil Binders
SS-6	Straw Mulch
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats
SS-8	Wood Mulching
SS-9	Earth Dikes/Drainage Swales & Ditches
SS-10	Outlet Protection/Velocity Dissipation Devices
SS-11	Slope Drains
Temporary Soil Stabilization	
SC-1	Silt Fence
SC-2	Desilting Basin
SC-3	Sediment Trap
SC-4	Check Dam
SC-5	Fiber Rolls
SC-6	Gravel Bag Berm
SC-7	Street Sweeping and Vacuuming
SC-8	Sandbag Barrier
SC-9	Straw Bale Barrier
SC-10	Storm Drain Inlet Protection
Wind Erosion Control	
WE-1	Wind Erosion Control
Tracking Control	
TC-1	Stabilized Construction Entrance/Exit

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash
Non-Storm Water Management	
NS-1	Water Conservation Practices
NS-2	Dewatering Operations
NS-3	Paving and Grinding Operations
NS-4	Temporary Stream Crossing
NS-5	Clear Water Diversion
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting
NS-7	Potable Water/Irrigation
NS-8	Vehicle and Equipment Cleaning
NS-9	Vehicle and Equipment Fueling
NS-10	Vehicle and Equipment Maintenance
Waste Management and Materials Pollution Control	
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Source: Caltrans 2000.

In addition, stormwater runoff from the existing oxidation pond site shall be diverted into the wastewater treatment system. Stormwater runoff from the visitors parking lot on Parcel A shall be treated either by diversion into the wastewater treatment system or installation of an oil and grease separator at the bottom of the lot.

Construction within the Petaluma River or the lower portions of Ellis Creek shall be performed from a barge and with divers when appropriate. Excavation underwater shall be done with pressurized water.

Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Construction Manager and Design Engineer
Timing:	**Start**: Prior to start of construction
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma and San Francisco Bay Regional Water Quality Control Board
Validation:	Storm Water Pollution Prevention Plan

PD-19 Protection of Historic and Archaeological Resources

Description: In order to preserve cultural resources, the City shall perform subsurface testing, evaluation for significance, and/or recordation for the ~~three~~four sites, when avoidance is not feasible. The Hopper Street facility, the communication facility, Site C-757 (to the extent it is located on City property), and the farm complex on Lakeville Highway shall be recorded, mapped, and photographed by a qualified professional architectural historian to Department of Parks and Recreation (DPR) standards on current DPR 523 series forms. The Hopper Street facility shall be evaluated for significance to the NRHP. All site records and evaluation documentation shall be submitted to the State Historic Preservation Office for Section 106 compliance prior to any construction activities on the site.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Completion: Prior to construction

Monitoring Agency: City of Petaluma

Validation: Recordation for the ~~three~~ four sites

that the primary use of the land may create agricultural "nuisance" situations, such as flies, noise, odors, and spraying of chemicals.

AR-4c: Protect agricultural operations by establishing a buffer between the agricultural land use and the residential use at the urban fringe adjacent to an agricultural land use category. Buffers shall generally be defined as a physical separation of 100 to 200 feet and/or may be a topographic feature, a substantial tree stand, water course or similar feature. In some circumstances a landscaped berm may provide the buffer. The buffer shall occur on the parcel for which a permit is sought and shall favor protection of the maximum amount of farmable land.

AR-4d: Apply the provisions of the "Right to Farm" Ordinance to all lands designated within agricultural land use categories.

California Department of Conservation

The California Department of Conservation's Farmland Mapping and Monitoring Program produces maps and statistical data used for analyzing impacts on California's agricultural resources (California Department of Conservation, 1992). The agricultural lands in California are categorized by soil quality and irrigation status, then depicted on a map by symbol. The agricultural categories range from Prime Farmland (the best) to Grazing Land.

Although the local agencies do not differentiate between different *types* of agricultural land and feel that loss of any agricultural land is significant, the California Mapping and Monitoring Program does categorize the lands. Appendix G of the CEQA Guidelines states that a significant impact would occur if Prime Farmland were converted to a nonagricultural use. The state farmland mapping program designates the oxidation pond site at Lakeville Highway as "D-Urban and Built-up Land", which is defined as land containing man-made structures or the infrastructure required for development (e.g., sewage treatment facilities). Parcels A and B, northwest of the oxidation ponds, are designated "L-Farmland of Local Importance", which is defined as land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. Specifically, this designation includes the hay producing areas of the Petaluma Valley.

Resource Conservation Service Soil Capability Classification

<u>Soils on Parcel A are primarily Clear Lake clay; soils on Parcel B are primarily Reyes silty clay. Clear Lake clay is a Class II productivity soil and Reyes silty clay is Class IV.</u>

Capability Unit IIs-5 (CeA - Clear Lake clay)

In this unit are soils of the Clear Lake series and the land type "Alluvial land, clayey". Some of these soils are moderately well drained and others are drained and on the edge of basins. Slopes are drained and on the edge of basins. Slopes generally are less than 2 percent, but along the edge of the larger basins they are less than 1 percent. The surface layer is clay loam to silty clay, and wide cracks form as it dries. The Clear Lake soils are more than 60 inches deep. They have thick layers of fine gravel at a depth below 20 to 40 inches in places.

The total available water capacity varies in Alluvial land, clayey, and is 8 to 10 inches in Clear Lake soils. Infiltration is rapid, and moisture is absorbed rapidly until the cracks in the surface close; after that infiltration is slow or very slow. Fertility varies.

The soils and land type in this unit are better suited to field and forage crops and to certain row crops than to other crops. They are also suited to prunes, pears, and grapes.

Alluvial land, clayey, and Clear Lake soils are slow to warm in spring. Crops on them generally respond to nitrogen fertilizer. Preparing a seedbed is difficult because hard clods form unless the soils are worked at the right moisture content. Returning all crop residue to the soil helps to improve tilth and structure.

Capability Unit IVw-9 (RmA – Reyes silty clay)

Reyes silty clay, 0 to 2 percent slopes, is the only soil in this unit. This poorly drained soils is in low areas, where the surface is undulating and irregular. Generally layers of peat that range from thin to thick occur throughout the profile. In places small stringers or organic material extend from the surface to a depth of several feet. Erosion is not a hazard.

Reaction in the lower layers of this soil and in unreclaimed areas is pH 4 to 5.5. In places where the soil is drained and reclaimed and the soil is cultivated and allowed to dry and oxidize, reaction is pH 3.5 to 5.0. Some salt is in the soil in places, but fresh water from winter rains reduces or neutralizes the harmful effects of excess salt. Fertility is moderate. Runoff and permeability are slow. The water table generally is within a few feet of the surface.

This soils is suited only to small grains and forage plants that tolerate salts and acidity. The chief crop generally is oats grown for hay, though occasionally the oats are threshed for grain. This soil is fairly well suited to narrow-leaf trefoil. Growth of safflower is fair.

If this soil is drained, care is needed to reduce the water table only to the minimum depth suitable for shallow-rooted crops. This soil is difficult to rewet once it dries.

Williamson Act (Land Conservation Act of 1965)

Some of the agricultural lands in Sonoma County are contracted under the Williamson Act. The contracts lower property taxes on lands that are kept in agricultural use. The property owner enters into an agreement with the county or city and pledges to restrict a determined amount of land to agricultural use only. In return, the county or city agrees to assess the price of the restricted land based on the actual use instead of its potential value assuming full development. This lowers the property tax amount considerably.

To be eligible, the land in question must be: "designated by a city or county as agricultural preserve, scenic highway corridor, or wildlife habitat area, or it must be

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Total Chlordanes	µg/L	6.1E-05	1.9E-04	3.4E-04	5.4E-05	2.7E-04	7.8E-04						
Total DDTs	µg/L	2.4E-04	6.6E-04	2.4E-03	7.5E-04	1.2E-03	6.8E-03						
Diazinon	µg/L	1.0E-06	4.4E-03	3.1E-02	1.0E-06	6.1E-03	1.4E-02						
Dieldrin	µg/L	1.0E-06	8.0E-05	2.4E-04	1.0E-06	6.4E-05	1.6E-04						
PCBs	µg/L	1.4E-04	3.7E-04	1.5E-03	1.7E-04	4.7E-04	1.4E-03						
PAHs	µg/L	0.0065	0.033	0.090	0.030	0.080	0.505						
Mercury (TR)	µg/L	0.004	~~0.009~~ 0.010	~~0.0470~~ 0.0881	0.013	0.046	0.126				0.0089	0.0142	0.018
Mercury (D)	µg/L	0.000	0.001	0.003	0.001	0.002	0.035						
Selenium (TR)	µg/L	~~0.113~~ 0.089	0.170	0.330	0.060	0.225	0.410						
Selenium (D)	µg/L	0.100	0.150	0.240	0.104	0.171	0.310						
Arsenic (TR)	µµg/L	0.003	~~0.010~~ 0.014	0.058	0.012	0.045	0.140						
Arsenic (D)	µg/L	1.190	~~1.430~~ 1.420	~~1.950~~ 2.33	1.830	2.240	3.280						
Cadmium (TR)	µg/L	0.026	0.040	0.098	0.049	0.092	0.170						

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Cadmium (D)	µg/L	0.010	0.029	0.092	0.010	0.045	0.100						
Chromium (TR)	µg/L	2.580	4.50	~~24.83~~ 40.7	4.570	39.59	55.96						
Chromium (D)	µg/L	0.110	~~0.195~~ 0.190	2.470	0.130	0.310	8.790						
Copper (TR)	µg/L	2.200	~~4.100~~ 4.787	~~10.04~~ 14.3	2.860	11.04	20.75				5.27	7.6	11.5
Copper (D)	µg/L	1.200	1.550	2.540	2.200	3.349	4.770				2.14	5	10.6
Lead (TR)	µg/L	0.300	~~1.480~~ 2.08	~~4.410~~ 6.46	1.190	4.800	7.380						
Lead (D)	µg/L	0.002	~~0.021~~ 0.017	0.253	0.007	0.015	0.991						
Nickel (TR)	µg/L	2.600	~~6.300~~ 7.32	~~22.90~~ 30.35	5.600	28.58	41.30				10.2	16.9	24.5
Nickel (D)	µg/L	1.000	~~1.630~~ 1.57	3.730	1.700	6.505	37.40				5.06	11.6	26.8
Silver (TR)	µg/L	0.003	~~0.010~~ 0.014	~~0.058~~ 0.059	0.012	0.045	0.140						
Silver (D)	µg/L	0.001	0.002	~~0.004~~ 0.005	0.001	0.003	0.012						

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Zinc (TR)	µg/L	2.330	~~7.400~~ 10.55	~~19.67~~ 35.0	6.720	27.31	46.36						
Zinc (D)	µg/L	0.200	~~0.649~~ 0.594	1.30	0.200	0.579	8.40						
Ammonia	mg/L as N	0.0	~~0.03~~ 0.06	0.13	~~0.00~~ 0.02	~~0.05~~ 0.11	~~0.26~~ 0.42	0.1	0.73	1.9	0.3	0.675	1.1
Un-ionized ammonia	mg/L as N							0.0004	0.003	0.0072	0.002	0.00575	0.011
NO_3	mg/L as N										0.9	1.2	1.5
NO_2	mg/L as N										0.07	0.10	0.16
PO_4	mg/L as P										0.8	1.0	1.4
TSS	mg/L	7.2	~~34.2~~ 62.7	~~148.4~~ 242	32.0	~~217~~ 211	414				28	60	120
Temperature	°C	10.3	~~12.7~~ 12.9	~~16.0~~ 18.0	11.4	14.4	22.5	6.1	12.4	19	12.8	15.4	19
pH	--	7.5	7.8	8.3	7.1	7.8	9.0	7	7.4	7.6	7.2	7.5	7.8
Salinity	Ppt	0.5	~~6.6~~ 8.1	22.9	0.3	5.3	22.3	0.2	10.8	38.0	0.7	5.6	15.4

Table 4.5-1

Receiving Water Quality

Constituent	Units	San Pablo Bay (BD20)			Petaluma River (BD15)			Petaluma River at Outfall (Self Monitoring C2B			Petaluma River at Outfall (Special study)		
		Min	Median	Max	Min	Median	Max	Min	Mean	Max	Min	Mean	Max
Conductivity	µmhos/cm							338	16,800	59,400			
Hardness	mg/L							86	1661	4720	310	838	0160
DO	mg/L	0.8	9.5	10.6	1.4	~~8.1~~ 8.4	10.2	5.0	7.2	9.4			
Chl-a	µg/L	0.6	6.9	32.5	2.2	11.3	106.3	0.4	10.5	45.7	<5	28.8	120
Turbidity	NTU							24.8	95.1	220			
Secchi depth	inches							1	7.2	12.5			
Total coliform bacteria								22	797 (median = 500)	>1600			

Table 4.5-2

Existing Effluent Quality[a] (October-May, 1997-2001)
(all values in µg/L unless noted)

Constituent	# samples	Min or Detection Limit	Median or 30-day Average	Instantaneous Max	Lowest of CTR[b] or Basin Plan Criteria
Conventional Constituents					
Ammonia-N (mg/L)	26	1.6	8.7	17	NA
Un-ionized ammonia-N (mg/L)	25	0.0085	0.030	0.15	0.025 (median) 0.16 (maximum)
Total Coliform Bacteria (MPN/100 ml)	508	<2	2[c]	>1600	240 (median)[d] 10,000 (maximum)
TSS (mg/L)	332	5	28[c]	77.4	NA
BOD_5 (mg/L)	297	6.6	16.0[c]	40.3	NA
pH	664	6.6	7.4[c]	8.5	≥6.5 and≤8.5
Conductivity (µmhos/cm)	18	307	1,025[c]	1,177	NA
Hardness (mg/L)	26	154	174 median 182 average	250	NA
DO (mg/L)	659	0.6	5.4[c]	0.6 (min)	≥5.0
Oil and Grease (mg/L)	25	2	5.0	14.9	NA
Chl-*a*	24	8.8	220	745	NA
Cyanide	31	<3	<3	17	1.0
Acute Toxicity - minnow (% survival)	26	95	100	100	Median >90% or >70% 10% of the time
Acute Toxicity - stickleback (% survival)	13	40	100	100	Median >90% or >70% 10% of the time
Chronic Toxicity (100/NOEL)	~~4~~ 5	NA	1	~~1~~ 1.2	1
Chlorine residual (#hrs>0)	26	0.0	0.0	4.3	NA
Detected Organic Compounds					
Total dioxin compounds	2	0.000078	0.0000088	0.0000099	NA[e]
1,2,3,4,6,7,8-HeptaCDD (pg/L)	3	ND	2.72 (0.027)[f]	4.6 (0.046)[g]	0.014
OctaCDD (pg/L)	3	ND	16.9 (0.0017)[f]	41 (0.0041)[g]	0.014
1,2,3,4,7,8-HexaCDF (pg/L)	3	ND	ND (0.00)[f]	0.991 (0.099)[g]	0.014
1,2,3,4,6,7,8-HeptaCDF (pg/L)	3	ND	1.5 (0.015)[f]	2.1 (0.021)[g]	0.014
OctaCDF (pg/L)	3	ND	3.77 (0.00038)[f]	5 (0.0005)[g]	0.014
Bis(2-ethylhexyl)phthalate	14	<5	<5	8	5.9

project and is the basis for the water quality impacts evaluation presented here. It was determined that the criteria were met for a simple analysis.

City of Petaluma General Plan

The River Element of the City's General Plan includes the following objective:

River Element Objective

h) Improve the quality of the water in the Petaluma River.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

Table 4.5-4

Evaluation Criteria with Point of Significance – Surface Water Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will the project discharge cause numeric-based criteria to be exceeded?	Concentration	Varies	U.S. EPA (California Toxics Rule) criteria; Basin Plan criteria
2. Will the project discharge cause narrative-based criteria to be exceeded?	Varies	Varies	Basin Plan narrative criteria
3. Will the project ~~construction~~ result in a substantial degradation of surface runoff quality?	Compliance with local and state storm water quality regulations requiring implementation of effective Best Management Practices	Any failure to implement effective, reasonable and appropriate measures	State of California General NPDES Permits for Discharges of Storm Water Associated with Construction and Industrial Activities. CEQA Checklist

Source: Parsons, 2002

Numeric Criteria

Numeric criteria are based on the California Toxics Rule and the Basin Plan. The California Toxics Rule and Basin Plan numeric criteria for the protection of aquatic organisms have both saltwater and fresh water criteria. Since the Petaluma River is estuarine, the lowest of the salt water or freshwater criteria for the protection of aquatic life was used to evaluate impacts (as stipulated in the California Toxics Rule). In addition, organisms in the receiving water will be exposed to wastewater for varying lengths of time. For this reason, the chronic criteria (criterion continuous concentration in the California Toxics Rule and 4-day average criteria in the Basin Plan) were used where available since these are more stringent than acute criteria. The lowest

Analysis: *Toxicity – Less than Significant.* Acute toxicity in Petaluma's effluent is tested for monthly during the discharge season as part of Petaluma's NPDES permit. Since 1997, the median acute toxicity was 100 percent survival for both minnows and sticklebacks. The minimum survival for minnows was 95 percent. The minimum survival for sticklebacks was 40 percent, but that occurred in only one case (8 percent of the time) (personal communication, McCord 2002). The next lowest survival for sticklebacks was 80 percent. Therefore greater than 70 percent survival occurred more than 10 percent of the time. Chronic toxicity was conducted ~~four~~ five times through 2001. In ~~all~~ four of the five tests, 100 percent wastewater produced no observed effect for both larval survival and larval growth tests. However, in 2001 and again in 2002 (2002 data recently received and not reported in Table 4.5-2) chronic toxicity was observed, with 100/NOEL greater than 1. During both these toxicity tests, effluent ammonia concentrations were elevated (10 to 14 mg-N/L during both tests). Although not promulgated for the State of California, the EPA has guidelines for ammonia toxicity that update Basin Plan objectives. The concentrations of ammonia in the chronic toxicity tests exceeded the EPA's recommended chronic criterion for ammonia (fish early life stages present) and are the likely cause of the observed toxicity. However, with implementation of the project, ammonia toxicity is not expected to have a significant impact on the receiving waters for two reasons:

With the particular treatment processes being constructed as part of the project, final effluent discharged to the river is expected to have greatly reduced ammonia concentrations (less that 8 mg-N/L).

The toxicity tests evaluate toxicity in 100 percent wastewater although dilution will occur. Using mass balance calculations (maximum effluent concentration of 8 mg-N/L, median receiving water concentration of 0.11 mg-N/L and maximum percent wastewater of 33.4 percent), the predicted concentration of ammonia in the receiving water is 2.7 mg-N/L. With the usual temperature (13-14 °C) and pH (7.8) conditions in the receiving water, the EPA chronic criterion for ammonia (fish early life stages present) is 3.2 mg-N/L so the discharges to the receiving water are not expected to exhibit ammonia toxicity.

Therefore, the impact of the project on acute and chronic toxicity in the receiving water is expected to be less than significant.

Mitigation: No mitigation is needed.

Analysis: *Turbidity – Less than Significant.* Turbidity in aquatic systems results primarily from suspended sediment and planktonic algae. Therefore, the impact of the project on turbidity is covered under sediment and biostimulation objectives.

Mitigation: No mitigation is needed.

Analysis: *River Access Improvements – No Impact*

These improvements have no discharge component and therefore have no impact

Mitigation: No mitigation is necessary.

IMPACT: WQ-3: Will the project ~~construction~~ result in a substantial degradation of surface runoff quality?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

Construction activities, particularly the proposed polishing wetlands and filtration/disinfection facilities that will be located at the Lakeville Highway site that is near Ellis Creek have the potential to cause discharge of pollutants to waterways through erosion and accidental spills. In addition, replacement of the outfall and levee stabilization has the potential to cause temporary sediment disturbance during construction in the Petaluma River. Runoff from parking lots and streets during operation of the project also has the potential of contributing contaminants to stormwater runoff entering Ellis Creek and the Petaluma River. Measure PD-9, Construction Erosion and Spill Control Measures, adopted as part of this project, requires the City develop and implement measures designed to prevent significant construction and operational impacts to water quality. With implementation of this measure, impacts will be reduced to less than significant.

Mitigation: No mitigation is necessary.

CUMULATIVE IMPACTS

IMPACT: WQ-C1: Will the project have a cumulative potential to cause numeric or narrative-based criteria to be exceeded?

Analysis: *Water Recycling Facility and River Access Improvements - Less than Significant*

rustica), red-winged blackbird (*Agelaius phoeniceus*), savanna sparrow (*Passerculus sandwichensis*), mallard (*Anas platyrhynchos*) with young; and western meadowlark (*Sturnella neglecta*). Three long-billed curlews (*Numenius americanus*) were observed in flight over this community.

Parcel C appears to be plowed and therefore is agricultural. However, marsh is also apparent on the site as determined from 1999 aerial photography.

Table 4.8-1

Plant Community/Wildlife Habitat Relationship System Habitat Type Comparison

Plant Community	Corresponding CWHR Habitat
Agricultural	Cropland
Ornamental Landscape	Eucalyptus
Ruderal/Disturbed	Urban
Coastal Brackish Marsh (including Aquatic)	Saline Emergent Wetland and Aquatic
Black Cottonwood Riparian Forest	Valley Foothill Riparian

Source: Holland (1986); Mayer and Laudenslayer, Jr. (1988)

Coastal Brackish Marsh

Small channels are interspersed throughout the agricultural lands of Parcels A and B and are lined by cattails (*Typha latifolia*) and tules (*Scirpus californicus*). Species observed in these channels included song sparrow, cinnamon teal (*Anas cyanoptera*), and red-winged blackbird. Dominant plant species include saltgrass (*Distichlis spicata*) and alkali heath (*Frankenia salina*) with scattered pickleweed (*Salicornia virginiana*). Several ditches or canals drain the agricultural areas. These are vegetated with annual semaphore grass (*Pleuropogon californicus*), Douglas meadowfoam (*Limnanthes douglasii* ssp. *douglasii*), and in the wettest portions, flowering quillwort (*Lilaea scilloides*). Parcel C may contain marsh habitat. Evidence for the occurrence of this vegetation type was taken from the February 11, 1999 color aerial photograph of the site (Pacific Aerial Surveys 1999).

Ornamental Landscape

This community type is comprised primarily of eucalyptus (*Eucalyptus globulus*) stands, but also contains English ivy (*Hedera helix*) and other ornamental species including Lombardy poplars (*Populus nigra*) on the north side of the existing oxidation ponds. The two principal eucalyptus stands are located along the edge of the business park adjacent to Parcels A and B and along the western edge of the oxidation ponds. Lawn and small ornamental trees are in the area northwest of Parcel A where the new access road will

connect to the cul-de-sac on Cypress Drive. Species observed included red-winged blackbird, California towhee (*Pipilo crissalis*), house finch, European starling (*Sturnus vulgaris*), Anna's hummingbird (*Calypte anna*), and Bullock's oriole (*Icterus bullockii*)

therefore qualifies not only as "waters" but also as "wetlands" since, by definition, wetlands are vegetated. The Corps takes jurisdiction over the OHWM of creeks or drainages that are either navigable waters of the U.S., or tributary to navigable waters. The Petaluma River is a navigable water of the U.S. and Ellis Creek is a tributary to the Petaluma River.

Nonjurisdictional wetland habitats include the vegetated irrigation canals within the plowed hayfields that were excavated on dry land and do not connect to a water of the U.S. Upland habitats consist of annual grasslands and plowed agricultural fields.

Jurisdictional areas are preliminary and subject to review and modification by the regulatory branch of the Corps.

Aquatic Habitat

Information on aquatic habitat and fisheries resources in and near the project site was obtained from sources including the Brown and Caldwell and Jones and Stokes (1995) Revised Draft EIR, the Petaluma General Plan (1997), the Initial Study for this project (Parsons HBA 2001), Moyle et al (1995), Jennings and Hayes (1994), Leidy (1984), USFWS (1998), CNDDB records (2000), Fawcett (2001), and discussions with Bill Cox (CDFG) and Don Hankins (USFWS).

Petaluma River, Marsh and Tributaries

The Petaluma River is a shallow, 18-mile long tidal estuary draining a watershed of approximately 126 square miles. Because of an excessive sediment load from tributaries and surrounding land uses, the river is regularly dredged and intensively managed to maintain channel capacity, provide adequate clearance for commercial and recreational navigation, and limit flooding of urban and rural residential areas. Most of the tributaries are small, seasonal streams draining small, highly modified watersheds. Only two tributaries, Adobe Creek and San Antonio Creek, are presently known to irregularly support runs of anadromous salmonids (personal communication Bill Cox, CDFG and Pete Adams, NMFS; February 2002). However, as a tidal estuary and as part of the San Pablo Bay estuary, the Petaluma River and Marsh support a variety of aquatic species on a regular, seasonal, or occasional basis, including a number of special-status species. In the previous Draft EIR (Brown and Caldwell 1995), 25 fish species found in the Petaluma River are listed, about half of which are natives (Table 3F-1). In recent collections near downtown Petaluma, Fawcett (~~Report in prep~~. Tetra Tech, 2001) found 17 fish species, including three species not listed in the 1995 report.

Ellis Creek, the tributary adjacent to the existing oxidation ponds, is a third-order (i.e., the main stem is connected to at least two smaller branches, each of which is joined by smaller branching tributaries) seasonal stream that has been highly degraded by agricultural activities (dams, diversions, dairy wastes, loss of riparian corridor, erosion) over a long period of time. Most of the main stem dries completely each summer. However, at least one small reach (above the confluence with Higgins Creek) has a mature riparian canopy and maintains water in pools throughout the dry season, and there may be similar remnants on private lands further upstream. Downstream from Lakeville Highway (adjacent to the oxidation ponds), the straightened channel has a well

- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.

- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.

- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.

- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of 2:1 (2 acres of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.

- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. <u>As an appropriate example, best management practices are described in the *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual* (November 2000). Refer to Measure PD-8 for a potential list. These shall be implemented as necessary under the supervision of the construction manager</u>. Detailed specifications shall be incorporated onto bid documents and construction drawings.

- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

Mitigation: **BIO-1b. Rare, Threatened and Endangered Plant Protection Program**

A qualified biologist shall be retained to conduct floristically-based surveys for special-status plants in accordance with the CDFG's "Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities" prior to initiation of construction activities. The purpose of these

surveys will be to locate and identify any special-status plants that may occur in the proposed construction zone.

If special-status plants are located during the surveys, exclusionary buffer zones (recommend a minimum 30-foot buffer, where feasible) shall be established around each population site. Mesh fencing shall be installed at the boundary of the exclusionary buffer zone prior to initiation of construction activities.

Table 4.8-6

Project Impacts to Sensitive Habitats (Acres)

Structure or Activity	Riparian Forest		Marsh and Aquatic (Wetlands and Waters of the U.S.)[1]		Cropland	
	Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Water Recycling Facility						
Ellis Creek Bridge	0.19	0.13	0.03	0.02	0	0
Fill at headworks	0	0	0	0.1	0	0
North road, including culvert	0	0	0.2	0.2	0	0
East road	0	0	0.3	~~0.~~ 0.20	0	0
Wastewater pipelines	0.03	0	1.6	0	2	0
Polishing wetlands, access roads and parking lot	0	0	0	0	25	45
Roads and trails to the Petaluma River	0	0	0	0	0	0
Construction staging areas	0	0	0	0	15	0
Outfall	0	0	0.8	0	0	0
Subtotal	0.22	0.13	2.93	~~0.32~~ 0.52	42	45
River Access Improvements						
Restoration of Ellis Creek and creation of habitat	0.03	0	1.0	0	0	1.0
2 docks	0	0	0	<0.01	0	0
Levee stabilization	0	0	0	.15	0	0
Retrofit radar antenna structures	0	0	0	.04	0	0
Boardwalk trail to Ellis Creek	0	0	0	<0.01	0	0
Subtotal	0.03	0	1.00	0.21	0	1.0
Total	**0.25**	**0.13**	**3.93**	**~~0..53~~0.73**	**42**	**46**

Source: Parsons 2002

[1] Please note that the Marsh and Aquatic Habitat columns include waters of the U.S. which are not vegetated and in some cases are not included in impact calculations or mitigation requirements.

Permanent loss of wildlife habitat is very small and does not meet the threshold of significance set at 10 percent of the habitat in the region. Therefore, impacts are found to be less than significant. In addition, the wildlife habitat currently provided by agriculture will be replaced with wildlife habitat provided by wetlands. These wetlands will continue to support nesting and foraging activities of wildlife populations.

Mitigation: No mitigation is necessary.

IMPACT: BIO-4: Will the project cause a permanent loss of sensitive native plant communities?

Analysis: *Water Recycling Facility and River Access Improvements - Significant*

Sensitive riparian habitat (including intermittent aquatic habitat) occurs at the site of the proposed Ellis Creek Bridge; project impacts are 0.25 acres of temporary and 0.13 acres of permanent disturbance. The site also includes several different kinds of marsh, wetlands, and aquatic habitats; project impacts are 3.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent fill or disturbance. See Impact BIO-7 for a discussion of wetland impacts.

Mitigation: **BIO-4: Prepare a Riparian Census and Conceptual Riparian Mitigation Plan**

A qualified biologist shall conduct a census of all riparian woody vegetation from the top-of-bank and/or drip-line of the tree or shrub canopy within the project area of the proposed Ellis Creek bridge and approaches. The census will take place within the staked and flagged areas of the site where ground disturbance will take place. The census will include identification of riparian tree and shrub species, counts of stems, and diameter at breast height for those stems greater than 24-inches in diameter within the construction footprint. The City will prepare a Riparian Mitigation and Monitoring Plan to include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. The plan will be written in sufficient detail for a CDFG 1603 Streambed Alteration Agreement. Mitigation will be on site, if possible, at a ratio of 2:1, namely 2 acres of riparian forest for every acre impacted by the construction of the proposed Ellis Creek Bridge. Mitigation sites will be preserved in perpetuity.

After Mitigation: *Less than Significant*

Replacement of lost riparian vegetation on site will reduce the impacts of the project on sensitive riparian wildlife habitat to less than significant. Land is available within the project area for compensatory creation of riparian habitats.

Analysis: *River Access Improvements – Significant*

Docks proposed in the Petaluma River and Ellis Creek will permanently effect approximately 75 feet and 10 feet of streambed respectively. A permanent loss of aquatic habitat will occur in the Petaluma River from levee stabilization over approximately 1,300 linear feet.

Mitigation: **BIO-1a**. **Aquatic Species Protection Program**

After Mitigation: *Less than Significant*

Mitigation Measure BIO-1a will require avoidance of impacts to aquatic habitat where feasible, and compensation for any loss if necessary. Compensation will consist of restoration or creation of habitat on site in kind at a ratio of 2:1 or at the ratio prescribed by the Corps of Engineers. This will reduce impacts to aquatic habitats to less than significant. Land is available within the project area or at Shollenberger Park for compensatory creation of riparian, wetlands or river habitats.

IMPACT: BIO-7: Will the Project destroy wetlands or other waters of the U.S.?

Analysis: *Water Recycling Facility - Significant*

The Water Recycling Facility will cause up to 2.93 acres of temporary and ~~0.32~~ 0.52 acres of permanent fill or disturbance to jurisdictional wetlands or waters of the U.S. Even though the project will create polishing wetlands that will be used as habitat, the wetlands will be managed for wastewater treatment as well as habitat, and therefore will not qualify as mitigation for lost wetlands.

Analysis: *River Access Improvements – Significant*

The River Access Improvements will cause up to 1.0 acre of temporary and 0.21 acres of permanent fill or disturbance to wetlands or waters or the U.S.

Mitigation: **BIO-7. Create or Restore Wetlands and Waters of the U.S.**

The City shall prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. The Plan shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. Mitigation will be on site and in kind, if possible.

Compensatory mitigation for permanent impacts shall be provided at a ratio of 2:1, that is, 2 acres of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers.

After Mitigation: *Less than Significant*

The Conceptual Wetland Mitigation and Monitoring Plan will provide for revegetation of temporary impacts and compensatory mitigation of permanent impacts, thereby reducing impacts to a less-than-significant level. Land is

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4.9 TRANSPORTATION AND CIRCULATION

This section identifies potential project impacts to transportation and circulation during project and cumulative conditions. Analysis includes evaluation of intersections adjacent to the project site and project entrances, safety issues, and potential impacts during construction.

SETTING

The Lakeville site is located on Lakeville Highway, State Route 116, in Petaluma, California. Lakeville Highway extends from ~~is an 11-mile highway connecting State Route 37 to~~ Highway 101 in Sonoma County to the southeast, where it becomes Lakeville Road before joining Highway 37. Lakeville Highway is a 2-lane highway with a speed limit of 55 mph that widens to a 4-lane highway west of Pine View Way reducing the speed limit to 45 mph. Lakeville Highway is a designated truck route where trucks constitute 8.9% of traffic volumes.

The Lakeville site has two existing entrances along Lakeville Highway, the West Gate and the East Gate as illustrated in Figure 4.9-1. At the West Gate, the entrance is 12 feet wide at the gate and 110 feet wide where the entrance meets Lakeville Highway. The sight distance along Lakeville Highway to the west is 565 feet and to the east is unlimited. The East Gate entrance is 13.5 feet wide at the gate and 80 feet wide where the entrance meets Lakeville Highway.

Along Lakeville Highway, a total of 20 accidents were reported near the project site within a three-year period according to Caltrans' records, as cited in Traffic Master Plan Draft Report for the Water Recycling Facility Project (see Appendix D). Many of these accidents were caused from the drivers' failure to yield at unsignalized intersections.

The three unsignalized study intersections analyzed for this project are as follows:

- Lakeville Highway and McDowell Boulevard
- Lakeville Highway and Pine View Way
- Lakeville Highway and Browns Lane

The level of service for these intersections was analyzed using the Highway Capacity Manual (HCM) 2000 Methodology. Level of service (LOS) is both a quantitative and qualitative description of an intersection's operation, ranging from LOS A, or free-flow conditions, to LOS F, or highly congested conditions. LOS B and C signify stable conditions with acceptable delays. LOS D is typically considered acceptable for peak hour in urban areas. LOS E is approaching capacity. The correlation between average stopped vehicular delay and level of service for signalized and unsignalized intersections are shown in Table 4.9-1. For unsignalized intersections, the HCM methodology rates the level of service on the movement with the highest delay at the intersection. The lane geometry for each of these intersections is on Figure 4.9-2.

approximately 30 feet long will be used for various construction activities. The truck with the attached trailer will have a turning radius of approximately 55 feet and the single unit truck will have a turning radius less than 50 feet. No improvements are proposed at the West Gate. However, the existing East Gate entrance into the site will be improved to handle truck access. Trucks traveling inbound to the construction site will travel on US 101 and junction eastbound onto Lakeville Highway and turn right into the East Gate. The hours of construction are anticipated to be from 7 AM to 6 PM with most activities from 8 AM to 5 PM.

A construction staging area is proposed on Parcel A. Typical equipment such as graders, compactors, excavators, cranes, forklifts, trucks, concrete mix trucks, and other specialty vehicles will be stored at the construction staging area or on-site. Parking for construction workers will also be at the staging area or on-site. No parking will be allowed on Lakeville highway.

Project Conditions

Due to the amount of traffic on Lakeville Highway during the commute periods, the expansion of the Lakeville site requires a new site access road from the adjacent Oakmead/Northbay Business Park. The new access road runs across Parcels A and B and will be the primary access for staff and the public. It includes a bridge across Ellis Creek. Chemical deliveries and sludge hauling trucks would continue to enter through the existing East Gate.

In addition, the following improvements are proposed:

- Lakeville Highway will be widened to accommodate a new acceleration and deceleration lane
- The East Gate will allow right ~~and~~ left turn in and out; <u>a left turn bay may be added</u>
- The West Gate will allow right turn in and out
- A frontage road inside the facility will connect the two gates

Project traffic volumes are identified in Table 4.9-4. A total of 28 trucks per month from May – October and 35 trucks per month from November – April will be used for the new expansion. Visitor traffic is estimated to be up to 100 vehicles or 200 trips per day.

Prehistoric site (C-757 is located on Parcel C adjacent to the south access road along the border of the oxidation ponds and may still exist subsurface on the oxidation pond property.

The communication facility on Parcel B maintains integrity of location, design and setting, however, the materials and workmanship, as well as the association, that conveyed the feeling of a communication facility have been removed. Whilethe location and structure itself are still distinguishable, the site lacks the overall integrity to warrant listing on the National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR).

The farmhouse located on Parcel A does not appear eligible for listing in the NRHP or the CRHR as it is not associated with the lives of persons significant in our past (criteria b and 2 respectively), does not embody the distinctive characteristics of a type, period, or method of construction (criteria c and 3), and is not likely to yield information important to prehistory or history (criteria d and 4). Although the farm complex is associated with a significant period in Petaluma's history (e.g., poultry ranching) it is not the last remaining or best preserved example of this history and therefore is not likely to be eligible under criteria a and 1 of the NRHP and CRHR respectively. However, although development has begun to encroach within the vicinity of the farmhouse, the setting remains primarily that of a rural/agricultural landscape with little apparent alteration to the immediate viewshed. Lakeville Highway remains a two-lane transportation route and the views both to the north (foothills), and to the south (pasture/wetlands) have changed little since the farmhouse was constructed. The farmhouse, outbuildings and landscaping contained within the one-acre parcel are associated with the life of a well-known local citizen, and continue to retain a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association with the historic rural/agricultural character of Petaluma and Sonoma County. Therefore, although the dwelling is not eligible to the federal and state registers, the one-acre site constitutes a cultural landscape with ties to the agricultural heritage of the local community. Destruction or removal of the farmhouse and its immediate setting would contribute to the cumulative loss of character and charm that has historically been a trademark of Petaluma.

As part of the project description, the City will implement PD-19, Protection of Historic and Archaeological Resources, in order to mitigate the potential impacts. The preferred mitigation to preserve cultural resources is avoidance of the sites. If avoidance is not a feasible alternative, subsurface testing, evaluation for significance, and/or recordation will be completed for the Hopper Street facility, the communication facility, and the farm complex on Lakeville Highway.

Mitigation: No mitigation is necessary.

IMPACT: CR-2: Will the Project disturb unknown archaeological resources?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The results of archival research indicates that there is a moderate likelihood of encountering subsurface archaeological resources within Parcels A and B. This impact is potentially significant. With the implementation of PD-20, Protection of Previously Undiscovered Historic and Archaeological Resources, work shall

IMPACTS AND MITIGATION MEASURES

IMPACT: VR-1: Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?

Analysis: *Water Recycling Facility and River Access Improvements – No Impact*

Neither the Lakeville site nor the Hopper Street site are within a designated Community Separator, and therefore do not have any impact upon the implementation of these General Plan policies.

Mitigation: No mitigation is necessary.

IMPACT: VR-2: Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?

Analysis: *Water Recycling Facility and River Access Improvements – No Impact*

The nearest scenic landscape unit identified by Sonoma County is the hills south of Petaluma, and the Open Space Element contains policies for protecting those views. The project is not located in the hills and, as stated above, is at ground level, with relatively low structures. Thus, no views of either major or minor scenic landscape units are impacted.

Mitigation: No mitigation is necessary.

IMPACT: VR-3: Will the project be inconsistent with the Sonoma County Open Space Element or Petaluma General Plan regarding Scenic Corridors?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

Both the City and County designate Lakeville Highway as a Scenic Corridor, and travelers along the highway currently have high-quality views of agricultural lands. The existing facilities are currently obscured to southeast-bound travelers due to the lower elevation of the roadway relative to the site, and dense stands of eucalyptus and poplar trees. The new facilities will be partially visible from portions of Lakeville Highway, see Figure 4.13-7 for the visual simulation of the administration buildings. <u>If Administrative Building #2 is delayed, the Solids Handling Building in Pond #4 may be visible at approximately the same height as the Administration Building. Aerobic or anaerobic digestion tanks, also in Pond #4 would be obscured by the Solids Handling Building.</u> For northwest-bound travelers, the existing facilities are visible due to the elevation of the road above the surrounding lands, and the absence of dense screening vegetation on the southern side of the site. The existing oxidation ponds and buildings are industrial-type structures set within a relatively intact agricultural landscape. Construction of the new facilities at the Lakeville site will add additional structures and the constructed wetlands on Parcels A and B would convert current agricultural lands to wetlands. Fencing and road improvements associated with

the wetlands could reduce the visual quality of views along Lakeville Highway. See Figure 4.13-8 for the visual simulation of the polishing wetlands.

Measure PD-~~19~~ 21, Landscaping Design, adopted as part of this project will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway.

Because the farmhouse will be retained in approximately the same condition as existing, the project has no impact upon views of the structure and surroundings.

Mitigation: No mitigation is necessary.

IMPACT: VR-4: Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?

Analysis: *Water Recycling Facility and River Access Improvements – No Impact*

The Sonoma County General plan has a policy requiring a 200-foot minimum building setback from the center of the highway for structures along Sonoma County-designated scenic corridors. The project plan specifies a 200-foot landscaped buffer for the facilities to be constructed at the Lakeville site. Thus, the proposed project would be consistent with this Sonoma County General Plan policy.

Mitigation: No mitigation is necessary.

IMPACT: VR-5: Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

As discussed above the existing facilities are visible to northwest-bound travelers on Lakeville Highway, which can be considered a high volume travelway and the City's main entry point from the southeast.

The Hopper Street site is not visible from a high volume travelway or public use area.

Portions of the polishing wetlands on Parcel A, together with the parking area, levee stabilization, bridges, and Petaluma River dock, may be visible from Shollenberger Park. Small portions of project facilities at the oxidation pond site may also be visible from certain parts of the Park. Most of the project facilities will be about a mile away from the Park, too far from the Park to affect views adversely. Some improvements, such as the bridges and Petaluma River dock will be clearly visible from Shollenberger Park or from boat traffic on Petaluma River. Both improvements are river-related and for recreational use; although visible they will not provide a strong contrast with other man-made made river-related improvements in the area, such as the surrounding levees, radar structure, train bridge, etc. This impact is considered to be less than significant.

Measure PD-~~19~~ 21, Landscaping Design, adopted as part of this project, will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway.

Mitigation: No mitigation is necessary.

IMPACT: VR-6: Will the project cause an adverse effect on foreground views from one or more private residences?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The nearest private residences to the project site are two or three houses associated with surrounding agricultural operations, northeast from Lakeville Highway 1,000 to 2,000 feet from the eastern boundary of the existing oxidation ponds, and are elevated slightly above them. Any changes on Parcels A and B and at the existing pond site would be potentially visible from these residences. However, since these homes are at the far edge of the foreground view, the new facilities would not provide strong visual contrast or obstruction when compared to the existing site with its wastewater treatment facilities as viewed from that distance. Conversion of agricultural lands to wetlands will not block views nor provide a major visual contrast and is not considered a significant impact. Measure PD-19, Landscaping Design, adopted as part of this project, will require the City to provide landscaping to screen views of the site from northwest-bound Lakeville Highway.

The Hopper Street site is not visible from private residences.

Mitigation: No mitigation is necessary.

IMPACT: VR-7: Will the project create a new light source?

Analysis: *Water Recycling Facility and River Access Improvements – Less than Significant*

The new administration and maintenance buildings at the Lakeville site will be lighted to accommodate normal office operations, the treatment facilities will be illuminated for operation and maintenance, and the parking lot on Parcel A and B will be illuminated for safety. These activities will introduce new light sources to the area, visible to both travelers and residents to the northeast. Lighting impacts to nearby residences are considered a significant impact. Demolition of the Hopper Street site would not entail new light and glare sources. Measure PD-21, Lighting Design, adopted as part of this project, requires the City to design lighting for the administration and maintenance buildings, treatment facilities and partking areas to utilize shielded, low-intensity light sources.

Mitigation: No mitigation is necessary.

TABLE 5-4

Alternative Impact Comparison

Impact	Project	No Project	1-Advanced Facultative Ponds	2-Aerated Lagoons	3-Primary Clarifiers/Ponds	4-Hopper Street
WQ-1, 2. Will discharge from the project or alternatives exceed criteria for surface water quality?	Less than Significant after mitigation.	Significant. With growth of the population, as projected in the adopted general plans of Petaluma and the County of Sonoma for Penngrove, water quality criteria will be exceeded.	Less than Significant after mitigation.	Less than Significant after mitigation.	Less than Significant after mitigation.	Less than Significant after mitigation.
BIO-7. Will the project or alternatives cause loss of wetlands or waters of the U.S.?	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss.	No impact	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss, plus likely loss of some wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss, plus likely loss of substantial wetlands acres on Parcel C.	Less than Significant after mitigation. Impacts would be 2.93 acres of temporary and ~~0.53~~ 0.73 acres of permanent disturbance or loss.

6 REFERENCES

California Department of Transportation. 2002. *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual*. November 2002.

Whitelock & Weinberger Transportation, Inc. 2002. *Kaiser-Permanente Clinic Traffic Impact Study in the City of Petaluma*. April 2002.

Exhibit 1A

City of
Petaluma, California

water recycling

FACILITY AND RIVER ACCESS IMPROVEMENTS

Environmental Impact Report
Biomass -to-Biofuel Addendum

State Clearing House #2001052089

January 2016

CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND RIVER ACCESS IMPROVEMENTS ENVIRONMENTAL IMPACT REPORT

2016 ADDENDUM BIOMASS-TO-BIOFUEL IMPROVEMENTS

January 4, 2016

Prepared by

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1 INTRODUCTION AND SUMMARY

BACKGROUND

The City of Petaluma currently operates the Ellis Creek Water Recycling Facility. An EIR for the Ellis Creek Water Recycling Facility (titled the Water Recycling Facility and River Access Improvements EIR – State Clearinghouse #2001052089) was certified by the City of Petaluma in 2002. The City continues to improve its Water Recycling Facility and now proposes to modify the Facility to accept high-strength waste[1] from local food and beverage industries and convert it to compressed natural gas (CNG) for use in buses and utility fleets. The City has applied to the California Energy Commission for funding assistance for these modifications, which are known as the Biomass-to-Biofuel improvements. This Addendum evaluates the environmental impacts of the Biomass-to-Biofuel improvements at the Water Recycling Facility.

Four previous Addenda have been prepared for the Water Recycling Facility EIR. In 2004, the City adopted an Addendum that considered revisions to the site plan evaluated in the 2002 Certified EIR. In 2005 and 2006, the City adopted two Construction Addenda that considered minor revisions to the site plan and re-routing of construction traffic. In 2007, the City adopted an Addendum to increase the capacity of tertiary treatment from 4.0 to 6.7 mgd to match the capacity of the rest of the Facility.

This fifth Addendum concludes that the minor revisions being proposed for the Biomass-to-Biofuel improvements do not result in new significant impacts and do not cause substantially more severe significant impacts relative to the impacts previously disclosed in the Water Recycling Facility EIR. Thus, an Addendum is the appropriate level of CEQA analysis and the appropriate method of amending the 2002 Certified EIR, pursuant to Sections 15162 and 15164 of the Guidelines implementing the California Environmental Quality Act (CEQA).

PUBLIC AND AGENCY COMMENTS

This Addendum is available for review at the City Clerk's Office located at City Hall at 11 English Street. The Addendum is tentatively scheduled for consideration at the Petaluma City Council meeting to be held on Monday, January 4, 2016, at 7:00 pm.

Written comments should be mailed or emailed:

City of Petaluma
Ellis Creek water recycling Facility
3890 Cypress Drive
Petaluma, CA 94954
lwalker@ci.petaluma.ca.us

[1] High-strength waste is the liquid waste from food processing industries that exceeds local limits for biological oxygen demand (BOD) and, therefore, cannot be discharged to the sewer system.

Attention: Leah G. Walker, P.E., Environmental Services Manager

ORGANIZATION OF THE ADDENDUM

The Addendum is organized in a similar fashion to the 2002 Certified EIR.

- This Introduction and Summary Chapter includes Table 1-1, a summary of the potential significant impacts and mitigation measures associated with the approved project and the proposed revisions.
- Chapter 2 contains a detailed description of the proposed modifications to the Project Description.
- Chapter 3 presents the revisions to the Mitigation Monitoring Program.
- Chapter 4 presents the changes to the environmental analysis due to the proposed revisions.
- Chapter 5 updates the Alternatives chapter.
- Chapter 6 updates the CEQA Issues chapter.
- Chapter 7 presents the preparers of this Addendum.

APPLICABILITY AND USE OF AN ADDENDUM

As directed by CEQA, California Public Resources Code Section 21166, and CEQA Guidelines Section 15162, when an EIR has been prepared for a project, no subsequent EIR shall be prepared, unless one or more of the following circumstances occur:

1. Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

2. Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

3. New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

    a) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

    b) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

    c) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of

the project, but the project proponents decline to adopt the mitigation measure or alternative; or

d) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

The change in environmental impacts due to proposed changes in the project or changed conditions has been evaluated and measured against the standards set forth in paragraphs 1, 2, and 3 above to determine whether an Addendum is appropriate or a subsequent EIR is needed. The environmental analysis in Chapter 4 provides the detailed examination of each of these issues. The conclusion is that none of the circumstances which might require a subsequent or supplemental EIR has occurred, and that an Addendum is, therefore, appropriate.

This Addendum should be read together with the full text of the 2002 Certified Petaluma Water Recycling Facility and River Access Improvements EIR and previous Addenda. Even though modifications to the adopted project are minor, the modifications have been subjected to a detailed analytical process consistent with the methodology and thresholds of significance applied in the 2002 Certified EIR. The Addendum has been prepared by a team of professional environmental consultants managed under the direction of the City of Petaluma (see Chapter 7, Preparers).

Section 15164 of the Guidelines implementing the California Environmental Quality Act ("CEQA") provides that an Addendum is the appropriate level of CEQA analysis when the circumstances defined in Section 15162 calling for preparation of a Subsequent EIR do not occur. None of the circumstances that require a Subsequent EIR, such as new significant impacts or significant impacts of a substantially more severe nature, is present. Thus, an Addendum is the appropriate level of CEQA analysis and the appropriate method of amending the 2002 Certified EIR.

SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

There are no new significant unavoidable environmental impacts as a result of the proposed revisions to the project. The one significant unavoidable impact from the previously approved Project remains:

- Impact **AG-1**: Loss of approximately 149 acres of farmland on Parcels A and B

When the project was approved in August of 2002, a statement of overriding considerations was adopted, explaining the City's reasons that the polishing wetlands and public educational and recreational facilities were approved despite their significant impact on farmland.

IMPACT AND MITIGATION SUMMARY

No new significant impacts have been identified as a result of this addendum, and therefore, no new mitigation measures have been developed. Table 1 provides a summary of the impacts and mitigation measures that were identified in the 2002 Certified EIR as revised in the 2004, 2005, 2006, and 2007 Addenda.

The impacts and mitigation measures are identified in one of three categories:

- Significant - Impact is significant before mitigation; some of these significant impacts can be mitigated to a less than significant level, but others remain significant after mitigation.
- Less than Significant - Impact is not considered significant and no mitigation is required.
- No Impact - The project has no effect on the resource described in the criterion.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
1. Land Use			
LU-1. Will the project be inconsistent with the land use plan map of an adopted General Plan?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-2. Will the project be inconsistent with zoning?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-3. Will the project be an incompatible land use type in the MRZ-2 classification or in a designated quarry area?	No Impact	No Impact	No mitigation is necessary.
LU-4. Will the project introduce inappropriate uses in a Community Separator?	No Impact	No Impact	No mitigation is necessary.
LU-5. Will the project increase potential for conflict as a result of incompatible land uses?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-6. Will the project convert non-urban land to urban uses for Project facilities?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-7. Will the project convert public open space for Project facilities?	No Impact	No Impact	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
LU-8. Will the project result in loss of homes due to construction of facilities?	Less than Significant	Less than Significant	No mitigation is necessary.
LU-C1: Will the project have a cumulative potential to disturb land uses?	Less than Significant	Less than Significant	No mitigation is necessary.
2. Agriculture			
AG-1. Will the project cause loss of farmland?	Significant	Significant	No feasible mitigation available.
AG-2. Will the project cause Williamson Act contracts to be canceled?	No Impact	No Impact	No mitigation is necessary.
AG-3. Will the project cause damage to adjacent vineyards by increasing glassy-winged sharpshooter populations?	Less than Significant	Less than Significant	No mitigation is necessary.
AG-C1. Will the project have cumulative impacts to agriculture?	Significant	Significant	No feasible mitigation available.
3. Geology, Soils and Seismicity			
GS-1. Will project facilities be located within an area of unstable slope conditions?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-2. Will project facilities be subject to ground rupture due to location near a surface trace of an active fault?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-3. Will project facilities be located in areas with soils and groundwater conditions that are susceptible to liquefaction during an earthquake?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-4. Will earthquake-induced strong ground shaking damage project facilities?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-5. Will construction of the project cause off-site water-related erosion?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
GS-6. Will project facilities be exposed to damage due to expansive soils?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-7. Will project facilities be exposed to damage due to construction on corrosive soils?	Less than Significant	Less than Significant	No mitigation is necessary.
GS-C1: Will the project have a cumulative potential for geologic or seismic impacts?	Less than Significant	Less than Significant	No mitigation is necessary.
4. Groundwater			
GW-1. Will the project degrade groundwater quality at existing drinking water wells, resulting in a public health hazard?	Less than Significant after Mitigation	Less than Significant	No mitigation is necessary.
GW-2. Will the project cause groundwater mounding or increase groundwater levels that cause surface discharge in a non-stream environment?	Less than Significant	Less than Significant	No mitigation is necessary.
GW-3. Will the project lower groundwater levels at existing wells?	No Impact	No Impact	No mitigation is necessary.
GW-C1: Will the project have a potential for cumulative groundwater impacts?	Less than Significant	Less than Significant	No mitigation is necessary.
5. Surface Water Quality			
WQ-1. Will the project discharge cause numeric-based criteria to be exceeded?	Less than Significant after Mitigation	Less than Significant	No mitigation is necessary.
WQ-2. Will the project cause narrative-based criteria to be exceeded.	Less than Significant after Mitigation	Less than Significant	No mitigation is necessary.
WQ-3: Will project construction result in a substantial degradation of surface runoff quality?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
WQ-C1: Will the project have a cumulative potential to cause numeric or narrative-based criteria to be exceeded?	Less than Significant	Less than Significant	No mitigation is necessary.
6. Hydrology			
H-1. Will the project discharge cause flooding anywhere along the Petaluma River?	Less than Significant	Less than Significant	No mitigation is necessary.
H-2. Will the project discharge cause streambank erosion in the Petaluma River?	Less than Significant	Less than Significant	No mitigation is necessary.
H-3. Will non-discharge project components cause flooding?	Less than Significant	Less than Significant	No mitigation is necessary.
H-4. Will non-discharge project components cause streambank erosion?	Less than Significant	Less than Significant	No mitigation is necessary.
H-C1: Will the project have a cumulative potential to cause flooding or erosion?	Less than Significant	Less than Significant	No mitigation is necessary.
7. Public Health and Safety			
PHS-1. Will the project expose the public to chemicals, radionuclides, pathogenic viruses, bacteria, or other disease organisms at concentrations detrimental to human health?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-2. Will the project expose workers or the public to hazards from a known hazardous waste site?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-3. Will the project increase potential exposure of the public to hazardous materials due to a chemical release?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
PHS-4. Will the project expose the public to safety hazards associated with operation of heavy machinery, vehicles, or equipment; or creation of accessible excavations (trenches, pits, or borings); or creation of an accessible open body of water?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-5. Will the project increase the potential exposure of the public to disease vectors (i.e., mosquitoes)?	Less than Significant	Less than Significant	No mitigation is necessary.
PHS-C1: Will the project have a cumulative impact on public health and safety?	Less than Significant	Less than Significant	No mitigation is necessary.
8. Biological Resources			
BIO-1. Will the project cause loss of individuals or occupied habitat of endangered, threatened, or rare fish, wildlife or plant species?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-1a. Aquatic Species Protection program. BIO-1c. Wildlife Protection Program
BIO-2. Will the project cause loss of active raptor nest, migratory bird nests, or wildlife nursery sites?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-2a. Active Raptor and Migratory Bird Nest Protection Program. BIO-2b. Rookery Protection Program.
BIO-3. Will the project cause permanent loss of sensitive wildlife habitat?	Less than Significant	Less than Significant	No mitigation is necessary.
BIO-4. Will the project cause permanent loss of sensitive native plant communities?	Less than Significant	Less than Significant	No mitigation is necessary.
BIO-5. Will the project substantially block or disrupt major fish or wildlife migration or travel corridors?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-1a. Aquatic Species Protection Program
BIO-6. Will the project cause permanent loss of aquatic habitat (i.e., streams)?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-1a: Aquatic Species Protection Program

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
BIO-7. Will the project destroy wetlands or other waters of the U.S.?	Less than Significant after Mitigation	Less than Significant after Mitigation	BIO-7: Create or Restore Wetlands and Waters of the U.S.
BIO-8. Will the project expose organisms to hazardous levels of toxic or bioaccumulatory substances?	Less than Significant after Mitigation	Less than Significant	No mitigation is necessary.
BIO-C1. Will the project have cumulative impacts to biological resources?	Less than Significant	Less than Significant	No mitigation is necessary.
9. Traffic and Circulation			
TR-1. Will project traffic cause congestion along study area roadways?	Less than Significant after Mitigation	Less than Significant	No mitigation is necessary.
TR-2. Will lane closures due to project construction cause traffic delays, transit delays, restricted access, increased traffic hazards, and rerouting of traffic, including emergency vehicles?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-3. Will project construction traffic increase traffic hazards to motor vehicles, bicyclists, or pedestrians?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-4. Will project construction traffic damage public or private roadbeds?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-5. Will there be inadequate parking for project activities?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-6. Will project construction activities result in heavy vehicles on roadways not designated or suitable as truck routes?	Less than Significant	Less than Significant	No mitigation is necessary.
TR-C1: Will there be traffic congestion along study area roadways during the cumulative conditions?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
10. Air Quality			
AQ-1. Will construction of the Project generate emissions that expose people to high levels of dust and equipment exhaust?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-2. Will project emissions cumulatively exceed allowable limits?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-3. Will the project expose sensitive receptors to substantial levels of toxic air contaminants?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-4. Will project violate or contribute to violation of ambient air quality standard?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-5. Will the project cause potential odors?	Less than Significant	Less than Significant	No mitigation is necessary.
AQ-C1: Will the project have the potential to have a cumulative impact to air quality?	Less than Significant	Less than Significant	No mitigation is necessary.
11. Noise			
N-1: Will construction of the Project expose the public to high noise levels?	Less than Significant	Less than Significant	No mitigation is necessary.
N-2. Will construction of the Project cause high noise levels from construction traffic?	Less than Significant	Less than Significant	No mitigation is necessary.
N-3: Will operation and maintenance of the project expose the public to high noise levels?	Less than Significant	Less than Significant	No mitigation is necessary.
N-C1: Will the project have a cumulative potential to disturb noise-sensitive receptors during or after construction?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
12. Cultural Resources			
CR-1. Will the project disturb known, potentially-eligible National or California Register properties, including archaeological, historical, architectural, and Native American/ traditional heritage resources?	Less than Significant	Less than Significant	No mitigation is necessary.
CR-2. Will the project disturb unknown archaeological resources?	Less than Significant	Less than Significant	No mitigation is necessary.
CR-C1: Will the project have a cumulative potential to disturb historical or cultural resources?	Less than Significant	Less than Significant	No mitigation is necessary.
13. Visual Resources			
VR-1. Will the project be inconsistent with the Sonoma County Open Space Element regarding Community Separators seen from public viewpoints?	No impact	No impact	No mitigation is necessary.
VR-2. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Landscape Units seen from public viewpoints?	No impact	No impact	No mitigation is necessary.
VR-3. Will the project be inconsistent with the Sonoma County Open Space Element regarding Scenic Corridors?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-4. Will the project be inconsistent with minimum building setbacks for structures along Sonoma County designated scenic corridors?	Less than Significant	Less than Significant	No mitigation is necessary.

Table 1

Impact and Mitigation Summary
Approved Project and Project with Proposed Revisions

Impact	APPROVED PROJECT 2002 EIR, as revised by 2004, 2005, 2006, 2007 Addenda	PROJECT WITH PROPOSED REVISIONS 2016 Addendum	Mitigation Measure
VR-5. Will the project cause an adverse effect on foreground or middle-ground views from a high volume travelway, recreation use area, or other public use area?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-6. Will the project cause an adverse effect on foreground views from one or more private residences	Less than Significant	Less than Significant	No mitigation is necessary.
VR-7. Will the project create a new light source?	Less than Significant	Less than Significant	No mitigation is necessary.
VR-C1: Will the project have a cumulative potential to disturb open space or visual resources?	Less than Significant	Less than Significant	No mitigation is necessary.
14. Public Services and Utilities			
PS-1. Will the project increase demand for police, fire, park and recreation facilities, water, sewage treatment and disposal or solid waste removal to such a degree that accepted service standards are not maintained?	Less than Significant	Less than Significant	No mitigation is necessary.
PS-2. Will project construction disrupt police, fire, schools, parks and recreation facilities to such a degree that accepted service standards are not maintained?	No Impact	No Impact	No mitigation is necessary.
PS-C1: Will the project have a cumulative potential to impact public services and utilities?	Less than Significant	Less than Significant	No mitigation is necessary.

2 PROJECT DESCRIPTION

LOCATION

The proposed modifications to the Project are located entirely on the existing site of the Ellis Creek Water Recycling Facility. The Water Recycling Facility is located in eastern Petaluma between Lakeville Highway and the Petaluma River.

PROPOSED PROJECT

The Biomass-to-Biofuel (B2B) improvements would allow production of biomethane from locally-produced food processing waste products and convert them to a renewable biofuel to power buses and other utility vehicle fleets. The improvements would install an anaerobic digester equipped with mixing and heating systems to allow co-digestion of the food processing waste with the existing wastewater solids. The improvements would eliminate the long hauls required for disposal of most of the food processing waste from local food and beverage industries (e.g., beer, dairy, and poultry processing) to the nearest processing facility over 45 miles away. The biofuel produced would be scrubbed, compressed, and dispensed via a new compressed natural gas (CNG) fueling station at the Water Recycling Facility.

The B2B improvements implement the original objectives of the Ellis Creek Water Recycling Facility Project, namely to "develop an economically and ecologically sustainable Water Recycling Facility to accommodate…treatment of 6.7 mgd during average dry weather flow". The City is proposing these improvements to maximize the production of energy from the wastewater treatment processes, reduce greenhouse gas emissions, and support the local food and beverage production industry and associated employment base. The B2B improvements would implement Petaluma's commitment to greenhouse gas reduction by producing a very low-carbon fuel[2] for local use, by decreasing trucking of food processing waste biomass out of the community, and by reducing emissions at the Water Recycling Facility. The proposed improvements would not increase the capacity of the Water Recycling Facility beyond that identified in the 2002 Certified EIR.

The B2B improvements require construction of three types of improvements at the Water Recycling Facility: 1) food processing or high-strength waste facilities; 2) upgrades to the solids treatment processes, including conversion of biomethane to CNG; and 3) a CNG fueling station. These improvements are shown in Figure 1 and explained in more detail below. All improvements related to 1 and 2 above would occur within the existing paved area labeled as "Treatment Upgrades."

[2] The carbon intensity of a fuel is associated with the lifecycle of transportation fuels, including the emissions associated with producing, transporting, distributing, and using the fuel. Fuels with a low carbon intensity reduce greenhouse gas emissions because of the lower emissions that result from the fuel's production, distribution, etc. A fuel with a low carbon intensity rating is said to be a "low-carbon" fuel.

Food Processing or High-strength Waste Facilities

The existing acid-phase digesters would be modified and repurposed for receipt and blending of high strength waste with wastewater solids. From the repurposed digesters, the high-strength waste would be conveyed to and split between two anaerobic digesters, one existing and one new. The digestion upgrades are described in the following section.

All construction staging would take place on existing paved areas.

Upgrades to the Solids Treatment Processes

A new strain press facility would be located on existing asphalt. The existing thickening system would also be expanded with a second gravity belt thickener and a third pump to be located inside an existing structure in space set aside for redundant equipment when the Water Recycling Facility was originally designed.

A second anaerobic digester would be constructed to treat the additional volumes as a result of the high-strength waste stream. The digester would be approximately 60 feet in diameter and 40 feet tall. It would be located on existing pavement in a location that was set aside for a second digester when the Water Recycling Facility was initially designed and constructed. To support the second digester and the different type of waste stream, new heating and mixing equipment systems would be installed on a new equipment pad to be located on existing pavement. The additional digester capacity would result in additional biomethane and additional solids production. Some minor improvements to the existing anaerobic digester would also be completed. The sludge heating pump will be relocated from the existing equipment area to a new sludge heating pump pad. This pad will be located on existing pavement.

The solids remaining after the anaerobic digestion process is complete would be conveyed to the screw press, where the final dewatering would take place. A second screw press would be added in a new building to be located on existing asphalt. The dewatered solids would be conveyed to truck trailers via new conveyors. The new conveyance equipment would be located inside an existing building. A new truck scale would be added adjacent to the existing building.

The other byproduct of the anaerobic digestion process is biomethane gas. The gas would be scrubbed using new equipment to be located in a small structure on existing pavement. The scrubbing treats the gas to remove impurities and meet requirements for vehicle fueling. The scrubbed gas would then be conveyed via a new pipeline to the proposed compression and fueling station. The pipeline would be approximately 2,000 to 2,200 feet long and buried in the shoulder of the existing Water Recycling Facility roadway. The trench would be shallow (approximately 4 feet deep or less) and 1 to 2 feet in width.

All construction staging would take place on existing paved areas.

CNG Fueling Station

A new 20,000 square-foot fueling station would be built across from the Administration Building near the entrance road to the Water Recycling Facility. The fueling station would include an equipment area, with dimensions of approximately 35 feet by 40 feet, for a compressor, inlet gas dryer, and fuel storage vessels. The tallest part of the equipment would be the fuel storage vessels at approximately 10 feet high. Because it is a gas, CNG storage would occur in approximately three small tube-like vessels, rather than tanks, and does not require much space. The equipment area would be fenced with a 6-foot high chain link fence. The fueling station would include two 15-foot area lights and two 8-foot lights at the dispensing pumps. Similar to the existing lighting fixtures at the Water Recycling Facility, the additional lights at the CNG fueling station would be sharp cut-off fixtures which comply with the City's standards. The existing gate across the Water Recycling Facility entrance road would be moved to the east so that the fueling station could be available to vehicles 24 hours a day, without allowing entry to the treatment area of the Water Recycling Facility.

Construction staging for the fueling station would temporarily disturb an additional approximately 13,000 to 15,000 square feet. The location for the fueling station was used for staging during the initial construction at the Water Recycling Facility, and the area is currently farmed for hay production.

Alternatively, the City may decide to conduct fueling of buses and trucks by loading a fuel truck with CNG at the Water Recycling Facility and driving it to the location of the buses and/or trucks to be fueled.

Construction Traffic

Construction of the proposed improvements would take place over several years. The maximum number of construction employees on the site at one time is estimated to be 35. Up to five deliveries per day could occur during construction. All major grading on the site was completed during the original construction of the Water Recycling Facility, so no hauling of soil on or off the site would be required. Therefore, construction traffic is estimated to be, at maximum, 40 round trips or 80 one-way trips per day.

Construction Schedule

California Energy Commission funding is expected to be received in 2016, and the improvements would be constructed in a phased manner over the next several years, completing by 2022 at the latest.

Operation

The existing anaerobic digester currently generates biomethane, a portion of which is used as fuel for the boiler and to heat the anaerobic digester. The remainder is burned via a digester gas flare. The B2B improvements would reduce the need for the digester gas flare and, at full capacity, would eliminate the need for flaring.

The B2B improvements would accommodate an increase in biomass inputs from food processing waste of up to 790,000 gallons per month. Together with processing of the solids from the rest of the Water Recycling Facility, the B2B improvements would have the capability to produce up to 150,000 gasoline-gallon-equivalents (GGE) of CNG per year. It is expected that it would take several years for biomass inputs from local industries to reach the full capacity of the proposed improvements. Therefore, the improvements may be constructed in phases. At full capacity, the 150,000 GGE of CNG would be sufficient to fuel up to 8 buses and 15 waste collection vehicles.

Because the Project would allow the Water Recycling Facility to accept 790,000 gallons per month in additional semi-liquid waste feedstock, the Project would produce an additional 0.026 mgd of recycled water (Walker personal communication, November 2015). During the summer, this additional discharge volume would likely be sent to agricultural or urban reuse customers. During the winter, the additional discharge volume would likely be discharged to the Petaluma River.

The additional inputs of up to 830,000 gallons per month from food processing industries would also produce an additional approximately 9,000 wet tons of biosolids (Walker personal communication, November 2015). The City currently has an agreement with Total Waste Systems to haul off and dispose of the biosolids generated at the Water Recycling Facility. At this time, the biosolids are hauled to the Hay Road Landfill in Vacaville where they are used for alternative daily cover and to build landfill cells. The City would prepare a new or amended agreement for the additional waste hauling when operation of the B2B improvements begin.

Approximately two to three additional employees would be needed to operate and maintain the Biomass-to-Biofuel improvements.

Increased traffic from trucking of food processing wastes to the Water Recycling Facility would be approximately 10 round trip truck trips per day at maximum[3]. Increased traffic from the fueling station would be approximately 27 round trip truck or bus trips per day at maximum. Increased traffic from employee trips would be approximately two to three round trips a day. Increased biosolids hauling would be approximately one to two round trips a day. In total, at maximum capacity, approximately 42 new round trips or 84 one-way trips a day would be added to local roadways accessing the Water Recycling Facility site.

If the City opts to use a CNG fuel truck instead of constructing a fueling station at the Water Recycling Facility, operational traffic would be less.

ENTITLEMENTS, PERMITS, AND APPROVALS

The following City of Petaluma entitlements and approvals may be required for the Project:

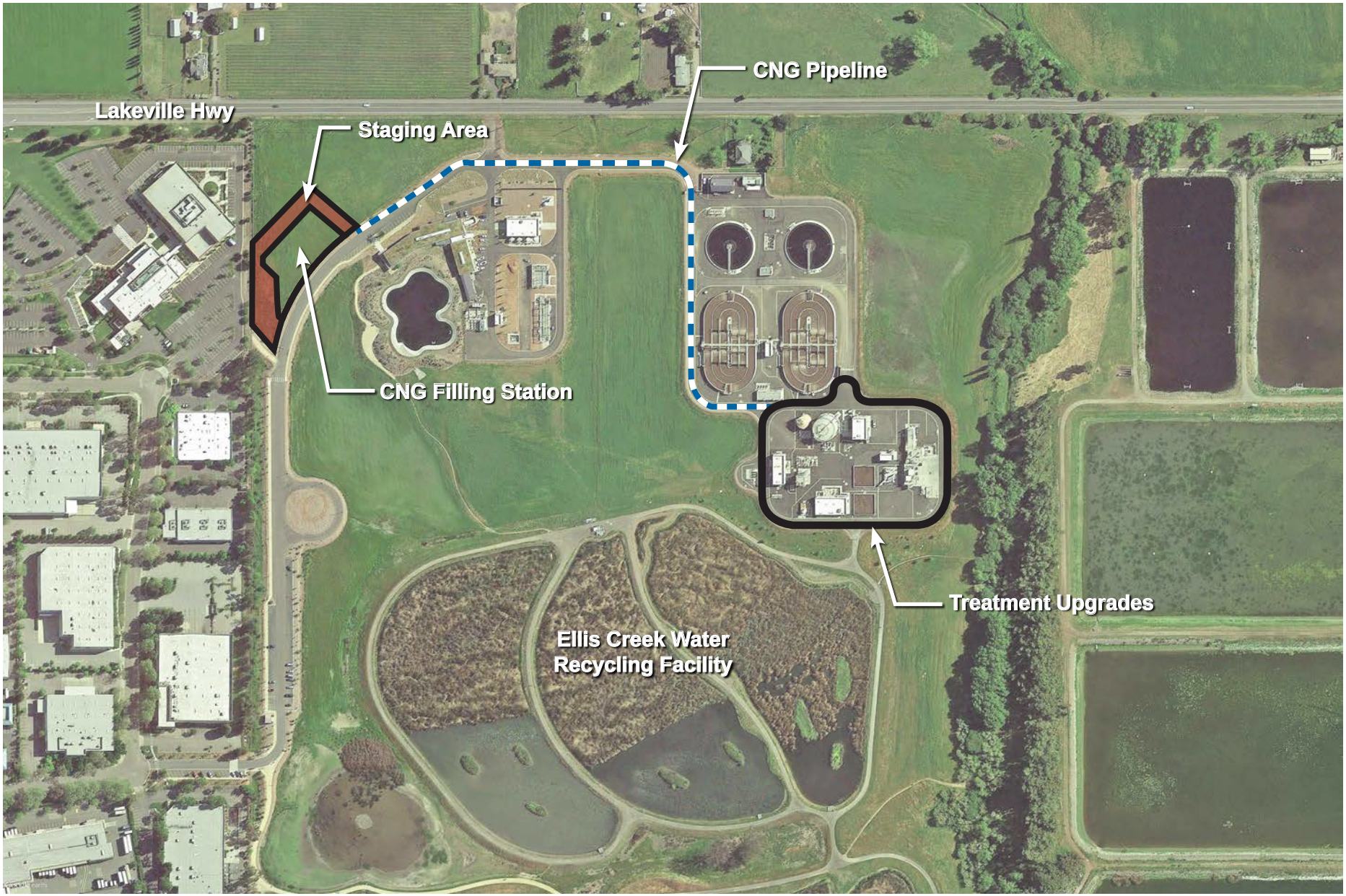
- Building Permit

[3] Each of the participating food processors currently trucks their waste to facilities for disposal, so these truck trips are not new trips within the region. However, there may be new trips for certain roadways, such as Cypress Drive, the access road to the Water Recycling Facility.

- Grading Permit
- Review of the CNG fueling station site plan may be required for both consistency with the PCD zoning standards and for Design Review. This review would occur when a more definitive site plan has been prepared.
- Hazardous Materials Business Plan
- New or revised agreement for biosolids hauling and disposal.

The following agency permits and approvals may be required for the Project:

- Authority to Construct permit from the BAAQMD.
- Amend existing Bay Area Air Quality Management District (BAAQMD) Permit to Operate.



City of Petaluma
Ellis Creek Water Recycling Facility

Job Number 8411271
Revision
Date Dec. 2015

Water Recycling Facility EIR
2016 Addendum
Biomass-to-Biofuel Improvements

Figure 1

2235 Mercury Way Suite 150 Santa Rosa California 95407 USA T 1 707 523 1010 F 1 707 527 8679 W www.ghd.com

3 MITIGATION MONITORING PROGRAM REVISIONS

The following Mitigation Measure from the 2002 Certified EIR is updated to conform to existing policies of the U.S. Army Corps of Engineers under the Clean Water Act:

Mitigation Measure BIO-7. Create or Restore Wetlands and Waters of the U.S.

> The City shall obtain credits at an approved Wetlands Mitigation Bank or prepare a Conceptual Wetlands Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. If the Plan option is selected, it shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. ~~Mitigation will be on site and in kind, if possible.~~
>
> Compensatory mitigation for permanent impacts shall be provided at a ratio of 1:1, that is 1 acre of wetlands habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers or Regional Water Quality Control Board.

4 ENVIRONMENTAL ANALYSIS

This Chapter consists of 14 sections, each of which presents the analysis of the proposed revisions to the Project within a particular environmental discipline. The analysis refers back to the original evaluation of impacts contained in the 2002 Certified EIR and 2004, 2005, 2006, and 2007 Addenda and identifies the change in impacts, if any, from the previously approved Project. If there are no changes to the previous impact evaluation, an explanation for this conclusion is provided. For those sections where a change in impacts is identified, the evaluation criteria taken directly from the 2002 Certified EIR are also provided. For ease of reference, the evaluation criteria table numbers remain the same as the numbering used in the 2002 Certified EIR.

Most of the information presented in the 2002 Certified EIR has not changed and is not repeated here. Please refer to the 2002 Water Recycling Facility and River Access Improvements EIR and subsequent Addenda for descriptions of setting, discussion of methodology, and the complete identification and discussion of impacts.

4.1 LAND USE

The proposed changes to the Project occur completely in the interior of the Water Recycling Facility site and do not require revisions to the evaluation of Land Use. The proposed treatment upgrades would be located approximately 800 feet west of Lakeville Highway adjacent to other similar treatment facilities and would be consistent with the prescribed uses on the property as described in the Planned Community Development (PCD) zoning standards for the Water Recycling Facility. The proposed fueling station would be located approximately 225 feet from Lakeville Highway, and the fuel dispensers would be approximately 40 feet from the parking lot for the Kaiser Permanent Medical Offices. The fueling station would also be consistent with the prescribed uses on the property as described in the PCD zoning standards. The City proposes to evaluate the consistency of the fueling station design with the PCD zoning standards related to the northeast portion of the Water Recycling Facility property, at the time that a more definitive design has been developed. Minor changes may be made to the design of the fueling station at that time. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the 2002 Certified EIR.

4. 2 AGRICULTURE

The proposed changes to the Project do not require revisions to the evaluation of Agriculture. The 2002 Certified EIR identified a significant and unavoidable loss of agricultural land due to construction of the Water Recycling Facility, including all 149 acres of the site. Since completion of construction at the Ellis Creek Water Recycling Facility, the City has leased some land on the site to a local farmer for hay production, including land at the northeast corner of the site where the CNG fueling station is proposed. The CNG fueling station would be about a half-acre in size, but due to its location and configuration, it may prevent farming on several acres. Because the original EIR identified the loss of 100 percent of the farmland on the site, the impact of the CNG fueling station on agricultural land would be the same as that identified in the 2002 Certified EIR. The impact was identified as significant and unavoidable. No change to the impacts on

agricultural resources relative to Williamson Act land and glassy-winged sharpshooter populations would occur due to the B2B improvements. Project Measure PD-2, Purchase Locally Grown or Inspected Plants, would continue to be implemented, as needed. The Project modifications would not result in new significant impacts. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.3 GEOLOGY, SOILS, AND SEISMICITY

The proposed changes to the Project do not require revisions to the evaluation of Geology, Soils and Seismicity. The entire site was evaluated in the original EIR, and the modifications will not result in any new impacts as the type of facilities, location, and geologic setting remain the same. The B2B improvements would not be deeper than the original Water Recycling Facility improvements, and therefore would not create the potential for additional or different geologic hazards. Project Measures included in the Project to address liquefaction, ground shaking, and expansive and corrosive soils will still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.4 GROUNDWATER

The proposed changes to the Project do not require revisions to the evaluation of Groundwater. The treatment facilities at the Water Recycling Facility were found to have less-than-significant impacts to groundwater because they are in completely contained structures. Similarly, the proposed Biomass-to-Biofuel improvements would be in completely contained structures, and would not interact with groundwater. In particular, the CNG storage tank at the CNG fueling station would be above-ground and would not affect groundwater. Measures included in the Project to address groundwater quality are still applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.5 SURFACE WATER QUALITY

The proposed modifications to the Project do not require revisions to the evaluation of Surface Water Quality. The B2B improvements would create approximately 26,000 gallons of new recycled water which would likely be discharged during the winter discharge season and reused during the summer non-discharge season. The quantity of additional water would be small (0.26 mgd compared to the Water Recycling Facility's 2015 ADWF of 4.8 mgd and the permitted ADWF of 6.7 mgd) and would not affect the water quality of effluent to be discharged or recycled water to be reused (Walker personal communication, November 2015). The City's discharges and recycled water reuse would continue to meet standards set by federal, state, and regional agencies.

Similar to the original Project, construction activities for the B2B improvements have the potential to cause discharge of pollutants to waterways through erosion and accidental spills. In addition, runoff from new impervious surfaces for the CNG fueling station has the potential of contributing contaminants to stormwater runoff entering the Petaluma River. Measure PD-9, Construction Erosion and Spill Control Measures, adopted as part of this Project, requires the City

to develop and implement measures designed to prevent significant construction and operational impacts to water quality.

Measures included in the Project to address potential exceedance of narrative- or numeric-based criteria from project discharge or potential degradation of surface water quality would still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.6 HYDROLOGY

The proposed changes to the Project Description do not require revisions to the evaluation of Hydrology. The changes to the Project would result in a small increase in the volume of discharge to the Petaluma River. The peak day discharge rate for the Water Recycling Facility at full capacity is estimated to be 16.0 mgd. Therefore, project revisions could cause an approximately 0.2 percent increase in discharge volume if they occurred during a storm during a peak day discharge. Such a small increase would not affect downstream flooding significantly and would not be a substantially greater impact than identified in the Certified EIR and subsequent addenda.

The CNG fueling station would add approximately 0.46 acre of impervious surfaces to site, and the solids treatment improvements would be located on existing impervious surfaces. Overall, impervious area at the project site would increase by 0.3 percent. This minor increase is not a substantially greater impact than identified in the Certified EIR and subsequent addenda.

The CNG fueling station would be located at an elevation of approximately 16 feet (NVGD 1929), which is above the 100-year flood elevation of 7 feet (NVGD 1929). The proposed new solids treatment facilities would be located at an elevation of approximately 15 to 17 (NVGD 1929). Therefore, the B2B improvements would not be located in the 100-year flood plain and would not displace floodwaters from a 100-year flood such that increased downstream flooding would result.

The site is not a valuable recharge area, and no domestic potable water wells are located downgradient of the improvements. Measures included in the Project to address potential flooding or streambank erosion would still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.7 PUBLIC HEALTH AND SAFETY

The proposed changes to the Project do not require revisions to the evaluation of Public Health and Safety. Both the proposed treatment facilities and the CNG fueling station would be designed, constructed, and operated in accordance with relevant local, state, and federal regulations, in a manner similar to that for the hazardous chemicals used at the existing Water Recycling Facility. The Hazardous Materials Business Plan for the Water Recycling Facility may need to be updated. Measures included in the Project to address potential exposure of the public or workers to hazardous materials, chemicals or disease vectors (i.e., mosquitoes) would still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.8 BIOLOGICAL RESOURCES

The proposed changes to the Project do not require revisions to the evaluation of Biological Resources. The solids treatment facilities would be installed adjacent to the existing solids treatment processes in the eastern part of the site on existing asphalt. A CNG pipeline from the solids treatment facilities to the CNG fueling station would be buried in the existing Water Recycling Facility access road or the road shoulder. The CNG fueling station would be located on uplands in the northeast portion of the property. The proposed facilities would not affect any jurisdictional wetlands and would not be located within the buffer zones of any sensitive resources.

The California Natural Diversity Database (CNDDB) was accessed on July 21, 2015 for the Water Recycling Facility and nearby areas. The special-status species potentially present on the project site were compared to the special-status species evaluated in the Certified EIR and subsequent addenda. No new special-status species were identified by the CNDDB and therefore, no new evaluation of special-status species is required for the B2B improvements.

Project modifications would not cause additional impacts to wetlands or waters, riparian areas, sensitive habitat, trees, migration corridors or streams beyond those that were identified in the 2002 Certified EIR and subsequent addenda. Furthermore, all affected areas of the Facility are in disturbed areas. These new and modified project components would abide by the same restrictions and be subject to the same project measures and mitigation measures as the existing Water Recycling Facility. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.9 TRANSPORTATION

Increased operational traffic would result from two to three additional employees, one to two additional biosolids trucks per day, and up to 37 round trips per day for trucks delivering high strength waste and buses and trucks coming to the CNG fueling station. Many of these trips already occur on local roadways, but would be new trips on roadways approaching the Water Recycling Facility such as South McDowell Boulevard and Cypress Drive. Construction traffic would increase traffic on South McDowell Boulevard by approximately 1 percent on peak construction days. Measures included in the Project to address congestion or lane closures would still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.10 AIR QUALITY

The changes to the Project do not require revisions to the evaluation of Air Quality. The proposed treatment upgrades would require a Authority to Construct from the Bay Area Air Quality Management District (BAAQMD) and would require a modification to the City's existing Permit to Operate at the Water Recycling Facility. If needed to meet permit requirements, emissions controls would be added to the new facilities. The proposed addition of a pump station would not increase air emissions because it would be electric powered. The CNG fueling facility would also be subject to standard regulations of the state Air Resources Board and BAAQMD. Therefore, no new significant air emissions, either for criteria pollutants or toxics, would occur.

The B2B improvements would substantially reduce greenhouse gas emissions in three ways: replacement of diesel fuel with CNG, reduction of vehicle miles traveled by waste haulers, and elimination of flaring of methane at the Water Recycling Facility. At build-out, greenhouse gas emissions would be reduced by 2,450 metric tons of CO2e per year, due to replacement of diesel fuel with biomethane fuel. In addition to the reduction from fuel replacement, the project would result in 87% fewer vehicle-miles-traveled by the heavy duty diesel haul trucks transporting the feedstock outside of Petaluma and Sonoma County. Three of the four Petaluma businesses that will participate in this Project currently haul their liquid feed stock and food waste from 40 to 45 miles to the East Bay (exact mileage varies depending on location of business). Petaluma Creamery takes waste 8 miles outside of Petaluma. Overall, the trucks from all four businesses travel 13,230 miles per month to dispose of waste in the East Bay and Sonoma County. The B2B Project would be conveniently located between 2 and 6 miles from the respective businesses. Once the B2B Project is up and running, the travel distance would be reduced to 1,760 miles per month, resulting in a reduction of 190 metric tons of CO2e. In addition, the need for the digester flare will be eliminated resulting in a reduction of 620 metric tons of CO2 per year. The total greenhouse gas savings from implementation of the Project would be 3,260 metric tons per year.

Measures included in the Project to address air quality will still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.11 NOISE

The changes to the Project do not require revisions to the evaluation of Noise. Construction noise would be substantially less than the noise levels identified in the Certified EIR for the construction of the Water Recycling Facility. Additional construction traffic (at maximum approximately 40 round trips per day, 35 of which would be from construction worker vehicles) would also be much less than the construction traffic for the original construction of the facility.

Operational noise from the proposed treatment upgrades would be similar to the existing noise levels at the Water Recycling Facility. Any noise generated during operation, even at night, would be muffled and not audible from surrounding sensitive receptors such as residences on the opposite side of Lakeville Highway which are at a distance of approximately 1,100 feet. Fueling of buses and trucks at the CNG fueling station would tend to occur in the evening when the Kaiser Permanente Medical Offices and other Business Park uses typically closed, and would not substantially increase noise levels for sensitive receptors.

Increased operational traffic would result from two to three additional employees, one to two additional biosolids trucks per day, and up to 37 round trips per day for trucks delivering high strength waste and buses and trucks coming to the CNG fueling station. Many of these trips already occur on local roadways, but would be new trips to roadways such as South McDowell Boulevard and Cypress Drive. Construction traffic would increase traffic on South McDowell Boulevard by approximately 1 percent. Noise from such an increase would be so small that adjacent businesses would not be affected. The Measures included in the Project to address high noise levels during construction and operation would still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.12 CULTURAL RESOURCES

The proposed changes to the Project do not require revisions to the evaluation of Cultural Resources. The entire site was evaluated in the original EIR, and the proposed modifications would not result in any new impacts as the type of facilities and location remain the same. Measures included in the Project to address unknown cultural resources would still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.13 VISUAL RESOURCES

The proposed changes to the Project do not require revisions to the evaluation of Visual Resources. The upgrades to the treatment processes would be located approximately 800 feet west of Lakeville Highway and would not be visible to residences due to intervening buildings and landscaping. Some of the upgrades may be barely visible from parking areas at the Business Park from a distance of approximately 1,400 feet. Many of the proposed treatment facilities would be inside existing buildings, while the other treatment upgrades would be located adjacent to existing improvements which are of similar height, mass, and color. The pipelines would be buried and therefore, not visible. The CNG fueling station dispensers would be approximately 225 feet from Lakeville Highway and 40 feet from the parking areas at Kaiser Permanente Medical Offices and Business Park. The fueling station improvements consist of a fence, CNG storage tanks that would be approximately 10 feet high, and two 15-foot area lights and two 8-foot high lights at the dispensing pumps.

The proposed treatment upgrades would be located far enough away from sensitive receptors that no view obstruction or significant degradation of visual quality would occur. The proposed CNG fueling station would be set back from Lakeville Highway further than the Business Park buildings, but less than the Water Recycling Facility Administration Building. Similar to the requirements in the original EIR, the CNG fueling station would be subject to Project Measure PD-21, Landscaping Design which requires that landscaping be provided to screen views from northwest-bound Lakeville Highway and residents east of the highway. Landscape materials would be mature and fast-growing trees. Therefore, no new significant visual impacts would occur resulting from view obstruction or degradation of visual quality.

Similar to the lighting fixtures evaluated in the original EIR, the additional luminaries at the CNG fueling station would be subject to Project Measure PD-22, Lighting Design that would reduce lighting impacts to less-than-significant levels. The luminaries would have sharp cut-off fixtures which, by design, eliminate glare and result in virtually no detectable light on adjacent properties. Therefore, the lights would not pose a glare hazard to traffic on SR 116 or in the Kaiser Permanente Medical Offices or elsewhere in the Business Park. These minor changes to the lighting would not substantially increase the lighting impacts identified in the original EIR. Measures included in the Project to address visual resources will still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

4.14 PUBLIC SERVICES AND UTILITIES

The proposed changes to the Project do not require revisions to the evaluation of Public Services and Utilities. The modifications will not change the demand for public services nor the potential disruption of emergency services that was analyzed in the Certified EIR. Emergency vehicles will still be able to access the site from two locations: from Cypress Drive and directly from Lakeville Highway via a gravel road. Measures included in the Project to address public services and utilities will still be applicable. The proposed B2B improvements would not cause new significant impacts or substantially more severe impacts than identified in the Certified EIR.

5 ALTERNATIVES TO THE PROPOSED PROJECT

The proposed changes to the Project are minor and would not affect the relative comparison of alternatives presented in the Certified EIR. Nor do they require the consideration of new or revised alternatives, because environmental impacts are not substantially greater than previously reported, and there are no new significant effects.

6 CEQA-REQUIRED SECTIONS

GROWTH-INDUCING IMPACTS OF THE PROJECT

The potential for growth inducement would not increase due to the proposed B2B improvements because they do not increase the capacity of the Water Recycling Facilities beyond what was evaluated in the 2002 Certified EIR and 2007 Addendum (6.7 ADWF).

SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

There are no new significant unavoidable environmental impacts as a result of the proposed revisions. The one significant unavoidable impact from the approved Project remains:

- Impact **AG-1**: Loss of approximately 149 acres of farmland on Parcels A and B

When the project was approved in August of 2002, a statement of overriding considerations was adopted, explaining the City's reasons that the polishing wetlands and public educational and recreational facilities were approved despite their significant impact on farmland.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The 2002 Certified EIR identified Environmentally Superior Alternatives both as Alternative 4, Hopper Street, and Extended Aeration, because they would have similar levels of environmental impacts and therefore both qualify as the Environmentally Superior Alternative.

However, since approval of the project in August 2002, the Hopper Street site has been reduced in size due to approval of a homeless shelter on the site, and is no longer large enough to accommodate the project. Therefore, the Environmentally Superior Alternative was limited to the preferred alternative and proposed project, Extended Aeration, in the April 2004 Addendum.

The impacts of the proposed project modifications are minor and do not affect the relative comparison of alternatives. Therefore, the proposed project, Extended Aeration, continues to be the Environmentally Superior Alternative.

7 PREPARERS

LEAD AGENCY

The City of Petaluma is the lead agency under CEQA for the preparation of the Petaluma Water Recycling Facility and River Access Improvements EIR 2016 Addendum.

Staff Member	Role
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CITY OF PETALUMA, CALIFORNIA

WATER RECYCLING FACILITY AND MARSH ACQUISITION, ENHANCEMENT, AND ACCESS IMPROVEMENTS PROJECT

REVISED MITIGATION MONITORING PROGRAM 2016

SCH # 2001052089

January 2016

Prepared by

REVISED MITIGATION MONITORING PROGRAM

BACKGROUND

The legal basis for the development and implementation of mitigation measures lies in the California Environmental Quality Act (CEQA). Pursuant to Section 21002 of CEQA, public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects. Subsection 21002.1 further requires that each public agency shall mitigate or avoid the significant effects on the environment of projects it approves or carries out whenever it is feasible to do so.

Assembly Bill (AB) 3180 was enacted in 1989 to ensure that required mitigation measures and project alternatives were implemented. AB 3180 specifies the public agency's responsibility to adopt a mitigation monitoring and reporting program:

> SECTION I. Section 21081.6 is added to the Public Resources Code, to read: 21081.6. When making the findings required by subdivision (a) of Section 21081 or when adopting a negative declaration pursuant to paragraph (2) of subdivision (c) of Section 21081, the public agency shall adopt a reporting or monitoring program for the changes to the Project which it has adopted or made a condition of Project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during Project implementation. For those changes which have been required or incorporated into the Project at the request of an agency having jurisdiction by law over natural resources affected by the Project, that agency shall, if so requested by the lead or responsible agency, prepare and submit a proposed reporting or monitoring program.

The monitoring program must be adopted when a public agency makes its findings under CEQA so that the program can be made a condition of Project approval in order to mitigate significant effects on the environment.

PURPOSE

This Mitigation Monitoring Program is designed to serve as a tool for the evaluation of Project compliance with mitigation measures accepted from the EIR. The basic objectives of the Mitigation Monitoring Program are to achieve the following:

- To report to the City Council, and the public, information regarding compliance with the EIR mitigation measures; and
- To provide assurance and documentation that the studies and actions called for in the mitigation measures are being performed as planned.

DOCUMENT FORMAT

Compliance with Existing Programs

This document presents the applicable federal, state, regional, county, and local policies and regulations with which the project must comply. Compliance with these policies and regulations will result in avoidance and/or minimization of adverse environmental impacts.

Measures Included in the Project

This document presents a listing and description of measures and standards which have been incorporated into the project design. The City has adopted these measures and incorporated them as part of the project in order to avoid or minimize potential environmental impacts. These measures represent standard engineering, design, construction, and maintenance practices. The process for the development of these measures began during the scoping and early planning phase of the project. Measures were developed to change the project and avoid potential impacts identified by the public and federal, state, and local agencies. Other measures were developed as a result of geotechnical, biological, cultural, and hydrological analysis in order to avoid or minimize potential impacts.

Because these measures are part of the project, they do not qualify under the normal definition of mitigation. However, these measures have been included in this chapter to provide a mechanism to ensure that these measures are implemented and monitored, and to assist the reader in understanding the commitments made by the City of Petaluma.

This document includes measures to be implemented in all phases of the project, including planning and design, construction, operation, and maintenance. Compliance with these measures will result in avoidance and/or minimization of adverse environmental impacts.

Mitigation Measures

This document incorporates mitigation measures recommended in Chapter 4, Environmental Analysis, of the Water Recycling Facility and River Access Improvements EIR (2002) and revisions made in the EIR Addendum (2004). The mitigation measures listed in this document are recommended by the consultant team to avoid or reduce environmental impacts. As described above under Background, the City is required to mitigate impacts whenever it is feasible. Mitigation measures will be adopted by the City at the time of project approval. At that time, the City has the option of approving alternate mitigation measures, if they can be shown to be effective and feasible.

Some of the mitigation measures will only be implemented during the final planning and detailed design of the project. They often require the refinement of the final project design to accommodate particular environmental constraints Other mitigation measures are intended to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Finally, there are mitigation measures to be implemented during operation of the project. These measures generally

require monitoring of operations over time and the modification of those operations to reduce adverse environmental impacts. Compliance with all of these measures would result in the reduction of adverse environmental impacts.

ADMINISTRATION

The Director of the Water Resources and Conservation Department and/or his/her designee will be responsible for overall implementation and administration of the Mitigation Monitoring Program. In order to carry out the mitigation monitoring program, the Director will designate a staff person to serve as coordinator among the various agencies and departments. This person (Coordinator) will ensure that each mitigation measure is implemented to the standards specified in the EIR and is completed in a timely manner. If current staffing within the Department cannot absorb the work demand to implement the program, a private contractor will be hired to manage and coordinate the mitigation monitoring and reporting program. The contractor will serve under the direction of the Director.

Administration of the Mitigation Monitoring Program will include the following:

- Documentation of permit approvals by other agencies;
- Compliance with conditions of project approval;
- Routine inspections and reporting activities;
- Plan checks;
- Coordination of activities of consultants hired by the City when such expertise and qualifications are necessary;
- Coordination with applicable agencies that have mitigation monitoring and reporting responsibilities (if any);
- Follow-up and response to citizens' complaints;
- Development of a work plan and schedule for monitoring activities;
- Maintenance of a mitigation monitoring checklist or other suitable mitigation compliance summary;
- Implementation of corrective actions or enforcement measures, as needed;
- Preparation of reports of the status of implementation and monitoring of mitigation measures; and
- Monitoring of financial resources associated with the program.

MITIGATION MEASURE FORMAT

Table 3-1 presents the format for each mitigation measure and the information that each measure will contain.

IMPLEMENTATION

Each responsible individual or agency listed as a "Monitoring Agency" in the Mitigation Monitoring Program will be responsible for determining whether the mitigation measures

contained within the monitoring program have been implemented. A Monitoring Agency may submit a Verification Report Form (see page 3-6) or other verification report to the Coordinator that documents compliance with each of the mitigation measures for which they are responsible. Based on the information provided by the reports, the Coordinator will maintain a mitigation monitoring checklist that documents the completion status of all required mitigation measures as shown in Table 3-2. Prior to issuance of grading or building permits, the Coordinator will review the mitigation monitoring program checklist to ensure that the Project design is in compliance with all mitigation measures that are required to be implemented as a condition of the permit.

ENFORCEMENT

If a responsible individual or agency determines that compliance has not been achieved, a written notice shall be delivered to the Director or Coordinator describing the non-compliance and requiring compliance within a specified period of time. If non-compliance still exists at the expiration of the specified period of time, construction may be halted, and/or remedies shall be required, as appropriate and at the discretion of the Director.

APPROVAL AND CHANGES

This Mitigation Monitoring Program is adopted in conjunction with the Final EIR and project approvals for the project. Subsequent changes to the Mitigation Monitoring Program may be approved by the Director if deemed to meet the intent of said mitigation.

VERIFICATION REPORT

Date:_____ Arrival Time:_____ Departure:_____

Location:_____
_____
_____

Construction Sheet No.:_____

Discipline:
- ☐ Archaeology
- ☐ Biology
- ☐ Soils/Geology
- ☐ Other_____
- ☐ Dust/Air Quality
- ☐ Noise

Condition:_____

Compliance: ☐ Acceptable ☐ Unacceptable

- ☐ Delay Activity
- ☐ Remedial Action Implemented
- ☐ Work Stopped
- ☐ Follow-up Conference Required

Activity:_____
_____

Observations:_____
_____

Recommendations:_____
_____

By:_____ Report Approval:_____

Receipt By Project Supervisor:

Signature:_____ Date:_____ Time:_____

Comments/Actions:_____
_____

Copies to:_____

Date Entered to Environmental Monitoring File:_____
By:_____

Table 3-2

Mitigation Monitoring Checklist – B2B Project Improvements

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
Measures Included in the Project				
PD-1 Uniform Relocation Assistance	City of Petaluma	City of Petaluma	NA	NA
PD-2 Purchase Locally Grown or Inspected Plants	Design Engineer	City of Petaluma		
PD-3 Liquefaction Protection	Design Engineer	City of Petaluma		
PD-4 Seismic Design to Resist Ground Shaking	Design Engineer	City of Petaluma		
PD-5 Standard Engineering Methods for Expansive Soils	Design Engineer	City of Petaluma		
PD-6 Standard Engineering Methods for Corrosive Soils	Design Engineer	City of Petaluma		
PD-7 Groundwater Monitoring and Management	City of Petaluma	City of Petaluma	NA	NA
PD-8 Erosion, Stormwater Runoff, and Spill Control Measures	Construction Manager and Design Manager	City of Petaluma & San Francisco Bay RWQCB		
PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons	City of Petaluma	City of Petaluma	NA	NA
PD-10 Monitor Soil and Groundwater During Demolition/ Construction for Evidence of Hazardous Waste at Hopper Street	Construction Manager	City of Petaluma	NA	NA
PD-11 Test Suspected and Properly Dispose of Soils and Groundwater at Hopper Street	City of Petaluma	City of Petaluma	NA	NA

Table 3-2

Mitigation Monitoring Checklist – B2B Project Improvements

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
PD-12 Inspect and Test for Lead-based Paint and Asbestos Containing Material (ACM) in any Buildings at 950 Hopper Street that will be Demolished	Construction Manager	City of Petaluma	NA	NA
PD-13 Mosquito Prevention	City of Petaluma	City of Petaluma	NA	NA
PD-14 Construction Air Quality Controls	Design Engineer	City of Petaluma		
PD-15 Permitting and Control of Toxic Air Contaminants	City of Petaluma	City of Petaluma		
PD-16 Odor Control	Design Engineer and Plant Operator	City of Petaluma		
PD-17 Construction Noise Mitigation Measures	Construction Manager and City of Petaluma	City of Petaluma		
PD-18 Operational Noise Mitigation Measures	Design Engineer	City of Petaluma		
PD-19 Protection of Historic and Archaeological Resources.	City of Petaluma	City of Petaluma		
PD-20 Protection of Previously Undiscovered Historic and Archeological Resources.	Design Engineer and Construction Manager	City of Petaluma		
PD-21 Landscaping Design	Design Engineer	City of Petaluma		
PD-22 Lighting Design	Design Engineer and City of Petaluma	City of Petaluma		
PD-23 Fire Protection	Design Engineer and City of Petaluma	City of Petaluma		
Mitigation Measures				
LU-1 Annexation and Change of General Plan Land Use Designation and Zoning	City of Petaluma	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist – B2B Project Improvements

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
GW-1 Drinking Water Well Protection Program	City of Petaluma	City of Petaluma		
WQ-1a Chromium Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1b Nickel Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1c Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
WQ-1d Constituents not Monitored in Effluent Monitoring and Source Reduction	City of Petaluma	City of Petaluma		
WQ-1e Dioxin/Furan Congener Monitoring and Source Reduction Program	City of Petaluma	City of Petaluma		
BIO-1a Aquatic Species Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-1b Rare, Threatened and Endangered Plant Protection Program	City of Petaluma	City of Petaluma		
BIO-1c Wildlife Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-2a Active Raptor and Migratory Bird Nest Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-2b Rookery/Nest Protection Program	City of Petaluma	City of Petaluma and Construction Manager		
BIO-7 Create or Restore Wetlands and Waters of the U.S.	City of Petaluma and Design Engineer	City of Petaluma		

Table 3-2

Mitigation Monitoring Checklist – B2B Project Improvements

Mitigation Measure	Implementing Agency	Monitoring Agency	Status	Comments
TR-1a Reroute Construction Worker Trips	Construction Manager	City of Petaluma		
TR-1b Install Signage to Reroute Employee and Visitor Trips	City of Petaluma	City of Petaluma and Construction Manager		

COMPLIANCE WITH EXISTING PROGRAMS

This section presents the applicable federal, state, regional, county, and local policies and regulations that the project components are required to comply with. Compliance with these policies and regulations, and future modifications thereof, is required, and will result in avoidance and/or minimization of adverse environmental impacts.

Federal

Archaeological and Historic Data Preservation Act of 1974

California Toxics Rule

Clean Air Act of 1970, amended 1977 and 1990

Clean Water Act of 1977, amending the Water Pollution Control Act

Comprehensive Environmental Response, Compensation and Liability Act of 1980, amended by the Superfund amendment and Reauthorization Act of 1986

Emergency Preparedness and Community Right-to-Know Act

Endangered Species Act of 1973, as amended (FESA)

Migratory Bird Treaty Act of 1918

National Historic Preservation Act of 1966, amended 1976 and 1980, Sections 106 and 110

Resources Conservation and Recovery Act

Rivers and Harbors Act of 1899, Section 10

U.S. EPA's 304(a) Gold Book (Water Quality Criteria)

U.S. EPA Federal Toxics rule

Water Pollution Control Act, as amended by the Clean Water Act of 1977; Section 404

State

Accidental Release Prevention and Hazardous Waste Control Laws

Alquist-Priolo Earthquake Fault Zone Act

California Clean Air Act

California Department of Fish and Game Stream Bed Alteration Agreement (Fish and Game Code Section 1601-1603)

California Department of Fish and Game Wildlife/Hardwood Management Guidelines (Revised 1994)

California Endangered Species Act (CESA) (Fish and Game Code Sec. 2050-2098)

California Government Code, Sec. 65962.5, Hazardous Waste and Substances Sites List (Cortese List

California Health and Safety Code, Sections 2270-2294, Mosquito Abatement

California Health and Safety Code, Section 25500 et seq. - Hazardous Materials Release Response Plans and Inventory

California Native Plant Protection Act (Fish and Game Code Section 1900-1913)

California Occupational Safety and Health Administration (Cal-OSHA)

California Wetlands Conservation Policy 1993

Porter-Cologne Water Quality Control Act

Public Resources Code, Sections 5020-5024 (California Register of Historic Places)

State Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy)

State Water Resources Control Board *Antidegradation Policy Implementation for NPDES Permitting (APU 90-004)*

Title 8, California Code of Regulations (CCR), Sec. 25500 *et seq*., Hazardous Material Storage

Title 8, California Code of Regulations (CCR), Sec. 1500-1938, California Construction Safety Regulations

Title 8, California Code of Regulations (CCR), Sec. 1539-1541.1, Excavations

Title 8, California Code of Regulations (CCR), Sec. 1509 & 3203, Injury and Illness Prevention Program

Title 8, California Code of Regulations (CCR), Sec. 1597-1599, Vehicles, Traffic Control, Flaggers, Barricades, and Warning Signs

Title 8, California Code of Regulations (CCR), Sec. 5194, Hazard Communication

Title 22, California Code of Regulations (CCR), Sec. 60301 *et seq*., Recycled/Reclaimed Water

Title 22, California Code of Regulations, Section 66260.1 *et seq*. - California Hazardous Waste Regulations

Uniform Building Code (UBC) as amended locally

Water Quality Control Plan for the San Francisco Bay Basin (1995)

Regional

Bay Area Clean Air Plan

Bay Area Air Quality Management District Risk Management Policy

Bay Area Air Quality Management District Rules and Regulations

Sonoma County

Sonoma County General Plan

Sonoma County Tree Ordinance (No. 4014)

Sonoma County Zoning Ordinance

Sonoma County Building Codes

Petaluma

Petaluma General Plan

Petaluma Building and Grading Regulations

Petaluma Zoning Ordinance

Petaluma City Ordinance No. 1856, Heritage & Landmark Trees

MEASURES INCLUDED IN THE PROJECT

This section presents the measures the City decided to incorporate into the project.

PD-1 Uniform Relocation Assistance

Description: To mitigate for the loss of a dwelling unit and disruption of farming operations, the City shall develop and approve a relocation assistance program in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies of 1970, which will govern all of the acquisition and displacement actions of the project. The affected property owner and tenants, depending on eligibility, would be afforded various services and forms of compensation in accordance with the provisions of this act.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR and after land acquisition.

Complete: Prior to the start of construction.

Monitoring Agency: City of Petaluma

Validation: Compensation of affected property owners and tenants shall be agreed upon in writing.

PD-2 Purchase Locally Grown or Inspected Plants

Description:	The City of Petaluma shall designate that the purchase of all plants for the wetlands and restoration efforts shall be from locally grown stock or from a nursery that has an approved monitoring program for the glassy-winged sharpshooter.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Prior to the start of landscaping or restoration
Monitoring Agency:	City of Petaluma
Validation:	Specifications for restoration and landscaping contracts

PD-3 Liquefaction Protection

Description*:*	The City shall densify or solidify soil as necessary where site specific conditions are identified that are liquefaction-prone. Over-excavation and replacement of liquefiable soil will be viable for some of the construction. Vibro-replacement or compaction grouting would also be effective, especially in areas of deeper excavation or trenching. Special foundation designs (e.g., pile or structural slab) may be appropriate for structures such as the new structures near existing Pond No. 10. Piles are not required for new facilities in existing Ponds No. 1 and 4.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: At completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Design phase geotechnical report.

PD-4 Seismic Design to Resist Ground Shaking

Description:	The City shall take into account the high probability of strong seismic ground shaking, by incorporating design features that accommodate lateral movements and flexibility. Construction of all facilities and earth embankments should meet UBC standards for Seismic Zone 4, Seismic Source Type A, and Seismic Coefficients of 0.44 Na (Ca) and 0.64 Na (Cv). UBC soil profile type for the site is Sd and near source factors for the Rodger's Creek fault are 1.19 (Na) and 1.58 (Nv). New facilities should be designed in accordance with the Sonoma County building codes which incorporate the seismic design for Zone 4 provisions of the 1997 Uniform Building Code.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Design phase geotechnical report.

PD-5 Standard Engineering Methods for Expansive Soils

Description:	The City shall implements standard geotechnical practices for expansive soils, testing according to American Society for Testing and Materials (ASTM) standards, and proper choice of materials shall be required.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Design phase geotechnical report.

PD-6 Standard Engineering Methods for Corrosive Soils

Description:	The City shall sample soils for corrosivity and remove affected soils. Facilities shall be constructed of materials not susceptible to corrosion or designed to provide corrosion protection.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** Upon certification of the EIR
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Design phase geotechnical report.

PD-7 Groundwater Monitoring and Management

Description:	The City shall monitor groundwater conditions around the site shall be monitored on a regular basis. Sampling of the three monitoring wells bordering the existing facility on the Lakeville site shall be supplemented by the addition of a fourth well, located downgradient from the proposed wetlands area (see Figure 4.4-1). This new well shall be installed and all four wells sampled prior to construction of new facilities. Following construction, the four wells shall be analyzed annually. Samples shall be analyzed for the constituents listed in Table 4.4-1, at a minimum. Additionally any constituents that are detected above the NPDES limits in the facility effluent should be added to the monitoring well analyze list. Monitoring shall include water level measurements. Should any groundwater contamination be determined to be resulting from the facilities, corrective action, such as source control (pretreatment) or additional treatment, shall be taken.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start:** Prior to the start of construction
	Complete: Five years after completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Annual report of monitoring results and Technical Memo describing corrective actions.

PD-8 Erosion, Stormwater Runoff, and Spill Control Measures

Description: The City shall develop and implement measures designed to prevent significant construction impacts to water quality. Examples of possible measures include the following:

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
Temporary Soil Stabilization	
SS-1	Scheduling
SS-2	Preservation of Existing Vegetation
SS-3	Hydraulic Mulch
SS-4	Hydroseeding
SS-5	Soil Binders
SS-6	Straw Mulch
SS-7	Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats
SS-8	Wood Mulching
SS-9	Earth Dikes/Drainage Swales & Ditches
SS-10	Outlet Protection/Velocity Dissipation Devices
SS-11	Slope Drains
Temporary Soil Stabilization	
SC-1	Silt Fence
SC-2	Desilting Basin
SC-3	Sediment Trap
SC-4	Check Dam
SC-5	Fiber Rolls
SC-6	Gravel Bag Berm
SC-7	Street Sweeping and Vacuuming
SC-8	Sandbag Barrier
SC-9	Straw Bale Barrier
SC-10	Storm Drain Inlet Protection
Wind Erosion Control	
WE-1	Wind Erosion Control
Tracking Control	
TC-1	Stabilized Construction Entrance/Exit
TC-2	Stabilized Construction Roadway
TC-3	Entrance/Outlet Tire Wash
Non-Storm Water Management	
NS-1	Water Conservation Practices
NS-2	Dewatering Operations

Construction Site Best Management Practices (BMPs)	
ID	**BMP Name**
NS-3	Paving and Grinding Operations
NS-4	Temporary Stream Crossing
NS-5	Clear Water Diversion
NS-6	Illicit Connection/Illegal Discharge Detection and Reporting
NS-7	Potable Water/Irrigation
NS-8	Vehicle and Equipment Cleaning
NS-9	Vehicle and Equipment Fueling
NS-10	Vehicle and Equipment Maintenance
Waste Management and Materials Pollution Control	
WM-1	Material Delivery and Storage
WM-2	Material Use
WM-3	Stockpile Management
WM-4	Spill Prevention and Control
WM-5	Solid Waste Management
WM-6	Hazardous Waste Management
WM-7	Contaminated Soil Management
WM-8	Concrete Waste Management
WM-9	Sanitary/Septic Waste Management
WM-10	Liquid Waste Management

Source: Caltrans 2000.

In addition, stormwater runoff collected on the Parcel A/B treatment facilities site during operation shall be diverted into the wastewater treatment system. Stormwater runoff from the visitors parking lot on Parcel A shall be treated either by diversion into the wastewater treatment system or installation of a retention basin/vegetated swale at the bottom of the lot.

Construction within the Petaluma River or the lower 300 feet of Ellis Creek shall be performed from a barge and with divers when appropriate. Excavation underwater shall be done with pressurized water.

Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Construction Manager
Timing:	**Start:** Prior to start of construction
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma and San Francisco Bay Regional Water Quality Control Board
Validation:	Storm Water Pollution Prevention Plan

PD-9 Conduct Phase II Site Assessment at Hopper Street to Assess the Potential for Contamination beneath the Sludge Lagoons

Description: The 1994 Phase I Site Assessment at 950 Hopper Street noted that the soil materials beneath the sludge lagoons may contain metals and other substances found in sewage influent. Therefore, the City shall perform a Phase II Site investigation (e.g., collection of soil or groundwater samples) for the lagoons. A State of California certified hazardous waste lab using EPA-approved analytical methods shall perform the laboratory analysis.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of demolition of Hopper Street facilities

Monitoring Agency: City of Petaluma

Validation: Phase II Site Assessment

PD-10 Monitor Soil and Groundwater during Demolition/Construction for Evidence of Hazardous Waste at Hopper Street

Description: The City shall include monitoring by the contractor for subsurface contamination in compliance with the California Department of Occupational Safety and Health (Cal/OSH) for all demolition/construction activities related to the demolition at Hopper Street that require excavation or exposure of soil in areas suspected of containing soil or groundwater contamination. This monitoring would, at a minimum, include visual observation by personnel with appropriate hazardous materials training, including 40 hours of Hazardous Waste Operations and Emergency Response (HAZWOPER) training as required by Cal/OSH for workers engaged in hazardous waste operations.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** At the start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Review of personnel training records to ensure use of appropriately trained personnel.

PD-11 Test Suspected and Properly Dispose of Contaminated Soils and Groundwater at Hopper Street

Description: In areas where contamination of soil and groundwater is suspected or known, the City shall contain groundwater brought to the surface as a result of dewatering in Baker tanks or similar containment devices or immediately dispose of or remediate on site as recommended by the Phase II investigation. At a minimum, this would allow the suspended solids associated with dewatering to settle out before discharge, if discharge is allowable. Depending on the Phase II investigation, and the probability of groundwater being contaminated based on visual or other evidence, samples would be collected and analyzed. A State of California certified hazardous waste laboratory using EPA-approved analytical methods should perform the laboratory analyses. The types of analyses should be based on the likely contaminant(s) and on local permitting requirements.

All potentially contaminated materials encountered during project demolition/construction activities shall be evaluated in the context of applicable local, state and federal regulations and/or guidelines governing hazardous waste. All materials deemed to be hazardous shall be remediated and/or disposed of following applicable regulatory agency regulations and/or guidelines. All evaluations, remediation, treatment and/or disposal of hazardous waste shall be supervised and documented by qualified hazardous waste personnel (having received a minimum of 40 hours HAZWOPER training).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Upon completion of Phase II investigation

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: The City of Petaluma shall ensure the use of qualified hazardous waste personnel, review the results of any hazardous waste analysis, and monitor any necessary containerization program.

PD-12 Inspect and Test for Lead-based Paint and Asbestos Containing Material (ACM) Any Buildings at 950 Hopper Street that will be Demolished

Description: The City shall inspect (and test as necessary) all buildings subject to demolition for asbestos containing material (ACM) and lead-based paints. Certified inspectors and consultants shall perform the work (i.e., Cal/OSH certification for asbestos workers and California Department of Health Services certification for lead workers). The City of Petaluma or its demolition contractor shall notify the Bay Area Air Quality Management District before demolition commences if the asbestos survey identifies ACM exceeding the threshold amounts specified in state regulations. Certified contractors shall perform any required remediation.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of demolition

Monitoring Agency: City of Petaluma

Validation: Review personnel certification records and pre-demolition inspection records to ensure compliance and carry out necessary notification and remediation.

PD-13 Mosquito Prevention

Description: The City shall continue consulting with the Marin/Sonoma Mosquito and Vector Control District in designing and developing the wetlands and storage ponds. The City of Petaluma shall comply with the Marin/Sonoma Mosquito and Control District's criteria for mosquito prevention in wastewater reclamation or disposal projects. The District's design and mosquito prevention criteria shall be incorporated into the project's Wetlands Management Program. For example, wetlands that are operated as shallow water areas (less than one foot) should be properly graded to facilitate drainage and ditched to provide access for mosquito fish. Among the District's design recommendations are that ponds should not have small coves or irregularities (although the ponds may be of any shape), that side slopes should be as steep as possible, and that dead algae, vegetation and debris should be routinely removed to minimize mosquito habitat.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start:** Upon certification of the EIR

Complete: Prior to the start of construction

Monitoring Agency: City of Petaluma

Validation: Marin/Sonoma Mosquito and Control District shall review design of wetlands and storage ponds.

PD-14 Construction Air Quality Controls

Description: The BAAQMD considers air quality impacts associated with construction activities to be less than significant, if all applicable control measures recommended in their CEQA guidelines are implemented. The City shall incorporate the following into construction contract specifications:

- Water all active construction areas with the potential to generate significant amounts of dust at least twice daily and more often during windy periods. Watering is the single-most effective measure to control dust emissions from construction sites. Proper watering could reduce dust emissions by over 75%.

- Cover all trucks hauling dirt or maintain at least two feet of freeboard. Dust-proof chutes shall be used as appropriate to load debris onto trucks during any demolition.

- Pave, apply water one time per day, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.

- Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.

- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas that are inactive for 10 days or more).

- Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.

- Limit traffic speeds on any unpaved roads to 15 mph.

- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

- Replant vegetation in disturbed areas as quickly as possible.

- Properly maintain construction equipment. This measure could reduce emissions of ROG, NOx and PM10 by about 5%.

- Prior to demolition activities, identify any hazardous building materials or soils that may be disturbed during construction/demolition. If hazardous materials are identified, consult with the BAAQMD's Enforcement Division to ensure that demolition activities will comply with BAAQMD Regulations.

- Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site or other equivalent measure.

- Optional – If necessary, install windbreaks, or plant trees/vegetative windbreaks at the windward side(s) of construction areas.

- Optional – Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph and visible dust emission cannot be prevented from leaving the construction site(s).

Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer
Timing:	**Start:** At the start of construction
	Complete: Upon the completion of Project construction
Monitoring Agency:	City of Petaluma
Validation:	Specifications for each construction contract.

PD-15 Permitting and Control of Toxic Air Contaminants

Description:	The City shall obtain all necessary permits from the BAAQMD. If necessary, the project shall incorporate control equipment to reduce exposure of the public to insignificant levels. Control measures, such as carbon absorption systems, shall be implemented if necessary to reduce air toxic emissions.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start:** Upon certification of EIR. **Complete:** Prior to start of Project operation.
Monitoring Agency:	City of Petaluma
Validation:	BAAQMD permits and Technical Memo describing control measures if needed.

PD-16 Odor Control

Description:	The City shall ensure proper design and operation of the facilities to reduce the potential for odor complaints. The design and operation of facilities shall ensure conformance with BAAQMD Regulation 7. Ten or more complaints or five or more verified complaints over a 90-day period would indicate that an odor problem with the proposed facility exists. Additional mitigation/abatement measures, such as scrubbers or further oxidation processes, shall be taken to eliminate any substantial odor problems
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer and Plant Operator
Timing:	**Start:** Upon certification of EIR
	Complete: On-going during operation of project
Monitoring Agency:	City of Petaluma
Validation:	A complaint monitoring program and Technical Memo describing additional abatement measures if required.

PD-17 Construction Noise Mitigation Measures

Description: The City shall incorporate the following conditions in related construction contract agreements:

- Construction Scheduling. Limit noise-generating construction activities, including truck traffic coming to and from the site for any purpose, to daytime, weekday, non-holiday hours (7:00 am to 6:00 pm).
- Construction Equipment Mufflers and Maintenance. Properly muffle and maintain all construction equipment powered by internal combustion engines.
- Idling Prohibitions. Prohibit unnecessary idling of internal combustion engines.
- Equipment Location and Shielding. Locate all stationary noise-generating construction equipment such as air compressors as far as practical from existing nearby residences and other noise-sensitive land uses. Acoustically shield such equipment.
- Quiet Equipment Selection. Select quiet construction equipment, particularly air compressors, whenever possible. Fit motorized equipment with proper mufflers in good working order.
- Noise Disturbance Coordinator. Designate a "noise disturbance coordinator" who will be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Construction Manager/City of Petaluma

Timing: **Start:** During construction

Complete: At the completion of construction

Monitoring Agency: City of Petaluma

Validation: The City will perform daily checks to ensure compliance with this measure. The City will respond to complaints from private citizens regarding construction noise within 24 hours.

Construction noise shall be monitored at the property line during high noise generating activity to determine compliance with local noise criteria. The sound level should not exceed 60 dBA L_{eq} for occupied properties. In the event that the noise criteria are exceeded, the construction activities shall be reviewed to determine additional mitigation measures to further reduce the construction noise. The telephone number of the Noise Disturbance Coordinator shall be made available to the residents around the project site so that annoyed residents would be able to report their complaints.

PD-18 Operational Noise Mitigation Measures

Description: As part of the design process the City shall retain an acoustical engineer to ensure that the noise levels produced by mechanical equipment at the Lakeville facility do not exceed County standards. Potential measures may include;

- Acoustical enclosures at noise producing equipment
- Alternative equipment selections with lower noise emissions
- Mufflers for equipment exhaust systems

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** During final design of the proposed Project

Complete: At completion of final design

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract

PD-19 Protection of Historic and Archaeological Resources

Description: The City shall evaluate the Hopper Street facility, the communication facility, and the railroad grade for historical significance. The sites shall be recorded, mapped, and photographed by a qualified architectural historian to DPR standards on DPR 523 series forms. All site records and evaluation documentation shall be submitted to the State Historic Preservation Officer prior to any construction on the respective Lakeville Highway or Hopper Street sites.

The City shall implement a Historic Property Treatment Plan (HPTP) for the farmhouse complex to mitigate adverse impacts that cannot be avoided by the Project. The HPTP must meet the requirements of the *Memorandum of Agreement Among the California State Water Resources Control Boar, United States Army Corps of Engineers, the City of Petaluma, and the California State Historic Preservation Officer Regarding Construction of the Ellis Creek Water Recycling Facility Project, Sonoma County California (MOA).*

The City shall implement the following elements of the HPTP, as stated herein, or as required by the California Office of Historic Preservation.

Avoidance during Construction

- Use protective fencing and monitoring to avoid impacts to components of the Masciorini Ranch such as the residence and much of the associated landscaping, dock remains on Ellis Creek, and landing piling remains on the Petaluma River. Establish an Environmentally Sensitive Area (ESA) around the dock and landing piling remains by the installation of high-visibility exclusionary fencing.

Interpretation / Public Participation

- Develop a brochure with interconnected historical interpretation of the Petaluma River, Northwestern Pacific Railroad, and the Masciorini Ranch.

- Meet with the Sonoma County Historical Society and the Petaluma Museum to obtain input for the preparation of the interpretive brochure.

- Make brochures available at the nearby Petaluma Visitors Center, local schools, Petaluma Museum, local library, and at the parking area near the public access portion of the site.

Create a self-guided tour for visitors linking brochure highlights to features of the ranch (e.g., residence, landings, railroad stop) through signage.

- Offer selected equipment (e.g., haystacker) to agricultural museums.

Prevent Adverse Effect by Neglect

- A caretaker may live in the Masciorini residence after project construction is completed. Any alterations to the residence needed to accommodate the caretaker must be taken into account in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (Secretary's Standards).

- Maintain the residence in its current condition, or rehabilitate it in accordance with the Secretary's Standards, to prevent loss of historical integrity.

Resource Documentation

- Record the Masciorini Ranch buildings and landscape features to Historic American Building Survey (HABS) standards.

- Prepare a history of the Masciorini Ranch to accompany the HABS-standards recording.

- Update the DPR 523 forms.

- Present the HABS-standard recording, history of the Masciorini Ranch and updated DPR 523 forms in a report to submit to the NWIC, the City, the State Water Resources Control Board (State Water Board), and the US Army Corps of Engineers.

Monitoring

- To effectively address unanticipated cultural resource discoveries, provide archaeological monitoring by a professional archaeologist for ground disturbing activities within and adjacent to the Ranch complex core and for demolition of Masciorini Ranch outbuildings. The duration and intensity of the program can range from full time monitoring to "as needed" inspections on either a regular or intermittent basis throughout all ground disturbing operations. Monitoring may be used 1) to ensure that construction avoids ESAs, 2) to ensure that any significant features that may have been missed during preconstruction identification are recorded

and properly treated, and 3) to identify archaeological resources that may occur but could not be addressed in advance of construction because they were deeply buried or covered by buildings or structures that could not be moved during preconstruction identification (Advisory Council on Historic Preservation 1989:49).

- Conduct monitoring by a Project Archaeologist with appropriate regional experience to ensure that prehistoric and historical cultural materials are preserved and to ascertain whether or not construction may continue or should be redirected after the unexpected discovery of any cultural materials.

- The Project Archaeologist will have the authority to temporarily halt construction operations within 50 feet of an unanticipated find to determine if significant cultural resources are present and if they will be adversely affected by continuing construction operations. Work may continue outside a 50-foot radius of the find.

- In the event that cultural resources are exposed during construction, the Project Archaeologist will immediately stop work at the location of the find or if the Project Archaeologist is not present, a responsible member of the construction crew will stop work at the find. The Environmental Manager (or other designated individual including the Construction Manager) will be notified of the discovery and the temporary work stoppage. The Project Archaeologist, if not present when the find is discovered, will be immediately notified by the Environmental Manager.

- The Project Archaeologist will immediately notify the State Water Board if cultural resources over 45 years old are exposed during construction. Formally record finds over 45 years old on DPR 523 forms and recommend measures to avoid adverse effects to it during construction.

Reduce Visual Effects

- Incorporate rural building design (pole barn) at the main electrical building so that it will be in keeping with the Ranch's historical setting.

Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start:** Upon certification of the EIR
	Completion: Within 6 months after the start of operations.
Monitoring Agency:	City of Petaluma
Validation:	Annual reporting starting no more than one year following the start of construction, and continuing on a yearly basis thereafter until the State Water Board, the Army Corps of Engineers, the City, and SHPO agree in writing that the terms are fulfilled.

PD-20 Protection of Previously Undiscovered Historic and Archaeological Resources

Description: If subsurface archaeological or historical remains are discovered during construction, work in the area shall stop immediately and a qualified professional archaeologist shall be consulted to develop, if necessary, further mitigation measures to reduce any archaeological impact to a less than significant level before construction continues.

If human burials are encountered, all work in the area will stop immediately and the Sonoma County coroner's office shall be notified immediately. If the remains are determined to be Native American in origin, both the Native American Heritage Commission and any identified descendants must be notified and recommendations for treatment solicited (CEQA Section 15064.5); Health and Safety Code Section 7050.5; Public Resources Code Section 5097.94 and 5097.98).

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and Construction Manager

Timing: **Start:** Upon certification of the EIR

Completion: Completion of construction

Monitoring Agency: City of Petaluma

Validation: A qualified professional archaeologist shall be consulted if subsurface archaeological or historical remains are discovered.

PD-21 Landscaping Design

Description: The City shall provide landscaping to screen views of the site from northwest-bound Lakeville Highway and residents east of the highway. Landscape materials in the form of mature and fast-growing trees (such as the poplars already on site) and other appropriate vegetation at the site's southwestern perimeter would screen the view from northwest-bound travelers. Where technically feasible, locate new facilities on the southwest portion of the site to increase the viewing distance from the highway. Design the landscaping, buildings and facilities in character with the surrounding agricultural uses and subject to site plan and architectural review. If new fencing is necessary along Lakeville Highway, locate new fencing for the new facility away from the highway with a landscape buffer between the highway and the fence.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer

Timing: **Start:** During construction.

Complete: Within one year of completing construction of a Project component.

Monitoring Agency: City of Petaluma

Validation: Specifications for landscape and restoration contracts

PD-22 Lighting Design

Description: The City shall design lighting for the administration and maintenance buildings, treatment facilities and parking areas to utilize shielded, low-intensity light sources. Locate light sources low and directed away from off-site viewers. Direct personnel to turn lights on only when needed; do not operate exterior lighting continuously or automatically.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: Design Engineer and City of Petaluma

Timing: **Start:** Certification of the EIR

Complete: Throughout the life of the project

Monitoring Agency: City of Petaluma

Validation: Specifications for each construction contract. The design of the lighting will be verified during the review and certification of Final Engineering Drawings. The City will check compliance with installation of the specified lighting and controls during regular inspections of construction. The City will monitor conformance with the operational criteria as part of regular reviews of operation procedures.

PD-23 Fire Protection

Description:	The City shall provide sprinklers in new buildings. In addition to the sprinklers, there will be a requirement to install a weather station at the site. This will provide the Fire Department with weather information in the event of any potential release of hazardous chemicals in the future. Fire alarms shall be installed at the site. This will quickly alert employees of fire danger and allow them to evacuate the area.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Design Engineer and City of Petaluma
Timing:	**Start**: At start of construction
	Complete: Upon completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Specifications for each construction contract

MITIGATION MEASURES

This section contains mitigation measures to be implemented prior to, during, and immediately following project construction. These measures generally require the construction manager to follow certain constraints during construction and to repair and rehabilitate impacts resulting from construction of the project. Compliance with these mitigation measures would result in minimizing, rectifying, or reducing adverse environmental impacts.

LU-1 Annexation and Change of General Plan Land Use Designation and Zoning

Description:	The City shall apply for annexation of Parcels A and B prior to construction of project facilities and change the General Plan Land Use Designation and zoning to a designation that allows allow for public facilities on the site (i.e., Public and Institutional Land Use Designation and General Industrial zone). As part of annexation, the Urban Growth Boundary shall be revised to include Parcels A and B.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: After approval of the project
	Complete: Prior to the start of construction
Monitoring Agency:	City of Petaluma
Validation:	Copy of the LAFCO resolution approving annexation.

GW-1 Drinking Water Well Protection Program

Description: The City shall monitor water quality in the nearby drinking water well before and after construction. If changes are detected after construction that are deemed deleterious to public health, one of the following measures, or an equivalent measure, shall be implemented:

- Drill a new well further from the Water Recycling Facility
- Retrofit the existing well, e.g., provide a deeper casing
- Provide wellhead treatment system for the constituents that are causing the public health concern.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring and Technical Memo describing corrective measures if necessary.

WQ-1a Chromium Monitoring and Source Reduction Program

Description: The City shall implement a Chromium Monitoring Program to determine if the concentration of chromium in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of chromium to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of chromium during the discharge season exceed the lowest CTR or Basin Plan criterion for chromium (currently 11 µg/L), the City shall implement a Chromium Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for chromium and will provide for enforcement of these limits. Typical chromium sources are industries involving the following uses of chromium: fabrication of alloys; preparation of alloy steels to enhance corrosion and heat resistance; fabrication of plated products for decoration or increased wear resistance; production of non-ferrous alloys to impart special qualities to the alloys; textile industry use in dyeing, silk treating, printing, and moth proofing wool; leather industry use for tanning; photographic fixing baths; and fuel additives and propellant additives.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Ongoing

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1b Nickel Monitoring and Source Reduction Program Program

Description: The City shall implement a Nickel Monitoring Program to determine if the concentration of nickel in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of nickel to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If three consecutive samples of nickel exceeds the lowest CTR or Basin Plan criterion for nickel (currently 7.1 µg/L), the City shall implement a Nickel Source Control Program. Under this program, the City will establish or revise as necessary local pretreatment limits for nickel and will provide for enforcement of these limits. Typical nickel sources are manufacturing processes involving the following uses of nickel: plating; for various alloys such as new silver, Chinese silver, German silver; for coins, electrotypes, lightning rod tips, electrical contacts and electrodes, spark plugs, machinery parts; as a catalyst for hydrogenation of organic substances; in the manufacture stainless steels and nickel chrome resistance wire; and for coloring glass.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Ongoing

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1c Bis(2-ethylhexyl)phthalate Effluent Monitoring and Source Reduction Program

Description: The City shall implement a Bis(2-ethylhexyl)phthalate Effluent Monitoring Program to determine if the concentrations of bis(2-ethylhexyl)phthalate in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of bis(2-ethylhexyl)phthalate results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for bis(2-ethylhexyl)phthalate. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Five years after completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1d Constituents not Monitored in Effluent Monitoring and Source Reduction

Description:	The City shall implement an Unmeasured Priority Pollutant Monitoring Program to determine if the concentrations of aldrin, 2,3,7,8-TCDD, acrolein, and acrylonitrile in effluent will cause a significant impact on the receiving water if discharged. Monitoring shall be done at least twice a year for a period of at least three years. If three consecutive samples during discharge season of any of these compounds results in receiving water concentrations that exceed the water quality criterion, the City shall implement a source control program for that compound. Under this program, the City will establish local pretreatment limits and provide for enforcement of these limits.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: After certification of the EIR **Complete**: Five years after completion of construction
Monitoring Agency:	City of Petaluma
Validation:	Annual monitoring reports and Technical Memo describing source reduction program if needed.

WQ-1e Dioxin/Furan Congener Monitoring and Source Reduction Program

Description: The City shall implement a Dioxin/Furan Congener Monitoring Program to determine if the concentration of dioxin/furan congeners in wastewater will cause a significant impact on the receiving water if discharged and, if necessary, identify and control the source of dioxin/furan congeners to avoid causing an impact in receiving waters and to comply with the anticipated mass emissions limit. If the TEF normalized concentration of three consecutive samples of a dioxin/furan congener exceeds the lowest CTR or Basin Plan criterion for 2,3,7,8-TCDD (currently 0.014 µg/L) or any future CTR or Basin Plan criterion established for that congener, the City shall implement a Dioxin/Furan Congener Source Reduction Program for non-atmospheric sources of dioxin/furan congeners. Under this program, the City will establish local pretreatment limits for non-atmospheric sources of the dioxin/furan congener and will provide for enforcement of these limits.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR

Complete: Ongoing

Monitoring Agency: City of Petaluma

Validation: Annual monitoring reports and Technical Memo describing source reduction program if needed.

BIO-1a Aquatic Species Protection Program

Description: The City shall implement an Aquatic Species Protection Plan, as follows:

- A Worker Environmental Awareness Training Program for construction personnel shall be provided.
- Any ground-disturbing construction activity in Ellis Creek (i.e., in the bank or bed of the channel) shall be 1) conducted when no or low freshwater flow from upstream into the work area (which will potentially be tidal at the time of construction) is occurring to avoid downstream transport of sediment and impacts on any migrating salmonid fish, or other rare aquatic species; and 2) conducted between coffer dams around which any tidal or stream flow shall be routed. Prior to coffer dam installation, a qualified biologist shall seine the area between the dams and the area within 25 feet of the dams to determine if sensitive species are present. If sensitive species are present, they should be relocated in consultation with NMFS, USFWS and DFG consistent with federal and State regulations.
- Facilities shall be located and constructed using methods that minimize the loss of existing riparian vegetation. Unavoidable loss of riparian vegetation shall be mitigated by planting sufficient riparian vegetation of like species so as to compensate for the loss.
- A 20-foot buffer zone from the top of the bank of Ellis Creek shall be established, where feasible, and fenced during construction.
- If aquatic habitat must be removed, create or restore like habitat on site at a compensatory ratio of 1:1 (1 acres of restored habitat for every 1 acre impacted) or as required by the Corps of Engineers or Regional Water Quality Control Board. Identify opportunities to improve current habitat conditions within Ellis Creek and implement, where feasible. Cropped upland is available as mitigation sites for salt marsh, freshwater marsh, or stream impacts. Shollenberger Park also has sites available for mitigation for river habitat impacts.
- Best management practices shall be implemented to control erosion, sedimentation, and runoff of pollutants. As an appropriate example, best management practices are described in the *Caltrans Storm Water Quality Handbooks: Construction Site Best Management Practices Manual*

(November 2000). Refer to PD-8 for a potential list. These shall be implemented as necessary under the supervision of the construction manager. Detailed specifications shall be incorporated onto bid documents and construction drawings.

- Construction and grading activities that would affect Ellis Creek, or upland areas that might erode into the creek, shall be restricted to the dry season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: Before start of construction of the affected area

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

BIO-1b Rare, Threatened and Endangered Plant Protection Program

Description: The City shall retain a qualified biologist to conduct floristically-based surveys for special-status plants in accordance with the CDFG's "Guidelines for Assessing the Effects of Proposed Developments on Rare and Endangered Plants and Plant Communities" prior to initiation of construction activities. The purpose of these surveys will be to locate and identify any special-status plants that may occur in the proposed construction zone.

If special-status plants are located during the surveys, exclusionary buffer zones (recommend a minimum 20-foot buffer, where feasible) shall be established around each population site. Mesh fencing shall be installed at the boundary of the exclusionary buffer zone prior to initiation of construction activities.

If complete avoidance cannot be achieved, the City shall submit a site-specific mitigation and compensation program for the affected plants in consultation with the CDFG. The mitigation program shall include the results of the surveys, delineation of suitable habitats for restoration or planting of rare species, procedures for obtaining seed before construction, and performance standards for success of the mitigation program. Sufficient areas exist along Ellis Creek and elsewhere on the site to create or restore plant communities if needed.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

BIO-1c Wildlife Protection Program

Description:	The City shall implement rules at the public areas on Parcels A and B to require dogs to be leashed at all times. In addition, rules will be established requiring the public to remain on established trails.
Lead Agency:	City of Petaluma Water Resources and Conservation Department and City of Petaluma Parks and Recreation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: Upon completion of construction
	Complete: Throughout the life of the project
Monitoring Agency:	City of Petaluma and Construction Manager
Validation:	Copy of rules

BIO-2a Active Raptor and Migratory Bird Nest Protection Program

Description: The City shall retain a qualified biologist to conduct pre-construction surveys to determine if any active raptor or migratory bird nests occur within 500 feet of the project area at least two weeks prior to initiation of construction activities.

If active nests are located in the study area, construction exclusion zones shall be established around each active nest. Appropriate construction exclusion zones shall be established through consultation with CDFG. Construction activities shall be prohibited within exclusion zone until the end of the nesting season.

During construction, a qualified biologist shall monitor each nest to evaluate potential nesting disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the nesting raptors. The monitor shall also monitor the nest to determine when the young have fledged and submit weekly reports to the CDFG and the City of Petaluma throughout the nesting season.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report

BIO-2b Rookery/Nest Protection Program

Description: A qualified biologist will conduct pre-construction surveys to determine if rookeries or other nests of protected species occur within 500 feet of an active project construction area. Appropriate construction exclusion zones and seasonal limitations shall be established through consultation with the California Department of Fish and Game to ensure that no construction activities occur within the exclusion zone of an active rookery or nest during the seasonal limitation.

If an active rookery or nest is found, a qualified biologist shall monitor it to evaluate potential disturbances caused by the construction activities. The monitor shall have the authority to stop construction if it appears to be having a negative impact on the rookery or nest.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma and Construction Manager

Validation: Annual report.

BIO-7 Create or Restore Wetlands and Waters of the U.S.

Description: The City shall obtain credits at an approved Wetlands Mitigation Bank or prepare a Conceptual Wetland Mitigation and Monitoring Plan that requires revegetation of temporary impacts to wetlands and compensatory creation of wetlands for permanent impacts. If the Plan option is selected, it shall include a planting palette, a conceptual planting plan, performance criteria, and procedures for maintenance and monitoring. ~~Mitigation will be on site and in kind, if possible.~~

Compensatory mitigation for permanent impacts shall be provided at a ratio of 1:1, that is, 1 acres of wetland habitat created for every acre filled, or at the ratio prescribed by the Corps of Engineers or Regional Water Quality Control Board.

Lead Agency: City of Petaluma Water Resources and Conservation Department

Implementing Agency: City of Petaluma and Design Engineer

Timing: **Start**: After certification of the EIR start of construction

Complete: Upon completion of construction

Monitoring Agency: City of Petaluma

Validation: Annual report

TR-1a Reroute Construction Worker Trips

Description:	Before 9:00 AM and after 4:00 PM, and after the new access road is constructed, construction workers shall be required to enter and exit Lakeville Highway at McDowell Boulevard.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	Construction Manager
Timing:	**Start**: At start of construction.
	Complete: Upon completion of construction.
Monitoring Agency:	City of Petaluma
Validation:	Specifications in each construction contract

TR-1b Install Signage to Reroute Employee and Visitor Trips

Description:	The City shall install an informational sign on Lakeville Highway just west of the intersection with McDowell Blvd., indicating that the new wetlands park can be accessed by turning right on McDowell Blvd. In addition, the City shall install a sign as visitors leave the wetlands park to prohibit a right turn into Pine View between 4:00 and 6:00 PM on weekdays.
Lead Agency:	City of Petaluma Water Resources and Conservation Department
Implementing Agency:	City of Petaluma
Timing:	**Start**: Upon completion of construction
	Complete: Throughout the life of the project
Monitoring Agency:	City of Petaluma and Construction Manager
Validation:	Copy of signage

RESOLUTION NO: 16-0309-7b

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: CITY OF PETALUMA BIOMASS-TO-BIOFUEL (B2B) PROJECT

WHEREAS, the City of Petaluma is the Lead Agency for proposed Agreement ARV-15-054, "City of Petaluma Biomass to Biofuel (B2B) Project" (hereafter, "ARV-15-054), to construct, at an existing wastewater recycling facility, an anaerobic digestion system including an anaerobic digester; biogas processing unit; compressed natural gas fueling station; screw press and housing; and a high-strength waste facility; and

WHEREAS, the City of Petaluma, on August 5, 2002, certified a Final Environmental Impact Report for the Water Recycling Facility and River Access Improvements Project (hereafter, "EIR"), the water recycling facility being the site at which the work proposed under ARV-15-054 will be completed, and also adopted a Mitigation Monitoring Program; and

WHEREAS, the City of Petaluma, on June 7, 2004, re-certified the EIR and adopted a Revised Mitigation Monitoring Program; and

WHEREAS, the City of Petaluma, on January 4, 2016, certified an Addendum to the EIR which considered work to be performed under ARV-15-054, adopted a Revised Mitigation Monitoring Program, and made findings that work under ARV-15-054 presents no new significant or substantially more severe environmental impacts beyond those already considered in the EIR and mitigated via the Revised Mitigation Monitoring Program; and

WHEREAS, the Energy Commission has reviewed the 2002 EIR and 2016 Addendum, has no information indicating that the environmental documentation is inadequate, and has used its own independent judgment to consider the EIR and Addendum in deciding whether to approve proposed Agreement ARV-15-054;

THEREFORE BE IT RESOLVED, that the Energy Commission finds, on the basis of the entire record before it, that the mitigation measures incorporated in the EIR and Addendum will prevent the proposed project from having any significant environmental impacts; and

BE IT FURTHER RESOLVED, that the Energy Commission approves Agreement ARV-15-054 with the City of Petaluma for $3,000,000; and

BE IT FURTHER RESOLVED, that this document authorizes the Executive Director or his or her designee to execute the same on behalf of the Energy Commission.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a RESOLUTION duly and regularly adopted at a meeting of the California Energy Commission held on March 9, 2016.

AYE: [*List Commissioners*]
NAY: [*List Commissioners*]
ABSENT: [*List Commissioners*]
ABSTAIN: [*List Commissioners*]

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Tiffani Winter,
Secretariat