San Luis Obispo County
Flood Control and
Water Conservation District

FEBRUARY 2004

Oceano Drainage and Flood Control Study

FINAL REPORT

RMC
Raines, Melton & Carella, Inc.
Consulting Engineers/Project Managers
In Association with:
Essex Environmental & Questa Engineering Corp

San Luis Obispo County
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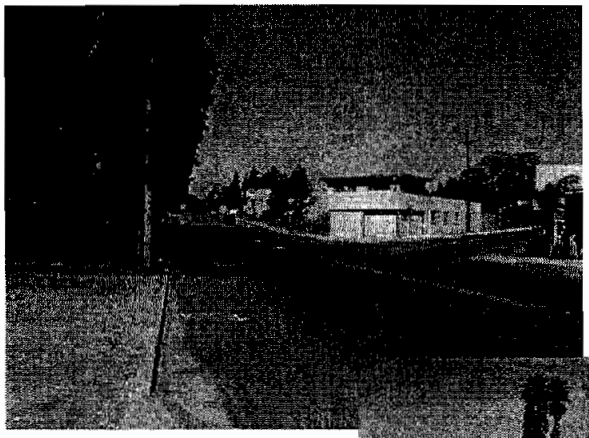

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EXECUTIVE SUMMARY

This report is a summary of findings, conclusions and recommendations of the Drainage and Flood Control Study conducted for the Community of Oceano. This report was prepared under the direction of the County of San Luis Obispo Public Works Department.

In response to questions raised by several citizens who experienced flood damage to their homes and businesses during the unusually heavy rainfall period of March 2001, the County Board of Supervisors approved funding for Drainage and Flood Control Studies for the communities of Cambria, Cayucos, Nipomo, Oceano, San Miguel, and Santa Margarita. **The goals of the studies were intended to quantify the extent of drainage and flooding problems of each of these communities, to generate recommendations for solutions for the drainage problems, to identify environmental permitting requirements, to provide planning level cost estimates, and to outline a plan for funding and implementation of the proposed solutions. This study was funded through the General Flood Control District Budget**.

Overview of Responsibility

The responsibilities for drainage are administered through the San Luis Obispo County Flood Control and Water Conservation District (District). The District is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in unincorporated public areas where no other agency has assumed an active role in such activities. The District has a regional role in the County and can work with individual cities or communities when requested. The District uses its general funding to identify water related issues, to determine solutions for these issues and to help local areas implement recommended solutions. The District is not, however, responsible for paying for community-specific mitigation improvements. **The specific property owners that benefit from these solutions must agree to pay for the construction and future maintenance of them. This policy (Resolution 68-223) was formally established by the Board of Supervisors in 1968. The policy was adopted because there is not sufficient funding available for the District to fund construction and operation of facilities**. This approach provides the best leveraging of the funds that are available.

The District is restricted in the way it can fund needed projects or increase revenues for existing operations. It is generally limited to an assessment district procedure for obtaining financing for the construction of new projects. Due to the changes enacted with the passage of Proposition 218, the District must now have all new benefit assessments and increases to existing benefit assessments for maintenance and operations approved through an election of affected property owners.

Existing Drainage Problems

In Oceano, flood control facilities are limited because in its early stages of urbanization, storm water conveyance and flood control infrastructure were not incorporated into the community because the high infiltration rate of the underlying sands was sufficient to naturally dispose of runoff. With an increase in urbanization came an increase in impervious surfaces and a decrease in the capability of the underlying soil to adequately absorb urban runoff. This has resulted in several areas becoming flood prone, causing public and private property damage during storms.

The combination of the area's geology, shallow topography, construction within natural drainage courses without provisions for rerouting surface drainage, and inadequate drainage facilities has resulted in localized poor drainage and/or flooding around some residences, buildings, and roadways. The most serious flooding in the community takes place along Highway 1. Extensive ponding can occur for several days after significant rainfall, causing damage to nearby businesses and creating driving hazards. This problem is generally caused by relatively flat topography and lack of capacity in the drainage facilities to convey runoff south towards the Arroyo Grande Creek Channel. The two main locations of the flooding occur at the intersection of 17th and 19th

Streets with Highway 1 (also known as the Cienaga and Front Street intersection) and the intersection of 13th Street and Paso Robles Street with Highway 1, as shown in Figure 5 of Appendix A.

Proposed Projects

The basic drainage issues in Oceano that need to be addressed include:

- Shallow flooding in residential areas
- Significant frequent flooding at Highway 1
- Management of local storm water runoff when the Arroyo Grande Creek Channel is flowing high

Existing infrastructure, such as the railroad, levees, the airport, and various agricultural operations, have filled in historical drainage paths to the Arroyo Grande Creek Channel. The result is that Highway 1 and the railroad right of way are the lowest points along the blocked drainage courses and are therefore flooded when there is a large storm event. The recommended solution to the problems is the construction of a comprehensive storm drainage system.

Near Term Project

Build Downstream Detention Facility

Prior to designing and constructing drainage infrastructure in the community, the underlying problem of how to convey flow into the Arroyo Grande Creek Channel or to a terminal disposal facility must be resolved. Based on the available land, location to the Arroyo Grande Creek Channel, and presence of an existing creek outfall, it is recommended that the County's Airport Enterprise Fund property, currently used as an RV Storage Lot, be further explored as a potential detention facility location. The proposed location is shown in Figure 9 of Appendix A. Constructing a detention facility would be the first step in building a comprehensive and effective community drainage infrastructure project.

The RV storage property is owned by the County's Airport Enterprise Fund, and was acquired with Federal Aviation Administration (FAA) funds. The property was purchased for the primary purpose of providing Runway Protection Zone (RPZ) for the Oceano airport. Allowable land uses within RPZ's are limited and must comply with local, state, and federal airport land use criteria. In addition, because the property was purchased with a FAA grant, the County is obligated, for perpetuity, to comply with grant assurances which include both physical and financial restrictions on the use of the property. The County must obtain FAA approval prior to any change in use of any airport property, including the RV storage property, since this was purchased using FAA funds. Furthermore, approval would be required from Caltrans Division of Aeronautics in order to ensure compliance with State airport permitting regulations.

County General Services staff indicated that there was a potential for use of airport property for drainage and flood control facilities, providing the following could occur:

- The revenue collected for RV storage would need to be replaced since this annual revenue collection is used to operate the airport.
- The proposed drainage basin would need to show a benefit to the airport in order to encourage FAA approval in change of land use.
- The potential conflict between waterfowl and aircraft would have to be addressed. FAA provides guidelines for mitigating against an attractive nuisance such as detention basins.

The County's General Services Department is in the process of initiating a Master Plan update for the Oceano Airport, and will subsequently prepare an environmental impact report (EIR) and Nation Environmental Policy Act (NEPA) document. The Master Plan update could potentially include drainage features that benefit the

airport and the community. Also, the Master Plan could possibly include the evaluation of wildlife attractants in more detail than is required for this drainage study.

Construct Highway 1 and Channel Improvements

The proposed Highway 1 improvements could then be constructed since a terminal facility would be in place to manage the additional runoff resulting from the installation of curbs and gutters east of Highway 1. Highway 1 improvements assume that ultimately, curbs and gutters would be built in the entire community, increasing runoff above what is currently experienced at Highway 1. Mitigating the flooding near Paso Robles Street and Highway 1 can be achieved by constructing a diversion pipeline adjacent to Highway 1 to divert runoff to the existing 42-inch railroad culvert near Front Street. The existing drainage channels would also need to be improved and the culverts on Creek Road would need to be replaced. These proposed improvements are shown in Figure 9 of Appendix A.

Long Term Project

Storm Drain, Curb and Gutter System

The final component of a comprehensive storm drainage and flood control project would be the mitigation of flooding problems in the residential neighborhoods of Oceano. It is proposed that a continuous curb and gutter system, along with a storm drain collection system be constructed. For those streets located in low points with no outlet, a subsurface infiltration chamber system could provide the necessary infrastructure to dispose of storm water from limited watershed areas. Due to the necessary phasing of improvements from the lower elevations to the higher elevations, these alternatives would be the last implemented. However, once in place, a series of curbs, gutters, storm drains, culverts, and detention basin would collect and convey storm runoff from the residential neighborhoods of Oceano to a terminal detention facility west of Highway 1, and eventually discharge to the Arroyo Grande Creek Channel or percolate into the groundwater.

These projects are recommended for mitigating flooding in the residential neighborhoods, preventing flooding of Highway 1, and providing a terminal disposal point for the collected runoff. It should be noted that the proposed improvements would address flooding created by a 10-year or less rain event. The benefit is that the most frequent problems experienced by residences on an annual basis would be corrected. Flooding problems could be expected for events larger than a 10-year event, however, proposing projects that mitigate flooding caused by larger rain events was determined infeasible due to the intensity of existing development and excessive cost of additional flood protection. The cost estimates for the four alternatives are summarized in Table ES-1.

Additional Recommendations

FEMA Community Rating System

Oceano should participate in the Community Rating System (CRS). The CRS gives credit points for any of several designated activities within four distinct categories (Public Outreach, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness). As points are accumulated, a community will receive one class reduction starting at class 9 all the way down to class 1. Each class translates to an additional reduction in insurance premiums of five percent for flood insurance policies within the special flood hazard area of that community.

New Development Investigate Drainage Flow Pattern

The County's Department of Planning and Building should require that all proposed developments that generate off-site runoff should investigate the drainage flow pattern from the lot to the discharge point. The conveyance path investigation requirement can be placed in the building or the grading permit. If the investigation

concludes that the proposed development is contributing to an existing problem, then on-site mitigation with a detention basin or equivalent facility should be required.

Table ES-1: Summary of Alternatives

PROJECT	LOCATION	PROBLEM AREA	PROPOSED MITIGATION	COST [1]	APPROXIMATE IMPLEMENTATION TIME FRAME [2]
Detention Facility	County's Airport Enterprise Fund	Drainage to Arroyo Grande Creek Channel	Construct detention facility to serve as terminal disposal facility	$1,753,000 [3]	4 to 5 years
Highway 1 Improvements	Highway 1	Flooding of Highway 1	Construct a diversion pipeline and improve existing drainage infrastructure	$1,820,000	5 to 6 years
Curb/Gutter and Storm Sewer	Zone F [4]	Zone F Residential Flooding	Construct complete storm sewer, curb and gutter system	$1,792,000	4 years
Curb/Gutter and Storm Sewer	Zone G	Zone G Residential Flooding	Construct complete storm sewer, curb and gutter system	$5,312,000	4 years
Infiltration Chambers	Zone F/G	Various Streets	Construct infiltration chambers in low lying streets with no drainage outlet	$1,303,000	As implemented by property owners

1. ENR CCI for Los Angeles (February 2003) = 7,566. Includes 20% for Engineering and Design, 60% for Administrative and Environmental, and a 20% Contingency. Typical estimates used for County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).
2. See Tables 6-2 and 6-4 for detailed milestone durations.
3. Includes present worth cost of lost annual revenue from RV storage facility and lost revenue from possible land sale.
4. Zones F and G improvements are shown in Figure 10 of Appendix A.

Defer Curb and Gutter Installation Requirement

County land use ordinance 22.106.070.A.2 requires curb, gutter and sidewalk installation with any project in the Oceano urban area, however, the installation of these facilities has historically and will likely continue to cause isolated flooding problems. In the long term, a complete system of curbs and gutters will improve local drainage since the end result will be a continuous system that collects and conveys runoff in an efficient manner. However, in the short term, the inconsistent placement of curbs and gutters in Oceano has lead to the concentration of street runoff onto areas that do not have curbs or gutters and generally represent local low spots within a neighborhood block. The County's Planning Department should evaluate new construction and remodels on a case-by-case basis. If a new curb and gutter system might concentrate runoff onto a low lying property, then the requirement should be waived and a fee collected for future installation of curb and gutters.

Establish Maintenance District

It is evident that many of the drainage/flooding problems in Oceano are exacerbated by inadequate maintenance of drainage facilities. Currently, the maintenance of drainage infrastructure located within public right of way for unincorporated communities in the County, including Oceano, is the responsibility of the County Public Works Department. It is recommended that a facility maintenance district be formed to better maintain the drainage infrastructure in Oceano. Responsibilities of the new maintenance district would include: (1) being the contact point for all resident complaints regarding drainage infrastructure in the community; (2) keeping an organized database of all new drainage infrastructure in the community including the size and capacity of culverts and storm drains, even if this infrastructure is installed by private property owners; (3) keeping a regular maintenance schedule that may involve multiple maintenance visits where needed; and (4) responding to drainage infrastructure repairs as needed. Having a localized facility maintenance district will make it easier to maintain drainage infrastructure as needed throughout the community.

Implementation Strategy

The most effective approach to improving drainage and flooding problems in each community is to identify the problems, develop solutions, and then create a local entity to implement the solutions. The role of the District is to assist the community in determining the improvements necessary to reduce flooding, and then to assist them in implementing programs to improve protection.

The District will continue to use its general funds only to provide programming and project initiation services so that communities can better understand the drainage problems they are facing, and determine how those problems should be solved. The recommended projects for Oceano totaled approximately $12.0 million. If the lead agency in Oceano established a funding source, approximately $850,000 per year would have to be generated by the community in order to build all the projects and pay off a municipal bond[1].

It is recommended that the OCSD serve as the lead agency and manage proposed projects, since the OCSD has drainage maintenance authority per LAFCo Resolution 80-6. The District could provide limited staff assistance to the lead agency in implementing the drainage facility projects. However, the OCSD has expressed little interest in serving as the lead agency.

Comments received during the information collection phase of this project illustrated that the OCSD will not participate in a lead role, but would observe and comment on proposed improvements. Another (existing or newly formed) group needs to assume the role of lead agency, or the OCSD should amend their position to initiate implementation. Otherwise, the recommended projects will not be implemented and the problems identified in this report will continue. Home owners must also be willing to fund a significant portion of the required capital costs. The potential for supplemental grant funding could reduce the financial burden on home owners, but grant funding is not guaranteed.

Implementation Steps

It is recommended that the following implementation steps, in general, be followed for the detention basin, Highway 1 and drainage channel improvements. It is assumed that a community supported agency/zone would serve as the lead agency and assume control of the project at completion.

- Fund and complete a Basis of Design Report[2] within 12 months of start (12 months for storm drain, curb and gutter system)
- Initiate coordination with Caltrans regarding a cooperative agreement for Highway 1 improvements, and with the County's General Services Department regarding use of County/Airport property as a detention basin
- Conduct a benefit assessment proceeding for the properties that benefit from the improvements
- Design project, prepare environmental documents and resource agency permits
- Apply for CDBG funds
- Advertise for construction
- Construct project

Construction of a drainage system (storm drain, curb and gutter) for Zone F and G follows a similar sequence of tasks. The major and, from a funding perspective, the most fundamental difference is that a curb and gutter project will only benefit those properties on streets receiving the improvement. The property owners will be expected to approve an assessment or property based fee to fund the project.

[1] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years.

[2] The Basis of Design Report would include a description of the existing problem, proposed alternatives, recommended project, preliminary alignments, potential environmental impacts, and cost estimates.

SCHEDULE FOR IMPROVEMENTS

The estimated duration for conducting the tasks outlined in the implementation steps could last approximately four to five years. The duration includes time for identifying a lead agency and developing community support. Chapter 6, "Implementation Strategy" includes more detail regarding task durations.

ACKNOWLEDGEMENT

The San Luis Obispo County Flood Control and Water Conservation District, Community of Oceano Drainage and Flood Control Study 2003 represents a collaborative effort between San Luis Obispo County, the Community of Oceano, Raines, Melton & Carella, Inc., Questa Engineering Corporation and Essex Environmental. We would like to acknowledge and thank the following key personnel from the County and the Oceano Community Services District whose invaluable knowledge, experience, and contributions were instrumental in the preparation of this report.

David Angello – Director Oceano Community Services District
Rick Searcy – Director Oceano Community Services District
Noel King – Public Works Director
Glen Priddy – Deputy Director Engineering Services
George Gibson – Design Engineer Public Works
Dean Benedix – Project Manager Public Works
Paavo Ogren – Deputy Public Works Director

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES AND FIGURES

ABBREVIATIONS

CEQA	California Environmental Policy Act
CDFG	California Department of Fish and Game
Caltrans	California Department of Transportation
CCC	California Coastal Commission
CCI	Construction Cost Index
CCRWQCB	Central Coast Regional Water Quality Control Board
CDBG	Community Development Block Grants
cfs	Cubic Feet per Second
Corps	U.S. Army Corps of Engineers
County	San Luis Obispo County
CSD	Community Services District
CZLUO	San Luis Obispo County Coastal Zone Land Use Ordinance
District	San Luis Obispo County Flood Control and Water Conservation District
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
FH	Flood Hazard
FIRM	Flood Insurance Rate Maps
FMP	Floodplain Management Plan
FAA	Federal Aviation Administration
ft	feet
LAFCo	Local Agency Formation Commission
LF	linear feet
NEPA	National Environmental Policy Act
ND	Negative Declaration
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
OCSD	Oceano Community Services District
OES	Office of Emergency Services
RWQCB	Regional Water Quality Control Board
SWRCB	State Water Resources Control Board
SLOCAPCD	San Luis Obispo County Air Pollution Control District
TM	Technical Memorandum
USFWS	United States Fish and Wildlife Service

CHAPTER 1 INTRODUCTION

Chapter Synopsis: This chapter presents the purposes, objectives, and scope for the Drainage and Flood Control Study, followed by the methodology used to achieve those purposes and objectives.

The community of Oceano (Oceano) is located on the central coast of California, situated 17 miles south of San Luis Obispo, and is bordered by the City of Grover Beach to the north, the Pacific Ocean to the west, and is surrounded by farm fields and sand dunes to the east and south. Figure 1-1 shows the location of Oceano with respect to surrounding communities. It is located within the Cienega Valley subbasin of the greater Arroyo Grande Creek watershed.

Figure 1-1: Community of Oceano Location[3]

Approximately 7,200 residents live in Oceano. As shown in Figure 1-2 (Figure 2 in Appendix A provides a large scale aerial map of Oceano), Highway 1 runs along the southern developed area of Oceano, turns northwest at 19th Street and runs parallel to the railroad. Oceano can be divided into two distinct areas: residential housing north of Highway 1, and a mix of industrial/agricultural/municipal and residential land use west and south of Highway 1. The Arroyo Grande Creek Channel runs along the southern boundary of Oceano and was designed to convey 100-year flood flows. Due to environmental restrictions, the District has not been able to perform maintenance to sustain the channel's design capacity. It is estimated that the current capacity of the channel is between a 2 year and 5 year storm event. The Arroyo Grande Creek Channel falls under the jurisdiction of Flood Control Zone 1/1A and is not part of this study.

Figure 1-2: Community of Oceano Detail Layout[3]

Almost all areas of Oceano experience flooding, ranging from roadway flooding to residential and business flooding. Roadway flooding varies from nuisance ponding to more severe inundation that causes road closure in low-lying areas. Severe roadway flooding occurs on Highway 1 at 13th and also at 19th Street. Residential flooding and drainage problems have been documented in many areas of the community, with the most severe locations being street depressions with no drainage outlet.

[3] Map is excerpted from Microsoft Streets and Trips

1.1 Project Understanding

Oceano has a variety of drainage issues and a long history of flooding problems. The community north of Highway 1 was initially constructed on gently sloping topography with little formal drainage system. There are a minimal number of curbs and gutters within this area. Roadway shoulders are bare and blend into residential lots, which are often lower than the adjacent roadway. Localized low spots collect storm runoff and cause flooding in many areas throughout the community. A significant amount of the drainage problems in Oceano are minor ponding and flooding at poorly drained or undrained locations. Along with these localized problems, culverts that run beneath Highway 1 and divert water away from the roadway may be undersized, in disrepair, or have no positive drainage outlet.

This report does not address flooding of the agricultural lands south of the Arroyo Grande Creek Channel, flooding issues around the lagoon and State Park areas, or control issues directly associated with the Arroyo Grande Creek Channel.

1.2 Objectives and Scope

This report has been prepared for the San Luis Obispo County Flood Control and Water Conservation District on behalf of the Community of Oceano. The main objective of the Drainage and Flood Control Study is to identify and present conceptual improvements needed to minimize or eliminate the localized flooding problems, and to convey the collected runoff from the developed areas to a disposal point. It serves as a guide for long range planning for improvements to ensure that the community has reliable drainage infrastructure in the future. This report documents the existing conditions, examines potential improvements, identifies environmental permitting requirements, and recommends a funding strategy to pay for the improvements.

1.3 Methodology

In order to accomplish the goals of the Study, the methodology shown in Figure 1 of Appendix A was used. As shown in the figure, community involvement in the study was imperative to gaining a local understanding of the flooding problems. Each community was represented by an Advisory Committee and this Advisory Committee also identified a sub-committee to work directly with the study team throughout the duration of the project. The sub-committee also reviewed technical documents and provided comments to the study team. The Oceano Community Service District Board of Directors represented the community of Oceano. Directors David Angello and Rick Searcy worked directly with the study team for the duration of the project. The study team requested input and endorsement from the Advisory Committee at the following milestones:

- Initiation of Study and Community Questionnaire
- Approach to Conducting Engineering Analysis
- Proposed Alternatives for Mitigating Flooding
- Review of Draft Report
- Endorsement of Final Report

1.3.1 Community Involvement

In order to gain the local knowledge of existing flooding problems, a questionnaire was mailed to the residences of Oceano. The questionnaire requested information on existing flooding problems, location of flooding, frequency of occurrence, and observed causes. Over 150 responses were received from Oceano residences. A summary of the responses and comments received is included in Appendix C. In order to protect the privacy of the respondents, personal information (names and phone numbers) is not included in the summary. A sample of the questionnaire is also included in Appendix C.

1.4 Existing Information

When available, existing information was used to assist in the engineering and environmental analysis. A list of references is provided in this report. Previous to this study, no engineering analysis quantifying the existing drainage and flooding problems had been conducted for the community of Oceano. However, resident observations and documentation were available and provided valuable information on the location and severity of historic flooding problems.

1.5 Report Content

The structure of the Drainage and Flood Control Study is outlined below.

- CHAPTER 1 – INTRODUCTION (this introduction)
- CHAPTER 2 – COUNTY POLICIES, (presents an overview of the drainage and flood control responsibilities in the County of San Luis Obispo).
- CHAPTER 3 – ENGINEERING ANALYSIS AND ALTERNATIVES DEVELOPMENT, (discusses the existing drainage and flooding problems in Oceano and presents alternatives that will mitigate the problems).
- CHAPTER 4 – ENVIRONMENTAL FEASIBILITY ANALYSIS, (discusses the environmental permitting and regulatory requirements for the proposed alternatives).
- CHAPTER 5 – FUNDING ALTERNATIVES, (provides a summary of funding options, including criteria for qualifying projects, available funds, and cost sharing formulas).
- CHAPTER 6 – IMPLEMENTATION STRATEGY, (This chapter consists of an implementation plan of the recommended improvements developed to reduce nuisance flooding and provide flood protection).

In addition to the six chapters, there are also ten appendices attached to the end of the report. The appendices are:

APPENDIX A – Figures

APPENDIX B – Photographs

APPENDIX C – Community Questionnaire and Responses

APPENDIX D – Resolution Establishing Policy

APPENDIX E – Engineering Analysis Technical Memorandum

APPENDIX F – Environmental Analysis Technical Memorandum

APPENDIX G – Funding Assistance Technical Memorandum

APPENDIX H – County General Services Department Review-Oceano Airport Property

APPENDIX I - Reply to Oceano Draft Technical Memorandum from the OCSD

APPENDIX J – Response to Comments

CHAPTER 2 COUNTY POLICIES

Chapter Synopsis: This chapter presents an overview of the drainage and flood control responsibilities in the County of San Luis Obispo, as carried out by the San Luis Obispo County Flood Control and Water Conservation District.

2.1 Overview of Responsibilities

The drainage and flood control responsibilities of the County are determined by State and County statutes and by County policy. The responsibilities for drainage are administered through the Road Division of the County Public Works Department and the San Luis Obispo County Flood Control and Water Conservation District (District). The District is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in unincorporated public areas where no other agency has assumed an active role in such activities. The District has a regional role in the County and can work with individual cities or communities when requested. The sections below describe the limits of the jurisdiction of road maintenance and improvement, Road Fund administration, and how the District is administered to best leverage its powers by creating Zones of Benefit to oversee specific projects.

2.1.1 FLOOD CONTROL AND WATER CONSERVATION DISTRICT

2.1.1.1 History

The San Luis Obispo County Flood Control and Water Conservation District was established in 1945. The powers of the District include flood control, water supply, water conservation, water quality protection and the ability to study all aspects of water resources. The District also has power to form zones of benefit within its boundary to implement water resource projects.

The District is a special district that is governed by the County Board of Supervisors. The boundaries of the District are the same as the County boundaries, and the staff of the District is the same as the staff of the County. The District also includes all of the territory within the County's seven incorporated cities. The District budget is separate and distinct from all other County budgets. It has its own funding sources, and its own expenditure plan.

2.1.1.2 Policy Direction: Resolution Number 68-223

The District is available to help communities deal with flood waters and to conserve, study and develop water supplies. The District uses its general fund to identify water related issues, to determine solutions to those problems and to help those local areas implement recommended solutions. The District is not, however, responsible for paying for community-specific mitigation improvements. The specific property owners that benefit from these solutions must agree to pay for the construction and future maintenance of them. This policy (Resolution 68-223) was formally established by the Board of Supervisors in 1968, and was reviewed and reconfirmed in April 2001. The documentation of the policy is included in Appendix D of this report.

The policy was adopted because there is not sufficient funding available for the District to fund construction and operation of facilities. This approach provides the best leveraging of the funds that are available on a county-wide basis.

2.1.1.3 Funding Sources

The primary funding source for the District, which is the entire County, is a pre-Proposition 13 general property tax allocation, which provides approximately $550,000 per year in revenue. In addition, the District receives about $130,000 per year in interest income from current resources. Reserves from the County's General Fund,

which is separate from the District fund, are normally not used for the construction of projects protecting private property, unless there is a significant general or roadway benefit.

2.1.1.4 Countywide Activities

The District provides funding for flood control programming and planning of localized drainage issues.

2.1.2 County Standards for Control of Drainage (Coastal Zone)

The County's planning department establishes the land use policies and drainage ordinances for the County (the District has no land use ordinances). Section 23.05.040 et. seq., of the San Luis Obispo County Coastal Zone Land Use Ordinance (CZLUO) contains the County's standards for the control of drainage and drainage facilities. These standards aim to minimize the harmful effects of storm water runoff and to protect neighboring and downstream properties from drainage problems resulting from new development. They include:

- Requirements pertaining to the drainage and construction of drainage systems
- Requirements pertaining to the maintenance of offsite natural drainage patterns
- Requirements pertaining to the location of development in the coastal area
- Restrictions on development in areas subject to flood hazards

Conditions of development in flood hazard areas must, at a minimum, enforce the current Federal flood plain management regulations as defined in the National Flood Insurance Program. Projects that may be subject to or cause flood hazards are required to prepare a drainage plan, subject to approval by the County Engineer.

In addition, Section 23.07.060 of the County's CZLUO contains development standards for areas with the Flood Hazard (FH) designation. The standards state that drainage plans for development in FH areas must include a normal depth analysis that determines whether the proposed development is in the floodway or the flood fringe. In addition, development in FH areas would be subject to construction practices that would not limit floodway capacity or increase flood heights above an allowable limit.

2.1.3 The Road Fund

The County provides some limited drainage improvements as a function of its road maintenance responsibilities. The Road Fund is a separate, distinct legal account and budget, from the District. It has numerous State statutes (primarily the Streets and Highways Code) that dictate how Road Fund monies may legally be expended. The Road Fund program operates the County Maintained Road System and is funded through a combination of restricted revenue sources that are primarily derived through taxes on gasoline that are apportioned to cities and counties by the State, as well as contributions from the County General Fund. These funding sources can only be spent on solving problems that directly relate to County maintained roads.

As a function of operating the road system, the drainage issues related to the road system are addressed when such drainage work protects the County maintained road system in a cost beneficial way, or is directly related to County road improvement projects and is necessary to prevent property damage. This includes directing the flow of streams across the roads through culverts and bridges.

Some of the specific historic drainage projects that have been completed in Oceano through the Road Fund include:

- Improved the drainage system between Highway 1 and Creek Road. Installed culverts between unconnected ditches and cleared the ditches. This work was intended to reduce flooding of the intersection of Cienaga and Front Street. Clearing the drainage area to permit the proper operation of Highway 1 culverts is typically Caltrans responsibility. There are no long-term County plans to maintain the drainage channels between Highway 1 and the railroad.

- Improved some of the smaller, more localized problems. Installed culverts near the Oceano Elementary School on 19th Street. Constructed berm and dip roadways at 15th and Wilmar, and areas along 23rd Street. Created shoulder area basins at various locations.

2.1.4 Other Agencies with Drainage Responsibilities

2.1.4.1 Community Service Districts

Community Service Districts (CSD's) are locally controlled special districts that can also provide drainage and flood control services. In the County, the Oceano CSD provides some drainage services. The Oceano CSD has drainage maintenance authority over the community's streets and drainages as per LAFCo Resolution 80-6.

2.1.4.2 County Service Areas

County Service Areas (CSA's) can focus the powers of the County to provide specific services to specific areas, including drainage and flood control services. These special districts are governed by the County Board of Supervisors and receive their funding through the collection of voter approved service charges or benefit assessments from the residents or property owners of the specific area served. LAFCo discourages the creation of CSA's within the boundaries of a CSD when the CSD is capable of performing the same service. A new CSA would also create extra administrative costs to operate. Therefore, no CSA currently provides drainage service in Oceano.

2.1.4.3 Cities

Individual cities within the County exercise control over drainage issues within their city limits.

2.1.4.4 U.S. Corps of Engineers

At the Federal level, the U.S. Army Corps of Engineers (Corps) provides flood protection throughout the nation, however, the Corps has done very little work in San Luis Obispo County and operates no facilities here.

2.1.4.5 California Department of Water Resources

The Sate of California also administers some flood control and drainage programs via the State Department of Water Resources' (DWR) flood control division. DWR has little presence in the County, and mainly gets involved in a consulting role during flood emergencies.

2.1.4.6 Caltrans

The California Department of Transportation (Caltrans) operates drainage facilities that are associated with the State Highway System. Highway 1 experiences flooding near 13th and 19th Street. Caltrans currently clears the drainage channel between 13th Street and the railroad.

2.2 Flood Control Zone

The District has the power to form Zones of Benefit to implement and operate facilities. Each Zone must have its own funding source.

2.3 Funding Issues

The District is restricted in the way it can fund needed projects or increase revenues for existing operations. It is generally limited to a zone of benefit or an assessment district procedure for obtaining financing for the construction of new projects.

Due to the changes enacted with the passage of Proposition 218, the District must now also have all new benefit assessments, and increases to existing benefit assessments for maintenance and operations, approved through an election of affected property owners.

The District provides a means of funding studies that define problems and recommend technical solutions to those problems. The critical next steps of constructing and maintaining drainage facilities can normally only be completed with local benefiting property owners being willing to vote to assess themselves for these costs.

Chapter 5 discusses in greater detail the alternative methods for potentially funding the construction of community-specific flood control and drainage projects.

2.4 Maintenance Responsibilities

Survey respondents reported that many of the existing drainage channels are filled with sediment and vegetation. Field investigations indicate that some of the drainage ditches were partially filled with sediment and excessive vegetal growth. Under maintained facilities reduce their design capacity and inhibit their ability to convey runoff. However, in many instances it was difficult determining who is responsible for maintaining the facilities. An example is the area immediately east and west of the railroad tracks, near Front Street. If a property owner does not maintain the conveyance facilities, then these structures will go unattended because the District is not responsible for maintaining facilities on private property or on property within the jurisdiction of other public agencies (e.g. Caltrans and Highway 1).

CHAPTER 3 ENGINEERING ANALYSIS AND ALTERNATIVES DEVELOPMENT

Chapter Synopsis: This chapter discusses the existing drainage and flooding problems in Oceano and presents alternatives that can mitigate the problems. The chapter also presents the estimated cost for planning, designing and constructing the proposed capital projects. An engineering technical memorandum was prepared for this study and is included in Appendix E. The technical memorandum provides greater detail on the engineering methodology, analysis and alternatives. Some items in this chapter were modified since the completion of the technical memorandum.

3.1 Overview of Proposed Project

The community needs to develop an overall plan to collect and convey runoff from residential neighborhoods located north of Highway 1 to the Arroyo Grande Creek Channel. Specifically, a system of curbs, gutters, drop-inlets, storm drains, and detention basins are needed to properly convey runoff. A comprehensive project consisting of several alternatives is necessary to mitigate the flooding problems in Oceano. In planning a drainage and flood protection project, downstream improvements must be constructed prior to upstream improvements so that runoff can be managed. In Oceano, any proposed solution must first devise a method for storing or discharging storm runoff that accumulates west of Highway 1 prior to constructing improvements that increase the amount of runoff across Highway 1. This order of implementation is necessary because a terminal disposal or management facility must first be constructed prior to conveying runoff away from residential areas.

The proposed projects include, 1) a detention facility west of Highway 1, 2) a diversion pipeline, pipeline replacement, and channel improvements, and 3) curb/gutter, storm drain and infiltration chambers. The proposed projects would mitigate flooding in the residential neighborhoods, prevent flooding of Highway 1, and provide a terminal disposal point for the collected runoff. In order of priority, the projects should be planned as follows:

1. Based on available land, location to the Arroyo Grande Creek Channel, and presence of an existing creek outfall, it is recommended that the existing RV Storage Lot be further explored as a potential detention facility location. Constructing a detention facility would be the first step in building a comprehensive and effective community drainage infrastructure project.
2. The proposed Highway 1 improvements would then be constructed since a terminal facility would be in place to manage the additional runoff. A diversion pipeline adjacent to Highway 1, terminating south of Railroad Street would mitigate flooding at 13th and Paso Robles Street. However, in order to also correct the problem near 19th Street, the existing drainage channels need to be improved and maintained.
3. The final piece of a comprehensive project would be the construction of a continuous curb and gutter system, along with a storm drain collection system. For those streets located in low points with no outlet, a subsurface infiltration chamber would provide the necessary infrastructure to dispose storm water.

Regular maintenance on existing drainage channels is also recommended. Existing natural or fabricated drainage channels should be kept free of obstructions such as fallen trees, debris, and sedimentation to maintain capacity in the drainage system. Determining who has maintenance responsibility for the various storm drains, channels and swales in Oceano cannot easily be established. For this reason, it is recommended that a facility maintenance district be formed to better maintain the drainage infrastructure in Oceano.

3.2 Engineering Methodology

The purpose of the engineering analysis was to examine the existing drainage conditions of Oceano, identify problematic areas and issues, and prioritize and categorize the problems. The engineering analysis also developed conceptual solutions to the identified drainage and flood control problems. This chapter includes a description of existing drainage conditions, a discussion of the methodology used to evaluate drainage problems, and an identification of a series of alternative projects to mitigate the drainage problems. The analysis did not address flooding of the agricultural lands south of the Arroyo Grande Creek Channel, flooding issues around the lagoon and State Park areas, nor did it address flood control issues directly associated with the reduction in capacity of the Arroyo Grande Creek Channel.

The approach for studying Oceano was to divide the community into drainage basins. The study team utilized existing topographic maps to delineate existing sub-basins. The known problem areas were assessed using a combination of resident accounts and field investigations. Problems in each sub-basin were prioritized from severe to moderate. The existing culverts under Highway 1 were analyzed to determine their condition and their adequacy for handling runoff from the upstream watershed. The problems were categorized and conceptual solutions for categories of problems were developed.

Initial concepts for mitigating existing flooding problems include the development of a formal drainage system. Also considered was the use of localized infiltration and/or detention basins to prevent localized flooding.

3.3 Existing Drainage and Flooding Problems

There are three categories of problems in Oceano; 1) lack of positive drainage to the Arroyo Grande Creek Channel during high flow periods, 2) flooding along Highway 1 at the base of the community, and 3) localized flooding problems within the residential areas of the community.

Drainage problems within the community were identified by:

- Reviewing community responses to the questionnaire
- Conducting community outreach discussions with local residents and County staff
- Conducting field mapping of curbs, gutters, and infiltration basins
- Reviewing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the Oceano Community

3.3.1 Regional Hydrology

The Cienaga Valley subbasin, draining an area of approximately 12 square miles, comprises the lowermost portion of the Arroyo Grande Creek watershed. The Arroyo Grande Creek Channel, flowing west along the southern edge of Oceano, forms the primary drainage corridor in the subbasin and was constructed for flood control in 1959. This segment of the creek receives runoff from developed areas of Oceano and conveys it west to the Pacific Ocean. Additional waterways in the Cienaga Valley subbasin include Meadow Creek, Los Berros Creek, and Oceano Lagoon. Meadow Creek runs south along the western edge of the community and drains to Oceano Lagoon. Oceano Lagoon is a confined dune lake that drains areas west of the railroad tracks. Flood gates at the southwestern end of Oceano Lagoon control flows from the lagoon into Arroyo Grande Creek. The floodgates also prevent high flows in the Arroyo Grande Creek Channel from entering the lagoon area. The State of California owns and is responsible for the maintenance of most of Meadow Creek and Oceano Lagoon.

3.3.2 Overview of Oceano Drainage Issues

Oceano is a community based on a subdivision of land (1920's) that created hundreds of buildable lots without the benefits of infrastructure improvements. In most urban areas, increased runoff from the construction of impervious surfaces, such as driveways and roads, is collected and disposed of by various types of flood control

facilities. In Oceano, however, flood control facilities are limited because in the early stages of urbanization, storm water conveyance and flood control infrastructure were not incorporated into the community because the high infiltration rate of the underlying sands was sufficient to naturally dispose of runoff. During this early period, curb, gutter and drainage improvements were not required for development, thus no upfront drainage infrastructure cost was borne by the property owners. With an increase in urbanization came an increase in impervious surfaces and a decrease in the capability of the underlying soil to adequately absorb urban runoff. This has resulted in several areas becoming flood prone, causing public and private property damage during storms.

The combination of the area's geology, shallow topography, construction within natural drainage courses without provisions for rerouting surface drainage, and inadequate drainage facilities has resulted in localized poor drainage and/or flooding around some residences and roadways. Reported areas of localized flooding and/or drainage problems based on community questionnaires are shown in Figure 2 of Appendix A. The most serious flooding in the community takes place along Highway 1, a State maintained highway. Extensive ponding can occur for several days after significant rainfall, causing damage to nearby businesses and creating driving hazards. This can cause State Highway 1 closures, mandating rerouting of traffic through local streets. This problem is generally caused by very low drainage system gradient and lack of capacity in the drainage facilities to convey runoff south towards the Arroyo Grande Creek Channel. The two main locations of the flooding occur at the intersection of 17th and 19th Streets with Highway 1 (also known as the Cienaga and Front Street intersection) and the intersection of 13th Street and Paso Robles Street with Highway 1.

Another problem complicating the drainage in Oceano is the fact that the Arroyo Grande Creek Channel has levees along the southern boundary of the developed area of Oceano. All runoff in Oceano generally flows south-southwest to the northern Arroyo Grande Creek Channel levee. At a few locations along the levee, privately owned culverts with outfalls and flap gates discharge runoff to the Arroyo Grande Creek Channel. If the water surface elevation in the channel is high, then the flaps gates remain closed and water backs up through the storm drain system until flow recedes in the creek channel.

3.3.3 FEMA Flood Hazard Zones

In addition to localized flooding and drainage problems, portions of Oceano have been classified by the Federal Emergency Management Agency (FEMA) as being located within 100-year flood hazard zones of Arroyo Grande and Meadow Creeks. The FEMA floodplain delineations are shown in Figure 3 of Appendix A. As previously mentioned, the area of the community located north of the airport and near Oceano Lagoon experiences drainage and flooding problems during large storm events. The reader should note that it is not the purpose of this study to evaluate or recommend solutions to the significant flooding problems in the FEMA designated zones. The flood zone is presented to show the relative context of the local drainage issue with the global flood issues concerning the Arroyo Grande Creek Channel.

3.4 Drainage and Flood Control Analysis

3.4.1 Local Drainage Patterns

Oceano was divided into seven different drainage zones (Zones A through G) based on drainage patterns within the community. Drainage zones are shown in Figure 4 of Appendix A. Generally, "the Pike" is the drainage divide to the north of the community. A summary of the existing drainage infrastructure and drainage patterns within each zone is presented in Table 3-1. Areas south and east of Nipomo Street and Cienaga Street were not included in the study because their drainage systems are separated from the rest of the community and no problems have been reported in that area.

Table 3-1: Summary of Existing Drainage Infrastructure and Pattern

ZONE	INFRASTRUCTURE
A	In Zone A, a network of curbs and gutters is used to convey most runoff to infiltration basins located within the zone. The infiltration basins allow storm water generated within this zone to percolate into the underlying sandy soils. The system of curbs, gutters, and infiltration basins is effective in Zone A, and as a result, the zone experiences minimal nuisance drainage and flooding problems. However, drainage problems were reported within this zone. Primarily due to an incomplete system of curbs and gutters.
B	Zone B is an upland zone that contributes some flow to the drainage network along "The Pike." However, there are some isolated low spots that accumulate runoff, notably on 16th Street. Zone B lacks a consistent organized network of curbs and gutters. The lack of an organized network of curbs and gutters within this zone has resulted in many nuisance drainage and flooding problems. Runoff from Zone B flows north to drainage infrastructure along "The Pike" in Grover Beach.
C	In Zone C, a network of curbs and gutters is used to convey most runoff to infiltration basins located within the zone. The infiltration basins allow storm water generated within this zone to percolate into the underlying sandy soils. The system of curbs, gutters, and infiltration basins is effective in Zone C, and as a result, the zone experiences minimal nuisance drainage and flooding problems. Those reported problems are primarily due to an incomplete system of curbs and gutters.
D	Zone D lacks a consistent organized network of curbs and gutters. The lack of an organized network of curbs and gutters within this zone has resulted in many nuisance drainage and flooding problems. Runoff from Zone D flows south to Zone G.
E	Like Zones A and C, runoff in Zone E either flows to infiltration basins located within the zone or flows in an easterly direction away from the lowland problems areas around Highway 1. Few drainage problems have been reported in Zone E.
F	Zone F lacks a consistent organized network of curbs and gutters. The lack of an organized network of curbs and gutters within this zone has resulted in many nuisance drainage and flooding problems. Storm water runoff from Zone F is conveyed south and west to a drainage ditch at Paso Robles Street and Highway 1. An infiltration basin located roughly at 13th Street and Warner Street allows for the infiltration of some of Zone F's storm water.
G	Zone G lacks a consistent organized network of curbs and gutters. The lack of an organized network of curbs and gutters within this zone has resulted in many nuisance drainage and flooding problems. Zone G, the largest drainage zone in Oceano, has the highest concentration of urbanization. Generally, runoff within Zone G flows south to an open channel along Highway 1 and then into a series of ditches that convey the runoff to the Arroyo Grande Creek Channel. Several areas of nuisance flooding have been noted in Zone G during large storm events.

3.4.2 Drainage and Flooding Issues

There are four basic drainage problems in Oceano that need to be addressed:

- Construction of segmented curbs and gutters
- Shallow flooding in residential areas
- Significant frequent flooding at Highway 1
- Management of local storm water runoff when the Arroyo Grande Creek Channel is flowing high

3.4.2.1 Segmented Curbs and Gutters

Unless waived, San Luis Obispo County Land Use Ordinance 22.106.070.2 requires the installation of concrete curb, gutters, and sidewalks along the entire street frontage on projects in Oceano for the following categories:

- New residential subdivisions, pursuant to Title 21 of the SLO County Code
- Residential multifamily land use category, remodeling improvements that are valued at 25 percent or greater than the current property value
- New residential multifamily and single family categories within an urban reserve line
- All commercial and office and professional categories within an urban reserve line
- All industrial categories within an urban reserve line.

Oceano is very interested in continuing the construction of curbs, gutters and pedestrian sidewalks. Current County policy encourages this practice, but these facilities cause isolated flooding problems. In the long term, a completed system of curbs and gutters will improve local drainage since the end result will be a continuous system that collects and conveys runoff in an efficient manner. However, in the short term, the inconsistent placement of curbs and gutters in Oceano has lead to the concentration of street runoff in areas that do not have curbs or gutters and generally represent local low spots within a neighborhood block. The downstream facilities receiving storm water are not able to handle this runoff and therefore experience flooding. The County's Planning Department should evaluate new construction and remodels on a case-by-case basis. If a new curb and gutter system might concentrate runoff onto a low lying property, then the requirement should be waived and a fee collected for future installation of curb and gutters.

This fee would be similar to a Development Impact Fee and the nexus for collecting the fee would be the submission of a building permit application to the County Department of Planning and Building. An ordinance to collect the fee could be approved by a majority of the Board of Supervisors or the Board of Directors after a protest hearing. The justification for such a fee would be to build a continuous curb and gutter system, and eliminate the concentration of runoff onto lower lying properties.

The OCSD has insisted that no waivers be granted by the County's planning department (seeking waivers is an approved procedure) even if isolated curb and gutter installation causes drainage and/or road tie in problems. Continuation of the current curb and gutter program will result in greater and more frequent flooding problems for those residents living in the low point of a street and do not have such facilities. An option is that all residents be required to install curbs and gutters, to direct flow to a storm drain or infiltration chamber. These alternatives are discussed in this chapter.

3.4.2.2 Flooding in Residential Areas

Developing projects that mitigate the flooding problems experienced by the residents of Oceano is the primary goal of this study. Figure 2 of Appendix A shows the location of flooding problems based on the responses received from questionnaires mailed to residents. In general, the responses indicate that these areas experience extended ponding and/or shallow flooding during large storms. The lack of a continuous curb and gutter system causes runoff to leave the roadway and collect in low spots that are adjacent to the road and usually on private property. Many of these low spots hold water for several days until the water either evaporates or infiltrates into the underlying soil.

In some cases where ground floors are low and runoff concentration is high, flooding can occur within the residence, damaging structures and belongings. Flooding in homes was reported at the following general locations:

- Aloha Place near the airport and lagoon
- Beach Street between 21st and 22nd Street
- Ocean Street between 24th and 25th Street
- Intersection of 23rd and Wilmar Avenue
- Paso Robles Street between 25th and S. Elm Street
- Scott Lee Drive

The flooding at Scott Lee Drive appears to be caused by a concrete channel installed by the developer. Further investigation is needed to determine that the channel can manage a 10-year storm event, per County standards.

Flood mitigation for structures flooding in the Aloha Place area was not evaluated because of their location within the 100-year flood zone. The low lying, flat topography of this area would preclude the use of a gravity system, indicating that a localized pump station and structural home flood proofing are the only feasible

alternatives for protecting individual homes in this area. For these reasons, the neighborhoods west of the railroad tracks were not studied, other than for regional solutions.

All other problems reported by residents experiencing structure flooding should be corrected with the alternatives proposed in this chapter.

3.4.2.3 Highway 1 Flooding

Highway 1 is a State maintained highway and Caltrans should fund a portion of the proposed improvements that mitigate flooding on Highway 1. Existing infrastructure, such as the highway, railroad, levees, the airport, and various agricultural operations, have filled in historical drainage paths to the Arroyo Grande Creek Channel. The result is that Highway 1 and the railroad right of way are the lowest points along the blocked drainage courses and therefore flood when a large storm event occurs.

13th Street and Paso Robles Street

The sections of Highway 1 that flood are located within the lower elevation areas of Oceano where most of the runoff from Zones D, F and G is ultimately conveyed. The railroad tracks immediately to the west of Highway 1 exacerbate the problem of positive drainage since they serve as a physical barrier and back up the runoff onto Highway 1.

The flooding at the intersection of 13th Street and Paso Robles is caused by two problems: 1) very little land slope between Highway 1 and the railroad culvert, and 2) an under sized culvert under the railroad tracks. Runoff from Highway 1 flows west in an existing channel, flows through the culvert under the railroad, across Railroad Street and eventually discharges to an open field west of an agricultural packaging plant. Photograph 1, Photograph 2, and Photograph 3 in Appendix B show the existing drainage channel and culvert crossing under the railroad.

The railroad culvert lacks sufficient conveyance capacity and the minimal slope causes water to back up and flood the intersection at Highway 1. This problem would be reduced if the existing railroad culvert is replaced or if storm water can be diverted to another location. The existing channel between Highway 1 and the railroad also fills with leaves and fallen branches from the adjacent eucalyptus trees, which can also obstruct the natural flow of storm runoff. Caltrans conducts periodic maintenance in the channel and removes the accumulated debris.

It is important to note that the existing culvert also passes beneath the agricultural packaging plant as shown in Figure 5 of Appendix A. Thus replacing the existing culvert with a larger capacity culvert would be difficult and costly since it would involve the purchase of an easement and disruption of business operation.

17th Street and 19th Street

Storm runoff that collects along Highway 1 between 17th and 19th Street flows towards the Arroyo Grande Creek Channel within existing railroad and roadside swales, and also in existing culverts. Figure 5 in Appendix A shows the existing drainage facilities and the storm runoff flow pattern around Beach Street and Highway 1. As shown in the figure, runoff flows in the existing channels parallel to the railroad, through a 42-inch culvert crossing at the railroad, then through a series of drainage channels and pipes, until eventually reaching the Arroyo Grande Creek Channel. These low gradient drainage facilities are filled with sediment and vegetation, and do not efficiently convey runoff away from Highway 1. These factors can also lead to the creation of a backwater condition that exacerbates drainage problems along Highway 1 and the lower portions of Oceano. Photograph 4 and Photograph 5 in Appendix B show the existing Caltrans culverts, drainage channel and 42-inch culvert crossing under the railroad.

It is important to note that the most severe flooding problems occur within or adjacent to the Highway 1 right-of-way. If flooding on Highway 1 is to be corrected, then improvements to drainage infrastructure outside of Caltrans right-of-way will be necessary. Caltrans has been approached concerning these drainage problems and has acknowledged that it would be willing to cost share in solutions to drainage problems adjacent Highway 1. A letter outlining Caltrans position is included as an attachment to the Engineering Technical Memorandum in Appendix E.

3.5 Proposed Capital Improvement Projects

The proposed projects and alignments presented in this report for mitigation of drainage and flooding issues in Oceano were established using best engineering judgment and available information. The final projects may vary from what is presented in this report as a project becomes more defined.

The proposed solution to the problems is the construction of a comprehensive storm drainage system. This would require the installation of collection facilities such as curbs and drop inlets, in addition to buried storm drain pipelines. It is possible that many of the existing roadways would have to be improved to convey runoff effectively into the proposed system.

Several projects have been developed to address the different flooding areas and issues. Since the area north of the airport and near Oceano Lagoon is located within the 100-year flood hazard zone, solutions were not developed to address flooding problems in this area. Conceptual drainage projects for the area northeast of Highway 1 in Oceano are presented below. The alternatives have been organized by specific category:

- Conveying flow into the Arroyo Grande Creek Channel
- Mitigating Highway 1 flooding
- Mitigating residential flooding

A comprehensive project consisting of several alternatives is necessary to mitigate all the flooding problems. In planning a drainage and flood protection project, downstream improvements must be constructed prior to upstream improvements so that runoff can be managed. In Oceano, any proposed solution must first devise a method for storing or discharging storm runoff that accumulates west of Highway 1 prior to constructing improvements that increase the amount of runoff across Highway 1.

The proposed project includes, 1) a detention facility west of Highway 1, 2) a diversion pipeline, pipeline replacement, and channel improvements, and 3) curb/gutter, storm drain and infiltration chambers. The proposed projects would mitigate flooding in residential neighborhoods, prevent flooding of Highway 1, and provide a terminal disposal point for the collected runoff.

3.5.1 Alternative 1: Conveying Flow Into Arroyo Grande Creek Channel

Prior to designing and constructing drainage infrastructure in the community, the underlying problem of how to convey flow into the Arroyo Grande Creek Channel or to a terminal disposal facility must be resolved. It is logical to construct adequate downstream drainage facilities first. Storm drainage infrastructure can then be built upstream to feed runoff to the downstream components. This study investigated three concepts for managing storm runoff at the Arroyo Grande Creek Channel:

1A. Dedicate significant tracts of land adjacent to the creek as flood easements for a detention/retention basin. This land would flood and allow the runoff to slowly infiltrate into the soil or eventually be discharged in the Arroyo Grande Creek Channel through an outfall. Conceptual locations of detention basins are shown in Figure 6 of Appendix A.

1B. Build a pump station(s) near the levee of the Arroyo Grande Creek Channel and pump the retained storm water into the channel. Conceptual locations of the pump stations are shown on Figure 7 of

Appendix A. A detention basin/sump would need to be constructed adjacent to the pump(s). The size of these facilities would depend on the pump size and land area available.

1C. The third solution would be to build a pressure storm drainage system. This system would consist of a gravity system to a certain elevation (depending on the hydraulics). It would then become a pressurized system, flowing in a pipeline and discharging to the Arroyo Grande Creek Channel. The probable area that could be drained by a pressurized system is shown in Figure 8 of Appendix A.

Solutions 1A and 1B assume that infrastructure to collect and convey upstream runoff from the residential area of Oceano will be constructed after the downstream terminal facilities are constructed.

3.5.1.1 Alternative 1A: Detention/Retention Facility

One of the basic problems with drainage in the lower elevation areas of Oceano is that when the Arroyo Grande Creek Channel is flowing near capacity, storm drainage outfalls with flap gates remain closed and runoff cannot flow by gravity into the levied channel. This alternative would establish an area on the north side of the levee as a designated flood area. During large storm events, if storm drainage outfall flap gates were closed, then this designated flood area could temporarily store runoff until flow in the channel receded.

The County's Airport Enterprise Fund owns property adjacent to the channel that could be used as a detention basin, assuming significant issues are adequately addressed. This solution would likely mean that the Recreational Vehicle (RV) storage currently operating on airport property would be reduced or removed to accommodate a detention basin. The proposed location of the detention facility is shown on Figure 6 of Appendix A. Using this site as a detention facility would reduce or eliminate a source of revenue for the County's Airport Enterprise Fund. This money is used to fund Oceano airport operation and maintenance. The annual cost of replacing this revenue source must be included in this alternative's economic analysis.

If removing the RV storage from County property is unfeasible, then there is also agricultural land that could be purchased and designated a flood area. Little or no agricultural production on the designated areas could occur during the wet winter months.

Either of these locations would accept runoff from upstream areas and temporarily detain it until the Arroyo Grande Creek Channel flows subsided, then runoff would either flow by gravity or be pumped into the creek. The amount of land necessary would depend on the location of the detention basin. For study purposes, we assumed approximately 5 acres would be necessary to construct a detention basin.

Two other locations have also been identified as alternative detention basin sites and are shown in Figure 6. One site sits on airport property between the south end of the runway and Delta Lane, but is subject to restrictions in use (similar to the area currently used for RV storage). The second site is on private property, north of Ocean Street and west of Railroad Avenue. These sites are mentioned for information purposes only. The location of existing infrastructure and proximity to the Arroyo Grande Channel make the RV Storage property and the agricultural field the two most viable sites. However, if the project cannot be implemented on either of these sites, then other locations should be pursued.

RV Storage Property [4]

Discussion regarding the RV storage property warrants more detail because the development of this site as a detention/retention basin would increase the complexity of permit authorization. The RV storage property is County owned, however, the property was acquired using Federal Aviation Administration (FAA) funds for the primary purpose of providing a Runway Protection Zone (RPZ) for the Oceano airport. Also, the development of the airport property and major maintenance is accomplished using FAA funds. The County must obtain FAA

[4] See Appendix H for a detailed summary of the County's General Services Department Review.

approval prior to any change in use of any airport property, including the RV storage property, since this was purchased using FAA funds. Since the RV storage property is a source of revenue, changes to land use could adversely affect the funding of other County airport operations. Because of these reasons, new or different property uses are extremely sensitive and must be directly tied to improvements or optimization of airport property uses.

A major issue with using the RV storage property is the potential conflict between the attraction of waterfowl to new drainage features within the vicinity of the Oceano airport take off and runway zones. According to FAA documents, any new land use practices that attract or could sustain hazardous wildlife populations on or near airports could increase potential for wildlife aircraft collisions. Siting criteria could influence the selection of a drainage basin south or north of the airport runway.

County General Services staff indicated that there was a potential for use of airport property for drainage and flood control facilities, providing the following could occur:

- The County's Airport Enterprise Fund would need to receive fair market rent for the use of the property. The revenue collected would need to be replaced since this annual revenue collection is used to operate the airport. The County estimates that approximately $30,000 is collected annually. Review of Figure 6 in Appendix A shows that less than half (Lot 40 only) of the property would be used as a detention basin. Therefore, for the purposes of quantifying the project costs, only a starting cost of $15,000 per year with annual Consumer Price Index (CPI) adjustments over 25 years is assumed as a replacement cost. However, in reality, the rental costs would continue in perpetuity.
- The proposed drainage basin would need to show a benefit to the airport in order to encourage FAA approval in change of land use. Any proposal for new airport property use for drainage facilities must obtain FAA's review and approval prior to any formalization of such concept use.
- The potential conflict between waterfowl and aircraft would have to be addressed.

The County's General Services Department is in the process of initiating a Master Plan update for the Oceano Airport, and will subsequently prepare an environmental impact report (EIR) and National Environmental Policy Act (NEPA) document. The Master Plan update could potentially include drainage features that benefit the airport and the community. The Master Plan could possibly include the evaluation of wildlife attractants in more detail than is required for this drainage study. The District should work with General Services in exploring the possibility of incorporating drainage features that also benefit the community of Oceano.

Benefits and Constraints

In addition to the items discussed above for the RV Storage Property, the following benefits and constraints are identified. To a certain extent, these areas already flood, however any upstream storm drainage improvement would likely increase the depth and duration of flooding in these areas. If the agricultural land is selected, then productive acres would be taken out of commission for a limited amount of time during the winter, growing crops would be damaged or destroyed, and easements would have to be acquired from private property owners who may not be receptive to selling a flood easement.

Alternative Costs

As summarized in Table 3-2, if the County's Airport Enterprise Fund parcel is used as the site of a proposed detention basin, then the cost of the alternative is approximately $1.75 million. If purchasing a flood easement on private agricultural land is required for this alternative, then the costs could decrease to approximately $1.23 million as summarized in Table 3-3. For purchasing a flood easement on private property, this study assumed that a total of 5 acres would be needed and the easement would cost approximately $100,000 per acre for a total of $500,000.

Table 3-2: Detention Facility Located at the County's RV Storage Lot

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
Land Acquisition	5 acres	100,000 per acre	500,000
Excavation/Grading [2]	16,150 cubic yards	5 per cubic yard	81,000
Berm Construction [3]	450 cubic yards	25 per cubic yard	11,000
Inlet/Outlet Facility	2	1,500 each	3,000
Fencing	1,900 feet	10 per foot	19,000
Present Worth of Lost Revenue [4]	Annual Payment	$15,000 per year plus CPI	263,000
		Subtotal	**877,000**
Engineering/Design [5]		20 percent of subtotal	175,000
Administrative/Environmental [5]		60 percent of subtotal	526,000
Contingency [5]		20 percent of subtotal	175,000
		Total	**1,753,000**

Notes:
1: Rounded to the nearest thousand
2: Assume excavation and grading of 2 feet over 5 acres.
3: Assume berm construction around perimeter of detention basin
4: Approximate fair market value of $15,000 annual revenue, plus annual CPI (2%) increase adjustment. Annual payments over 25 years to repay County's Airport Enterprise Fund for lost revenue from RV storage.
5: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

Table 3-3: Detention Facility Located on Agricultural Property

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
Excavation/Grading [2]	16,150 cubic yards	5 per cubic yard	81,000
Berm Construction [3]	450 cubic yards	25 per cubic yard	11,000
Land Acquisition	5 acres	100,000 per acre	500,000
Inlet/Outlet Facility	2	1,500 each	3,000
Fencing	1,900 feet	10 per foot	19,000
		Subtotal	**614,000**
Engineering/Design [4]		20 percent of subtotal	123,000
Administrative/Environmental [4]		60 percent of subtotal	368,000
Contingency [4]		20 percent of subtotal	123,000
		Total	**1,228,000**

Notes:
1: Rounded to the nearest thousand
2: Assume excavation and grading of 2 feet over 5 acres.
3: Assume berm construction around perimeter of detention basin
4: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

3.5.1.2 Alternative 1B: Pump Station at Arroyo Grande Creek Channel

During larger storm events, storm water pools behind the levee on the north bank of the Arroyo Grande Creek Channel. In lieu of dedicating large tracts of land for siting a large detention facility, the construction of a pump station would eliminate ponding of water by pumping runoff into the channel. As with the detention basins, two alternative locations could be selected for siting a pump station (only one of the two sites would be required). As shown in Figure 7 of Appendix A, a single large sump pump near the intersection of River Avenue and Creek Road would pump water pooled behind the levee into the channel. This component would also require the purchase of the parcel needed for the pump station. The County's RV storage property could also be used as the pump station location (The issues discussed above would also apply to this alternative).

This alternative assumes that improvements to the existing upstream drainage facilities between the Arroyo Grande Creek Channel and Highway 1 would also be implemented. Section 3.5.2 of this chapter discusses these improvements. The upstream channel improvements are necessary to convey runoff away from Highway 1 and fully utilize the downstream detention basin or pump station.

Benefits and Constraints

There are no technical drawbacks to building a pump station at the levee other than the high initial cost of the project and annual maintenance. A pump station could be combined with numerous other alternatives to build a comprehensive and effective community drainage infrastructure project. A pump station would require annual maintenance to ensure proper operation. Pumps would have to be tested and serviced, and sumps de-silted periodically. The long-term cost of the pump station would have to be considered to determine the size of the pumping facilities and compared to the benefit of minimizing flooding.

Alternative Costs

As summarized in Table 3-4, the cost for constructing a pump station at River Avenue and Creek Road, on existing agricultural property, is approximately $2.0 million. If the County's RV Storage lot is selected for the pump station site, then the land acquisition costs and payment for lost revenue increase the total project cost to approximately $2.26 million.

Table 3-4: Pump Station Costs [1]

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($)
Pump Station [2]			750,000
Land Acquisition	2.5 acres	100,000 per acre	250,000
Present Worth of Lost Revenue [3]	Annual Payment	$15,000 per year plus CPI	263,000
		Subtotal	**1,320,000**
Engineering/Design [4]		20 percent of subtotal	226,000
Administrative/Environmental [4]		60 percent of subtotal	679,000
Contingency [4]		20 percent of subtotal	226,000
		Total	**2,263,000**

Notes:
1: Costs assume that facilities will be located on agricultural private property.
2: Pump station would be located at the intersection of Creek Road and the Arroyo Grande Creek Channel or on County property. The sump would attenuate flow, therefore, the pump station capacity would range between 20 to 30 cfs.
3: Approximate fair market value of $7,500 annual revenue, plus annual CPI (2%) increase adjustment. Annual payments over 25 years to repay County's Airport Enterprise Fund for lost revenue from RV storage.
4: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

3.5.1.3 Alternative 1C: Pressurized Storm Drain Pipeline

A pressurized storm drain pipeline would require long runs with no inlets in order to achieve the hydraulic head necessary for pressurized flow and discharge into the Arroyo Grande Creek Channel during high flow events. The pressurized drainage line would not be capable of draining the entire area, just the northeastern portions of Zone G. The area that would be drained by the system is shown in Figure 8 of Appendix A.

Benefits and Constraints

This system would only drain the higher elevations of the community and alternatives for mitigating flooding in the lower elevations near Highway 1 would need to be developed. The pipe run from the last inlet to the Arroyo Grande Creek Channel would be expensive, greatly reducing the cost to benefit ratio of the project. Due to these considerations, a pressure storm drain line does not seem to merit further consideration.

Alternative Costs

As summarized in Table 3-5, the cost for constructing a pressure storm drain pipeline is approximately $2.7 million.

Table 3-5: Pressure Storm Pipeline Costs

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
Pressure Storm Pipeline	2,600 LF	225 per foot	585,000
Pressure Storm Pipeline Laterals	4,100	165 per foot	677,000
Inlets	10	1,500 each	15,000
Outfalls	1	Lump Sum	75,000
		Subtotal	**1,352,000**
Engineering/Design [2]		20 percent of subtotal	270,000
Administrative/Environmental [2]		60 percent of subtotal	811,000
Contingency [2]		20 percent of subtotal	270,000
		Total	**2,703,000**

Notes:
1: Rounded to the nearest thousand
2: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

3.5.1.4 Alternative 1 Recommendation

Based on available land, location to the Arroyo Grande Creek Channel, and presence of an existing creek outfall, it is recommended that the County's Airport Enterprise Fund parcel be further explored as a potential detention facility location. Constructing a detention facility would be the first step in building a comprehensive and effective community drainage infrastructure project. Although purchasing agricultural land from a private owner could be less expensive, the owner may be unwilling to sell the land, requiring the lead agency to explore other options (e.g. condemnation) to secure the property.

3.5.2 ALTERNATIVE 2: MITIGATING HIGHWAY 1 FLOODING

Following the construction of a detention basin or pump station to manage runoff, upstream drainage infrastructure can then be built or improved to convey runoff to the downstream components. The next step in a comprehensive project is mitigating flooding on Highway 1. Two locations requiring improvements include the intersections of Paso Robles and 13th Street with Highway 1, and 19th Street with Highway 1.

3.5.2.1 Paso Robles and 13th Street

Runoff from higher elevations of Zone F is concentrated in the downstream lower elevations where 13th Street and Paso Robles Street intersect Highway 1. Minimal relief, inadequate sizing and/or lack of drainage infrastructure in this downstream area cause storm water to back up into the intersection of Paso Robles and Highway 1. The outlet for Zone F is currently a pipe culvert beneath the railroad tracks and packaging plant as discussed in Section 3.4.2.3 of this chapter.

There are two options to improve flooding problems at Highway 1 and Paso Robles Street: 1) divert storm water to the existing 42-inch railroad culvert located near Front Street and Cienaga and increase capacity of downstream facilities to convey increased flow, or 2) replace the existing culvert under the railroad and packaging plant.

The first option would involve installing drop inlets and a 1,500 feet storm drain pipeline to convey storm water southeast along Highway 1 to an existing open drainage channel that runs parallel to the railroad, eventually flowing to the 42-inch culvert crossing under the railroad as shown in Figure 9 of Appendix A. This option is more cost effective and, from a constructibility perspective, does not present the obstacles that a bore and jack

operation would experience at the railroad and packaging plant. Depending on the change in slope between Paso Robles Street and Beach Street, this pipeline could range between 30 to 36-inch in diameter. If the pipeline is constructed within UPRR right of way, then an easement would be required prior to installation. Obtaining authorization from UPRR could take between six months to one year.

Option 2, replacing the existing culvert under the railroad and increasing the capacity of the pipeline beneath the packaging plant might be impractical since it would likely require bore and jacking a new pipeline under the railroad line and packaging facility. This alternative would also require the purchase of a drainage easement and may impact the business operation. Due to the constructibility issues and the increased costs associated with bore and jack construction, this option is not further considered.

3.5.2.2 19th Street

Near 19th Street (intersection of Front Street and Cienaga), there are two existing Caltrans' 18-inch pipelines that convey runoff collected at a drop inlet on the east side of Highway 1. There is also a third Caltrans 18-inch drainage pipeline and drop inlet that conveys water collected on the south-west side of Highway 1, near Front Street. All three pipelines discharge to an existing drainage channel that flows towards the 42-inch railroad culvert. Photograph 4 shows two of the 18-inch Caltrans culverts at Highway 1. It is believed that the existing 42-inch railroad culvert crossing near Front Street and Highway 1 possesses sufficient capacity to convey runoff. The drainage problems are caused primarily by 1) low gradient drainage channels that are filled with sediment and vegetation, and 2) undersized culvert crossings at Creek Road and Sand Dollar. This alternative requires the improvement or replacement of existing drainage infrastructure in and around Highway 1 as shown in Figure 9 of Appendix A.

The full development of a curb/gutter and storm drain system in Zone G (as discussed in the following Section 3.5.3 of this chapter) may produce an amount of storm runoff exceeding the conveyance capacity of the existing Caltrans and railroad culverts. If the community wishes to implement a project that accounts for future development, then replacing the Caltrans pipeline culverts may be necessary.

It is also recommended that the drainage channel between Front Street and the 42-inch railroad culvert be maintained on a regular basis. Section 3.6.3 recommends that maintenance on existing drainage channels be conducted to maximize conveyance capacity. Specifically the drainage channels between Highway 1 and the railroad (near Cienaga and Front Street), and between the railroad and Arroyo Grande Creek Channel should be maintained on a regular basis. The primary obstacle to conducting regular maintenance is determining who is responsible for maintaining the drainage channels. The County regularly cleans drainage facilities located within County public right-of-way. However, the open channels around Highway 1 and the railroad traverse between State, UPRR, private and County property or right-of-way. **The County or District should serve as the lead in identifying owner responsibility and securing commitments from the various parties to conduct routine maintenance.**

Storm Drain Versus Drainage Channels

If the low gradient drainage channels (between the railroad tracks and the Arroyo Grande Creek Channel) lack sufficient capacity to convey the forecast increase in flow, then a storm drain in Sand Dollar may be required to divert flow from the drainage channel to the recommended detention basin, as shown in Figure 9 of Appendix A. There is an existing utility easement and overhead power lines along this alignment. Depending on the available slope in the proposed alignment, the pipeline diameter could range between 42 to 48 inches. The length of this storm drain would be approximately 1,000 feet.

Benefits and Constraints

Mitigating the drainage in and around Highway 1 will relieve some of the worst flooding areas in the community and will also improve traffic safety. Caltrans has expressed interest in participating in a joint project and would be willing to cost share in the improvements. If the diversion pipeline is constructed in UPRR right of way, then an easement would need to be obtained.

Alternative Costs

As summarized in Table 3-6, the cost for constructing the Highway 1 improvements is approximately $1.8 million.

Table 3-6: Highway 1 Improvement Costs

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
36-inch Pipeline Zone F to G Diversion	1,500 LF	200 per foot	300,000
48-inch Pipeline Replacement at Sand Dollar and Creek Road	200 LF	300 per foot	60,000
Zone G Channel Improvements	2,200 LF	250 per foot	550,000
		Subtotal	**910,000**
Engineering/Design [2]		20 percent of subtotal	182,000
Administrative/Environmental [2]		60 percent of subtotal	546,000
Contingency [2]		20 percent of subtotal	182,000
		Total	**1,820,000**

Notes:
1: Rounded to the nearest thousand
2: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

Constructing a storm drain in lieu of improving the drainage channel downstream of Sand Dollar, as discussed above, would cost approximately $650,000, an increase of approximately $100,000 when compared to only improving the open channels. Accounting for the engineering/design, administrative/environmental, and contingency costs, the total project cost increases by approximately $200,000. It should be clarified that drainage channels between Sand Dollar and the railroad, and channels upstream of the railroad would yet require improvements to convey the anticipated increase in flow. If more detailed hydraulic analysis indicates that the drainage channels lack sufficient capacity to convey the anticipated increase in flow, then the storm drain alternative should be pursued.

3.5.2.3 Improvements Around Cienaga and Front Street

The OCSD proposed that the flooding around Front Street and Cienaga be addressed first since correcting this reach of Highway 1 would improve safety for commuters and pedestrians. Although this reach is included in Alternative 2, special discussion on implementing these improvements prior to a terminal detention facility is warranted.

If the lead agency in Oceano opted only to improve the flooding problem on Highway 1 near Front Street, then only the drainage channels between Highway 1 and the Arroyo Grande Creek Channel would be improved, and the 48-inch diameter pipeline replacement at Sand Dollar would be necessary. A terminal detention basin would not be constructed and runoff would flow to the lowest point and pond behind the levee. Based on field observations and existing channel alignments (see Figure 5 of Appendix A), it appears that the current private and County parcels used for RV storage would be partially inundated with runoff. The ponded water would either slowly drain into the Arroyo Grande Creek Channel via the existing culvert or would percolate into the groundwater.

Focusing solely on eliminating flooding on Highway 1 near Front Street would reduce the estimated project costs to approximately $1.2 million (includes 48-inch pipeline and Zone G channel improvements from Table 3-6, and mark-ups for engineering, administrative and contingency). If Caltrans funded half the improvements and CDBG funds were available (see Section 6.2.3.1 for discussion on local cost share), the local cost share would be approximately $500,000, which equates to approximately $17 to $25 per parcel per year[5]. If Caltrans did not contribute funding and if CDBG funds were not available, then the assessment would double to about $50 per parcel per year.

Implementing improvements to prevent flooding of Highway 1 only, without constructing a terminal detention facility is not recommended, since it will worsen the existing problems downstream of Highway 1, and could cause additional and unreasonable flooding liability. The potential for increased flooding downstream of Highway 1 would be disclosed during the environmental documentation process and will likely require mitigation. Possible mitigation measures include the detention basins and pump stations discussed in Alternative 1. For these reasons, improving the flooding problem at Highway 1 without first developing downstream facilities to manage the increased runoff is not recommended.

3.5.2.4 Alternative 2 Recommendation

Building on the detention facility recommended in Alternative 1, the proposed Highway 1 improvements could then be constructed since a terminal facility would be in place to manage the additional runoff. Mitigating the flooding near Paso Robles Street and Highway 1 is easily achieved by constructing a diversion pipeline adjacent to Highway 1 and terminating south of Railroad Street. However, in order to also correct the problem near 19th Street, the existing drainage channels need to be improved and maintained in the future.

3.5.3 ALTERNATIVE 3: MITIGATING RESIDENTIAL FLOODING

The final component of a comprehensive drainage and flood control project would be the mitigation of flooding problems in residential neighborhoods of Oceano. Due to the necessary phasing of improvements from the lower elevations to the higher elevations, these alternatives would be the last implemented. However, once in place, a series of curbs, gutters, storm drains, culverts, and detention basins would collect and convey storm runoff from the residential neighborhoods of Oceano to a terminal detention facility west of Highway 1, and eventually discharge to the Arroyo Grande Creek Channel or percolate into the groundwater.

In order to mitigate flooding of residential neighborhoods, two alternatives were investigated:

- Storm drains, curbs and gutters
- Subsurface infiltration chambers

3.5.3.1 Storm Drains, Curbs and Gutters

Many roadway shoulders in Oceano are bare, allowing runoff from impervious surfaces to flow freely onto residential lots. Low spots on residential lots collect storm runoff and cause localized flooding in many areas of the community. The construction of a network of curbs and gutters would function to confine most runoff to the streets, away from residential lots. Approximately 65,870 feet of new curb and gutter are needed to construct a continuous network in the seven drainage zones. Table 3-7 summarizes the amount of curb and gutter length needed to provide a continuous system that collects and conveys runoff in an efficient manner.

[5] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years. Also assumes that approximately 2,100 parcels in Oceano would be assessed to pay for the improvements. A range in the per parcel assessment is provided because of the assumptions regarding Caltrans involvement, the availability of CDBG funds, and the number of properties being assessed.

Table 3-7: Length of Needed Curb by Drainage Zone [1]

DRAINAGE ZONE	LENGTH OF NEEDED CURB (ft)
Zone A	1,240
Zone B	1,760
Zone C	2,420
Zone D	5,800
Zone E	4,190
Zone F	13,330
Zone G	37,130
Total	**65,870**

1: Information based on the Oceano General Plan and field inspections.

In order to install curbs and gutters, a typical underground storm drain system would be necessary to collect and convey runoff away from residential neighborhoods. Storm runoff would flow in the gutters to one of the drop inlets in Zones D, F and G. From the drop inlets, water would then be conveyed through the storm drains. The storm drain system would consist of a network of trunk sewers and a mainline serving as an interceptor for all the flow. In Zones A, C and E, completion of the curb and gutter system should eliminate all ponding water problems, except for existing isolated infrastructure or topographic problems. The general concept is laid out in Figure 10 of Appendix A. As shown in the figure, the trunk sewers would run north to south and the mainline would run parallel to Highway 1. The storm water would be conveyed to the locations of the Highway 1 improvements discussed above. The reader should note that approximately half of the proposed storm drain pipelines are located in Caltrans Highway 1 right of way. Caltrans will participate in any drainage project that locates facilities within Highway 1 right of way. This discussion is expanded upon in Chapters 5 and 6 of this report.

In order to get positive flow along the new gutters leading to the drop inlets, portions of existing roadways may need to be reconstructed. This would entail raising or lowering the flowline at the edge of pavement. This may necessitate that the roadway crown and other portions of roadway section be reconstructed. The approximate length of roadway requiring reconstruction will be determined during the preliminary design phase.

Benefits and Constraints

This alternative greatly increases the usability of the community streets by providing formal street infrastructure. Secondly, it provides an organized way to collect and convey runoff throughout the entire community. The installation of curb, gutters and related facilities would mitigate flooding at four of the six locations noted as having structure flooding in section 3.4.2.2 and other residences experiencing flooding. The overall cost is a negative aspect of this project. The current flooding problems are primarily nuisance ponding of water at street intersections and driveways. Only minor damage has been reported during flood events. The cost of these damages does not likely exceed the cost of the overall project.

Alternative Costs

As summarized in Table 3-8 and Table 3-9, the cost for constructing the curb/gutter and storm drain system in Zones F and G are approximately $1.8 and $5.3 million, respectively. Note that higher unit costs were used for the pipelines because of the need for installation of manholes and the uncertainty of additional roadway work associated with the installation of the local storm drainage network. Also additional pipe length may be needed in some areas. These are conceptual planning level cost estimates and should be refined as more detailed engineering design is accomplished.

Table 3-8: Zone F Curb/Gutter and Storm Drain Costs

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
Curb and Gutters	13,330 LF	12 per foot	160,000
Mainline Drainage Pipe	600 LF	250 per foot	150,000
Trunk Sewer Pipe	1,500 LF	200 per foot	300,000
Feeder Pipe	200 LF	180 per foot	36,000
Roadway Reconstruction	Estimate		250,000
		Subtotal	**896,000**
Engineering/Design [2]		20 percent of subtotal	179,000
Administrative/Environmental [2]		60 percent of subtotal	538,000
Contingency [2]		20 percent of subtotal	179,000
		Total	**1,792,000**

Notes:
1: Rounded to the nearest thousand
2: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

Table 3-9: Zone G Curb/Gutter and Storm Drain Costs

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
Curb and Gutters	37,125 LF	12 per foot	446,000
Mainline Drainage Pipe	2,500 LF	250 per foot	625,000
Trunk Sewer Pipe	4,100 LF	200 per foot	820,000
Feeder Pipe	640	180 per foot	115,000
Roadway Reconstruction	Estimate		650,000
		Subtotal	**2,656,000**
Engineering/Design [2]		20 percent of subtotal	531,000
Administrative/Environmental [2]		60 percent of subtotal	1,594,000
Contingency [2]		20 percent of subtotal	531,000
		Total	**5,312,000**

Notes:
1: Rounded to the nearest thousand
2: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

3.5.3.2 Infiltration Basins and Subsurface Infiltration Chambers

Localized infiltration basins are commonly used to collect and detain runoff, and allow it to infiltrate into the underlying sandy soils. Infiltration basins also reduce the amount of runoff flowing downstream into lower elevation neighborhoods. Existing infiltration basins are located in Zones A, C, E and F as shown in Figure 10 of Appendix A. Unfortunately, there are no vacant County or OCSD owned parcels to locate an infiltration basin in the areas that need storm water management. In order to create new regional or local infiltration basins, it is likely that private property would need to be purchased and all existing homes or other improvements would be removed. There are two existing vacant lots located near the low points on 16th Street and Holden Street.

These empty lot parcels could be purchased and converted into infiltration basins. A short run of storm drain pipeline could be installed from the low points on Holden and 16th Street to the proposed infiltration basins. Figure 10 in Appendix A shows the location of the empty lots that would be purchased.

A more viable option for limited locations is the use of subsurface infiltration chambers. These chambers can be installed under an existing roadway alignment or other public right of way. Additional information on these systems is presented in the engineering technical memorandum in Appendix E. These systems could be installed in smaller isolated areas within the community and are best used in swales or low points with no outlet. La Verne Street, between 22nd and 23rd Street, is typical of the type of street where this alternative is most useful as shown in Photograph 6 in Appendix B. As curbs and gutters are installed on La Verne Street, a drainage easement through private property will be necessary to construct a storm drain that conveys flow from the low point on La Verne Street, downstream to Paso Robles Street. However, a subsurface infiltration chamber eliminates that need by collecting the runoff on La Verne Street and percolating the storm water via a chamber into the subsurface.

The use of subsurface infiltration chambers should be only considered for small drainage areas where sediment is not excessive. Chamber systems should not be considered a permanent solution for managing runoff from large watersheds due to their limited capacity relative to large storm events.

Preferably, these infiltration chambers would be constructed on land owned by the County and/or the Oceano CSD. This would likely mean that the system would be constructed in County road right-of-way. Figure 11 in Appendix A shows four locations where these systems would be most useful due to the topography of the roads. The locations include:

- La Verne Street between 22nd and 23rd Street
- Holden Street between 22nd and 23rd Street
- 16th Street between The Pike and Wilmar Street
- Corner of Highway 1 and Casitas Street

The use of infiltration chambers at these locations will preclude the need to install storm drain pipelines to these somewhat remote locations.

Benefits and Constraints

One of the main advantages of the subsurface infiltrator system is that it can be built in stages. When entire streets receive curbs and gutters, this system can be installed to manage runoff conveyed by the continuous gutter system. The systems can also be tailored in size depending on the area of land contributing runoff to the infiltration system. The draw back is that these systems need periodic maintenance and are most likely cost prohibitive for handling storm events larger than the 25-year event. Additionally, concentrating groundwater infiltration in certain areas could potentially impact adjacent properties by locally elevating ground water levels. Rising groundwater levels would have to be investigated on a project specific basis.

The installation of infiltration chambers as a substitute for a storm drainage pipeline system is not recommended due to the potential for this system to not operate properly after a period of years. The chambers failure to operate will be caused by lack of maintenance, sediment or debris overloading. However, in localized low points with no outlet, the chambers may be the only option.

Infiltration Basins Versus Chambers

Cost estimates were developed for the infiltration basins to compare against the proposed subsurface infiltration chambers. Items included for the infiltration basins included land acquisition, storm drain pipeline, drop inlets, excavation/grading, fencing and roadway reconstruction. The construction cost (excluding engineering,

environmental, and contingencies) was approximately $174,000[6], which is costlier than an infiltration chamber. Also, since an infiltration basin requires the purchase of private property, constructing a chamber in public right of way is more feasible.

Alternative Costs

The systems cost approximately $150 per lineal-foot, plus any roadway repair or reconstruction costs. Generally, about 50 to 100 lineal feet of infiltrating systems are needed per acre of drainage area. Length depends on protection levels and underlying soil properties. The Holden Street area receives runoff from about 10 to 13 acres. Thus, mitigation in this area would range between $75,000 and $195,000 ($7,500 to $15,000 per acre) plus roadway repairs, curbs and gutters, and catch basins. For planning purposes, assume that the cost of the system would be $12,000 per acre of drainage area plus the cost of the collection system (curbs, gutters etc.).

As summarized in Table 3-10, the cost for constructing the infiltration chamber systems on Holden Street, La Verne Street, 16th Street and Casitas/Highway 1 is approximately $1,303,000.

Table 3-10: Subsurface Infiltration Chamber Costs

ITEM	QUANTITY	UNIT COST ($)	TOTAL ($) [1]
Holden Street	1	Lump Sum	156,000
La Verne Street	1	Lump Sum	156,000
16th Street	1	Lump Sum	84,000
Casitas Street/Highway 1	1	Lump Sum	156,000
Roadway Repairs	1	Lump Sum	100,000
		Subtotal	**652,000**
Engineering/Design [2]		20 percent of subtotal	130,000
Administrative/Environmental [2]		60 percent of subtotal	391,000
Contingency [2]		20 percent of subtotal	130,000
		Total	**1,303,000**

Notes:
1: Rounded to the nearest thousand
2: County Overhead & Support Costs for Construction Project Planning. Use 100% cumulative markup on construction costs for Coastal Zone Projects. Percentages provided by County (Typical to all estimates in this report).

3.5.3.3 Alternative 3 Recommendation

The final piece of a comprehensive and effective drainage project would be the construction of a continuous curb and gutter system, along with a storm sewer collection system. For those streets located in low points with no outlet, a subsurface infiltration chamber would provide the necessary infrastructure to dispose storm water.

3.5.4 Proposed Project and Cost Summary

- **Detention Facility on County's Airport Enterprise Fund parcel (Alternative 1A)**
- **Pipeline Diversion, Pipeline Replacement and Channel Improvements (Alternative 2)**
- **Curb/Gutter, Storm Sewer and Infiltration Chambers (Alternative 3)**

The recommended project would mitigate flooding in the residential neighborhoods, prevent flooding of Highway 1, and provide a terminal disposal point for the collected runoff. It should be noted that the proposed improvements would address flooding created by a 10-year or less rain event. The benefit is that the common

[6] Assumed each lot was acquired for $85,000.

problems experienced by residences on an annual basis would be corrected. However, flooding problems could be expected for events larger than a 10-year event.

Chapter 6 discusses the implementation strategy for planning, designing, constructing and phasing the recommended project.

Table 3-11:

ALTERNATIVE	DESCRIPTION	TOTAL COST ($)
1	Detention basin located on County Property	1,753,000
2	Highway 1 mitigation; storm drains and channel improvements	1,820,000
3	Residential flooding mitigation; curb/gutter and infiltration basins	8,407,000

3.6 Additional Recommendations

3.6.1 Participate in FEMA's Community Rating System Program

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 by FEMA as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Communities must individually apply for participation in the CRS program to receive insurance premium reductions. The CRS gives credit points for any of several designated activities within four distinct categories (Public Outreach, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness). Each CRS listed activity is worth a specified number of points. When all of a community's activities are verified, the achieved points are calculated and adjusted as necessary, according to the rules of the CRS. For each 500 points that can be verified, a community will receive one class reduction starting at class 9 all the way down to class 1. Each class translates to an additional reduction in insurance premiums of five percent for flood insurance policies within the special flood hazard area of that community. This is a voluntary program for communities.

All CRS participants must achieve a class of at least 9, which means they have accumulated a minimum of 500 points, and are therefore entitled to a five percent reduction in premiums. The maximum reduction in insurance premiums a community can receive would be 45 percent, if they achieved a class 1 rating. There are many things that each community can do to better prepare for and manage floods, accrue points in the CRS, further reduce flood insurance premiums, and prepare and protect its citizens from the damaging effects of floods.

All cities and towns should join CRS because of the economic benefits to the members of the community, and because it will heighten the flood hazard awareness and promote good floodplain management activities within the community. There are also proposals linking State and Federal programs to communities that engage in active floodplain management within the CRS program. It is also possible that more programs, either flood damage prevention or post-flood assistance, may be linked to participation in the CRS in the future.

The City of San Luis Obispo participates in the CRS and receives a ten percent discount for the Special Flood Hazard Area (SFHA) and a five percent discount for non-SFHA. The neighboring counties to San Luis Obispo County that participate in the CRS program include Santa Barbara, Monterey and Kern Counties. Monterey County currently receives a 20 percent discount for SFHA. Ventura and Kings County do not participate in the CRS program.

Reference the FEMA website at http://www.fema.gov/nfip/crs.shtm for documents on the CRS and for information on applying for the CRS.

3.6.2 Modifications to Existing Policies and Standards

A number of suggested modifications to existing policies and procedures have been identified to prevent the aggravation of existing drainage problems or creation of new flood prone areas. These policies range from improving current development review processes to changing existing maintenance procedures within Oceano.

3.6.2.1 Defer Curb and Gutter Installation Requirement

Since the inconsistent placement of curbs and gutters in Oceano has lead to the concentration of street runoff onto areas that do not have curbs or gutters; and since these areas also generally represent local low spots within a neighborhood block, the County should evaluate new construction and remodels on a case-by-case basis. If a new curb and gutter system might concentrate runoff onto a low lying property, then the requirement could be waived, with a condition that the owner pay for future improvements when a continuous curb and gutter system is constructed.

Instead of requiring a resident to construct a curb and gutter, the County could collect fees from building permit applicants, then apply these fees to construct a continuous curb and gutter system, and appropriate storm drain conveyance system for an entire street or block. This would reduce the impact caused by segmented curb and gutter systems. Imposition of a fee in lieu of constructing curb, gutter and sidewalks will require the County to pass an ordinance requiring this.

3.6.2.2 Require Development Plans to Include Analysis of Existing Drainage Routes

Every additional home and related impervious surface (e.g. driveways and patios), and every paved roadway and sidewalk in Oceano will increase urban runoff (if not managed on-site). Runoff that previously would have infiltrated into the ground will now be conveyed to the street and existing drainage facilities. Development plans for new construction should be required to provide additional information on existing drainage routes with grading plan submittals. Plans should identify where drainage routes currently exist and identify changes proposed in drainage due to site development.

As summarized in Section 2.1.3 of this report, the County's land use ordinances require detailed study and project review for proposed development within the floodplain. However, based upon review of County ordinances, there are no provisions requiring detailed analysis of drainage impacts for development located outside the floodplain but that also contributes runoff to flood prone areas. **The County's Department of Planning and Building should require that all proposed developments that generate off-site runoff should investigate the drainage flow pattern from the lot to the discharge point.** The conveyance path investigation requirement can be placed in the building or the grading permit. **If the investigation concludes that the proposed development is contributing to an existing problem, then on-site mitigation with a detention basin or equivalent facility should be required.**

This information would allow the County's Department of Planning and Building review staff to identify whether the property currently experiences flooding or could likely receive flood water from upstream development. In many of the infill areas of Oceano, the remaining areas to be developed are located in the lowest sump areas of the neighborhood. These areas may also receive roadway runoff onto their property that should be managed.

3.6.2.3 Install System Improvements with Increased Development

Drainage improvements should be planned with any proposed development. Regardless of whether drainage problems exist prior to development, mitigation should be planned as not to increase the severity or frequency of problems. Such mitigation could include on-site detention of runoff, thereby preventing the increase of runoff onto lower lying properties.

It is recommended that development fees collected for Oceano be used to fund drainage improvements for areas that will be most impacted by future development. These areas are typically the topographic low points within a drainage sub-basin. If new development can not retain runoff on site, then it should be responsible for funding the necessary improvements to convey increased runoff.

In conjunction with planning drainage improvements with future development, critical lots that are at risk to flood damages due to their location should be identified. These lots should dedicate drainage easements on their property or design sufficient conveyance facilities as not to impede the flow of storm water.

3.6.2.4 Separate Check by the Department of Public Works or the District on All Development Plans

To address drainage issues, a separate approval check by the Department of Public Works or the District should be incorporated into the approval process for all final development plans.

The identification of site specific problems would be more effective if allocated to Department of Public Works or the District, since the Planning Department has no means to enforce local Drainage Standards and Policies, and may not be aware of the details regarding specific drainage issues that have been observed or reported. Under the current system, the Department of Public Works receives many of the complaints from County residents during flooding situations. Public Works in turn informs the planning department of these problem areas and potential enforcement issues. However, the issues may not be fully communicated during this process, and problems or enforcement actions may be missed. Public Works or the District should also have the ability to mandate and follow up on specific drainage system requirements on new building permits.

3.6.2.5 Recommendations to Residential Infill Construction

Elevation Requirements

The location of a home is a key factor in the resulting drainage problems that are likely to be inflicted on it. Homes located below street grade and whose driveways slope down away from the road may experience flooding in the garage or home. This is because without an adequate curb/berm, the driveway may act to convey runoff from the street above to lower elevations and sometimes into the garage or home. In Oceano, homes constructed at grade or below the road grade are more typical of older homes and homes constructed prior to implementation of the County's flood damage prevention ordinance. Homes constructed within the floodplain are addressed by existing ordinances.

For homes outside the floodplain, it is recommended that Oceano and the County Planning Department mandate that the finish and garage elevation for all new home construction be one foot greater than the adjoining street grade. Driveways should slope down away from the home, towards the road.

Erosion Control

To control erosion, runoff from impervious surfaces such as roofs, driveways, walks, patios or decks should be collected and retained on-site, or released to the public right-of-way through an effective erosion control device or drainage system approved by the County's Department of Public Works. This requirement also achieves the goal of reducing urban runoff and the amount of water that flows to the street. Minimizing storm runoff also prevents erosion of streets and road shoulders because less water flows to the street and directing the runoff through a grassy swale slows water's velocity.

In general, new developments should achieve the following:

- Increase vegetative groundcover, to the maximum extent possible, as a means of reducing stormwater runoff
- Install on-site natural drainage channels or detention basins to retain runoff from impervious surfaces prior to reaching the public right-of-way

All natural drainage should be kept free of obstructions such as branches, trash, and sediment to maintain the drainage capacity of the channel. Maintenance responsibility should rest with the owners of the property through which the drainage channels pass.

Divert Runoff to Landscaped Areas

By diverting stormwater from impervious areas such as roofs, walkways and driveways, and reusing whenever possible, runoff that flows to streets can be greatly reduced. This can be achieved by directing rain gutters to landscaped areas, swales or infiltration basins on private property where water can percolate into the ground.

Placing landscaped areas directly below eaves allows roof runoff to percolate into the subsoil. Plants should be sturdy enough and provide a subsurface matrix of roots to tolerate heavy sheet flow runoff and periodic saturation. Landscaped infiltration basins for stormwater retention should have flow directed toward them with curbs, berm, or similar structures, and slightly concave to retain surface water until it infiltrates.

3.6.3 Conduct Maintenance on Existing Drainage Channels

All the natural drainage channels that conveyed flow from east to west were filled in by the railroad. Existing natural or fabricated drainage channels should be kept free of obstructions such as fallen trees, debris, and sedimentation to maintain capacity in the drainage system. Primary responsibility for this maintenance rests with the owners of the property through which the drainage channels pass. If the drainage channels pass through public property, such as County roads, then the County's maintenance department would be responsible for removing impediments. The District should continue to provide leadership, advice and encouragement to property owners and local agencies to assume their responsibilities.

The existing drainage channels west of Highway 1 would more efficiently convey flow if sediment accumulation was kept to a minimum and if vegetal growth was managed. It is recommended that periodic maintenance be conducted on these facilities to preserve the conveyance capacity of the channels.

Caltrans has conducted maintenance on the open channel between the railroad culvert and Highway 1, near Paso Robles Street. However, the open channels that run adjacent to the railroad, Highway 1, and Creek Road need to be maintained on a regular basis to manage the vegetal growth.

3.6.4 Establish Maintenance Responsibility and Create Maintenance District

Maintenance Responsibility

Determining who has maintenance responsibility for the various storm drains, channels and swales in Oceano cannot easily be established. Currently, the maintenance of drainage infrastructure located within public right of way for unincorporated communities in the County, including Oceano, is the responsibility of the County Public Works Department. The limited availability of County staff and the large area of responsibility make it difficult for maintenance workers to become familiar with all drainage issues in the community. This means that the maintenance of some culverts and ditches are sometimes overlooked and, therefore, these culverts and ditches may end up becoming clogged during the rainy season.

Many drainage facilities are also located outside of County public right of way, either in private property or in Caltrans state highway right of way. If the property owner does not maintain the conveyance facilities, then these structures will go unattended because the District is not responsible for maintaining facilities on private property or on property within the jurisdiction of other public agencies. Other parties that have maintenance responsibilities in Oceano include Caltrans, UPRR, OCSD, farmers and property owners.

A right of way investigation into the properties on which drainage structures exist should be conducted to identify the parties responsible for performing maintenance. Once responsibility is established, maintenance efforts should be coordinated so that the efforts of some are not diminished by the non-actions of others. For example, removing vegetation between Highway 1 and the railroad will provide little benefit unless the drainage channels are cleared west of the railroad. Maintenance should be accomplished for the entire channel, from Highway 1 to the Arroyo Grande Creek Channel. Developing and implementing a coordinated active maintenance program will provide immediate benefits to the current flooding problems.

Proposed Maintenance District

Many of the drainage/flooding problems in Oceano are exacerbated by inadequate maintenance of drainage facilities. Currently, the maintenance of drainage infrastructure located within public right of way for unincorporated communities in the County, including Oceano, is the responsibility of the County Public Works Department. The limited availability of County staff and the large area of responsibility make it difficult for District maintenance workers to repeatedly attend to all County drainage facilities prior to all predicted storms and between successive storm events. This means that the maintenance of some culverts and ditches is not performed in a timely manner and, therefore, these culverts and ditches may end up becoming clogged during periodic storm events.

If the community elects not to fund the proposed projects, then at a minimum, the community should finance annual maintenance such as channel clearing, sediment removal and vegetation management. **For this reason, it is recommended that either the existing Oceano Community Services District or a separate facility maintenance district be formed to better maintain the drainage infrastructure in Oceano.** Responsibilities of the new maintenance district would include:

- Being the contact point for all resident complaints regarding drainage infrastructure in the community
- Keeping an organized database of all new drainage infrastructure in the community including the size and capacity of culverts and storm drains, even if this infrastructure is installed by private property owners
- Keeping a regular maintenance schedule that may involve multiple maintenance visits where needed
- Responding to drainage infrastructure repairs as needed
- Conducting an information campaign for creek ownership responsibilities for maintenance and cleaning

Having a local facility maintenance district will make it easier to maintain drainage infrastructure as needed throughout the community.

3.6.5 Non-Structural Solutions

Non-structural solutions are defined as those that reduce or avoid flood damages without significantly altering the flooding or attempting to confine flood flows to the channel. This is accomplished by changing the land use within floodplains or retrofitting existing structures to accommodate potential flood hazard. Typical non-structural solutions are:

- Purchase flood insurance (currently implemented)
- Zoning ordinances and building codes (currently implemented)
- Flood proofing of existing structures to withstand flooding without damage
- Agency purchase of flood prone lands and structures

Flood proofing of existing structures to withstand flooding without damage may be the only reasonable option to homeowners currently paying flood insurance to protect their homes. Flood proofing could include raising homes one foot above the 100-year floodplain.

3.6.6 Collect Design Level Surveys

When the projects are implemented, one of the first tasks that should be conducted is the collection of aerial photography and digital orthophotography at 1 inch = 40 feet and one-foot contours. Field surveys should also be collected and include channel cross-sections and inverts, location of drainage infrastructure, and any structures (bridge, box culverts etc.) that could affect the hydraulic conditions of the existing facilities. This information will assist in refining the hydraulic analysis and recommended pipeline sizes.

3.7 Summary of Recommendations

- The community should investigate applying for FEMA's Community Rating System to reduce the insurance premiums of home owners in the Special Flood Hazard Area.
- Defer curb and gutter installation requirement when the installation leads to a concentration of runoff onto lower lying properties.
- Require that all proposed developments that generate off-site runoff analyze the drainage flow pattern from the lot to the discharge point.
- Include the Department of Public Works in the final approval of all development plans.
- For homes outside the floodplain, mandate that the finish and garage floor elevation for all new home construction be one foot greater than the adjoining street grade.
- Form a maintenance district and establish maintenance responsibility for flood prone areas on private property.

3.8 Cost Estimates

Project cost estimates have been provided in this report. More detail on the unit cost and quantity calculations are provided in Appendix E, Engineering Technical Memorandum. These cost estimates are preliminary and subject to revision based on more definition and detail of the recommended project. Construction cost adjustments for inflation will be required if the projects are implemented years from now.

CHAPTER 4 ENVIRONMENTAL FEASIBILITY ANALYSIS

Chapter Synopsis: This chapter discusses the environmental permitting and regulatory requirements for the proposed alternatives. An environmental technical memorandum will be prepared for this study and will be included in Appendix F. The technical memorandum will provide greater detail on the environmental methodology, analysis and alternatives.

4.1 Environmental Analysis Objective

The study investigated the potential environmental impacts, state and federal resource agency permit requirements for the proposed projects. The objective was to conduct a "fatal flaw" preliminary environmental feasibility analysis on the proposed drainage and/or flood control mitigation alternatives described in Chapter 3. This analysis assessed the environmental impacts and constraints associated with the proposed alternatives. Each proposed alternative was examined for the biological resources, cultural resources, geology and soils, hydrology and water quality, and land use constraints likely to be present in each given area. Specifically the investigation included:

- Determination of whether project can be permitted
- Outline of the types of probable mitigation measures
- Outline of additional studies required for the next phase implementation
- Determination of the level of California Environmental Quality Act (CEQA) documentation necessary (e.g. EIR, Negative Declaration, Categorical Exemption) for each alternative
- Identification of the applicable environmental regulatory requirements of jurisdictional agencies (e.g. U.S. Army Corps of Engineers, California Department of Fish and Game, Regional Water Quality Control Board)
- Outline of regulatory permitting requirements and approximate schedule for obtaining permits

4.1.1 Environmental Analysis Methodology

Project alternatives were analyzed for environmental constraints that would prevent agency approval, increase costs (particularly for mitigation), or delay the project schedule. Existing documentation relative to each resource topic (e.g., biological resources, cultural resources, geology and soils, hydrology and water quality, and land use) was examined to help determine the likelihood of constraints.

4.1.2 Biological Resources

A reconnaissance level site assessment was conducted to investigate biological resources in the project area on June 30, 2003. The assessment area included the proposed project sites and bordering areas. Each site was generally assessed for its potential to support sensitive biological and botanical resources. Information from the California Natural Diversity Database was combined with recent experience on other projects in the area to determine the potential for sensitive species and their habitat in the project areas.

4.1.3 Cultural Resources

Data on file in the San Luis Obispo County Department of Planning and Building was used to determine if cultural resources have been identified in each project area. No standard record searches or site visits were conducted.

4.1.4 Land Use

The San *Luis Obispo General Plan* and *Oceano Specific Plan* were reviewed to determine whether the proposed alternatives were consistent with local policies. The study examined the presence of prime farmland and farmland of local or state importance in the project area. In addition, the *Airport Land Use Plan, Oceano County Airport* and Federal Aviation Administration (FAA) policies were also analyzed for those areas near the Oceano Airport.

4.2 Environmental Analysis Results

4.2.1 Environmental Constraints

Table 4-1 summarizes the environmental constraints that may be encountered for each alternative. The constraints are summarized by resource topic. Based on this preliminary analysis, major environmental constraints include:

- Potential modification of jurisdictional waters (Alternative 2 – Improving or replacing existing drainage channels west of Highway 1)
- Potential presence of cultural resources (Alternative 1C – pressure storm drain and, Alternative 3 – curb, gutter and storm drain system),
- Potential impacts to endangered/threatened species habitat (Alternative 1A – detention basin, Alternative 1B – pump station, Alternative 1C, and Alternative 2)
- Related FAA recommendations on detention basins located near airports (Alternative 1A).

4.2.2 Permit Requirements

An assessment of the state and federal environmental permits that may be necessary for each project alternative is provided in Table 4-2. An estimate of the timeframe typically required to obtain each type of permit is summarized in Table 4-3. Based on the level of research performed for this analysis, most project alternatives would be possible to permit if mitigation measures are implemented to avoid significant environmental impacts. The U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service may not approve Alternative 2 due to potential impacts to jurisdictional waters and sensitive species habitat.

4.2.3 Potential Mitigation

Potential impacts to environmental resources may result from the proposed project alternatives. Those impacts may require implementation of mitigation measures to protect sensitive, threatened or endangered species, water quality (including erosion control), land use, and cultural resources. Table 4-4 summarizes the potential mitigation measures for each alternative.

Table 4-4: Potential Mitigation Requirements

ALTERNATIVE	POTENTIAL MITIGATION
1A – Detention Basin	• Preconstruction surveys for sensitive species • Construction monitoring of sensitive species habitat • Erosion and sediment control measures during construction • Record search for cultural resources; surface surveys during ground disturbance depending on results of record search • Implement the following FAA general recommendations for detention facilities near airports: – Placing riprap or quarry fragments on the side and bottom of the basin

ALTERNATIVE	POTENTIAL MITIGATION
	– Increasing the depth of the facility and making it more linear – Removing vegetation that could provide food or cover in or around the basins
1B – Pump Station and Sump Basin	• Preconstruction surveys for sensitive species • Construction monitoring of sensitive species habitat • Erosion and sediment control measures during construction • Record search for cultural resources; surface surveys during ground disturbance depending on results of record search • Implement the following FAA general recommendations for detention facilities near airports: – Placing riprap or quarry fragments on the side and bottom of the sump – Increasing the depth of the facility and making it more linear – Removing vegetation that could provide food or cover in or around the basins
1C – Pressure Storm Drain	• Preconstruction surveys for sensitive species • Construction monitoring of sensitive species habitat • Erosion and sediment control measures during construction • Record search for cultural resources; surface surveys during ground disturbance depending on results of record search
2 – Highway 1 and Drainage Channel Improvements	• Preconstruction surveys for sensitive species • Construction monitoring of sensitive species habitat • Erosion and sediment control measures during construction • Record search for cultural resources; surface surveys during ground disturbance depending on results of record search
3 – Curb, gutter, storm drain and infiltration chambers	• Record search for cultural resources; surface surveys during ground disturbance depending on results of record search

4.2.4 Additional Studies and Surveys

The following studies/surveys will need to be performed in order to begin the permitting phase of the project:

- Habitat assessments
- Sensitive species surveys
- Cultural resource record searches

Table 4-1: Environmental Constraints

Alternatives	Biological	Cultural Resources[7]	Geology and Soils	Hydrology and Water Quality	Land Use
Alternative 1. Convey Flow Into Arroyo Grande Creek					
1A: Dedicate land adjacent to Arroyo Grande Creek as flood easements for a detention or retention basin. Site will be a RV storage lot or on agricultural land.	Construction of a new outfall in the creek bank may affect endangered/ threatened species habitat, including steelhead, tidewater goby, and California red-legged frog (CRLF). Other sensitive species that may also be affected include: southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	None	None	None	Standing water in detention basins may attract waterfowl that may affect operations at Oceano Airport. Related FAA recommendations may increase project costs. Permanent loss of prime farmland may be likely if the detention basin is built in the agricultural land and if FAA recommendations are incorporated into the design of the detention basin. Permanent loss of prime farmland may require an Environmental Impact Report (EIR) if the loss cannot be mitigated, causing schedule delays and increased project costs.
1B: Build a pump station near the levee of the Arroyo Grande Creek Channel and pump the retained storm water into the channel.	Improving the existing outfall to the creek may affect endangered/threatened species habitat, including steelhead, tidewater goby, and CRLF. Other sensitive species that may also be affected include: southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	None	The proposed pump station is on land with moderate potential for liquefaction. Project design for the liquefaction zone may result in higher project costs.	None	Standing water in detention basins may attract waterfowl that may affect operations at Oceano Airport. Related FAA recommendations may increase project costs. Permanent loss of prime farmland may be likely if the detention basin is built in the agricultural field and if FAA recommendations are incorporated into the design of the detention basin. Permanent loss of prime farmland may require an EIR if the loss cannot be mitigated, causing schedule delays and increased project costs.
1C: Build a pressurized storm drainage system.	Construction of the drainage pipe outfall within the creek bed may affect endangered/threatened species habitat, including steelhead, tidewater goby, and CRLF. Other sensitive species that may also be affected include: southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	Numerous archaeological sites have been identified in the eastern portion of Zone G. Cultural resources include weathered shell, stone flakes, and stone tools. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None	None	None

[7] Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building. No standard record searches or site visits were conducted.

Alternatives	Biological	Cultural Resources[7]	Geology and Soils	Hydrology and Water Quality	Land Use
Alternative 2. Alleviate Highway 1 Drainage Problems					
Install drop inlets and a 1,500-foot storm drain pipeline and improve or replace existing drainage infrastructure in and around Highway 1.	Removal of vegetation and sediment from low gradient drainage channels may affect threatened CRLF's habitat. If CRLF habitat is determined to be present, approval from the U.S. Fish and Wildlife Service (USFWS) may be difficult. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	None	None	Sediment and vegetation removal from drainage channel may temporarily increase the sediment load of Arroyo Grande Creek. Implementation of Storm Water Pollution Prevention Plan and Best Management Practices during construction will minimize this impact. U.S. Army Corps of Engineers (Corps) approval for sediment removal may be difficult to obtain, thereby delaying the project schedule or preventing the project altogether.	None
Alternative 3. Resolve Residential Flooding Problems					
Construct a network of curbs and gutters and install a underground storm drain system to collect and convey runoff. Install subsurface infiltration chambers under existing roadway or other public right-of-way.	None	Numerous archaeological sites have been identified in the eastern portion of Zone G. Cultural resources include weathered shell, stone flakes, and stone tools. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None	None	None

Table 4-2: Permit Assessment

Alternative	Project Description	CEQA[8] Document	SHPO 106[9]	CDFG 1601[10]	Corps 404 Permit[11]	USFWS Section 7[12]	NMFS Section 7[13]	RWQCB 401[14]	SWRCB General Permit[15]	SWRCB Phase II SWMP[16]	CCC CDP[17]	APCD ATC/PTO[18]	FAA[19]	Notes
Alternative 1. Convey Flow Into Arroyo Grande Creek														
1A: Dedicate land adjacent to Arroyo Grande Creek as flood easements for a detention/ retention basin.	Detention basin on 5-plus acres at a RV storage lot or on agricultural land; grading required to increase capacity of field; new outfall constructed in creek bank to drain water by gravity into creek.	ND[20] (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	No	Yes	Because project involves new facilities and has the potential to affect sensitive species or their habitat, a ND will be required. If permanent loss of prime farmland cannot be mitigated, an Environmental Impact Report (EIR) may be required (Williamson Act). A Corps permit will be required if the new outfall or improvements to the existing outfall are constructed below ordinary high water (OHW). The Corps will consult with the NMFS and USFWS if threatened/endangered species will be affected by improvements to the existing outfall, new outfall construction and/or operation. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.

[8] California Environmental Quality Act: Required if a state agency has to take action on a project; If the project does not qualify for an exemption, the compliance document is either a Negative Declaration or Mitigated Negative Declaration (ND) or an Environmental Impact Report (EIR)
[9] State Historic Preservation Office – Section 106 (Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building): Required if a project has the potential to impact cultural resources
[10] California Department of Fish and Game – 1601 Streambed Alteration Agreement: Required if a project has the potential to impact sensitive species or their habitat
[11] U.S. Army Corps of Engineers – 404 Permit: Required if a project involves work below the ordinary high water mark
[12] U.S. Fish and Wildlife Service – Section 7 Consultation: Required if a project has the potential to impact sensitive species or their habitat
[13] National Marine Fisheries Service – Section 7 Consultation: Required if a project has the potential to impact sensitive marine and anadromous fish species or their habitat
[14] Regional Water Quality Control Board – 401 Certification: Required if a project has the potential to discharge to surface water, ground water, or other water systems
[15] State Water Resources Control Board – National Pollutant Discharge Elimination System (NPDES) General Construction Permit: Required if a project involves ground disturbance of more than 1 acre
[16] State Water Resources Control Board – Phase II Storm Water Management Plan Revision: Required for potential discharges to surface water, ground water, or other water systems by small municipal separate storm sewer systems not covered by the Phase I program
[17] California Coastal Commission – Coastal Development Permit: Required if a project is located in the Coastal Zone or in streams that feed into the Coastal Zone
[18] San Luis Obispo County Air Pollution Control District – Authority to Construct and Permit to Operate: Required for projects with the potential to emit pollutants
[19] Federal Aviation Administration – Notice of Proposed Construction or Alteration and Notice of Actual Construction or Alteration: Required for construction of detention basins near airports
[20] Negative Declaration or Mitigated Negative Declaration: Required if projects with impacts that are less than significant or less than significant with mitigation

Alternative	Project Description	CEQA[8] Document	SHPO 106[9]	CDFG 1601[10]	Corps 404 Permit[11]	USFWS Section 7[12]	NMFS Section 7[13]	RWQCB 401[14]	SWRCB General Permit[15]	SWRCB Phase II SWMP[16]	CCC CDP[17]	APCD ATC/PTO[18]	FAA[19]	Notes
1B: Build a pump station near the levee of the Arroyo Grande Creek Channel and pump the retained storm water into the channel.	New pump station and sump basin on 2.5 acres at a RV storage lot or on agricultural land; newly excavated and graded sump basin at either site; water would be discharged by pump into creek, requiring some improvements to existing outfall or construction of a new outfall.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	Yes	Yes	Because project involves construction of new facilities, a ND will be required. If permanent loss of prime farmland cannot be mitigated, an EIR may be required (Williamson Act). A Corps permit will be required if the new outfall or improvements to the existing outfall are constructed below OHW. The Corps will consult with the NMFS and USFWS if threatened/ endangered species will be affected by improvements to the existing outfall, new outfall construction and/or discharges through the outfall. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.
1C: Build a pressurized storm drainage system.	Drain southwest corner of Zone G; discharge into Arroyo Grande Creek; long runs with no inlets needed to achieve pressurized flow.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	No	No	Because there is potential of less than significant impacts to threatened/ endangered species and/or cultural resources, a ND will be required. A Corps permit will be required if the new outfall is constructed below OHW. The Corps will consult with the NMFS and USFWS if threatened/endangered species will be affected by outfall construction and/or operation. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.

Alternative	Project Description	CEQA[8] Document	SHPO 106[9]	CDFG 1601[10]	Corps 404 Permit[11]	USFWS Section 7[12]	NMFS Section 7[13]	RWQCB 401[14]	SWRCB General Permit[15]	SWRCB Phase II SWMP[16]	CCC CDP[17]	APCD ATC/PTO[18]	FAA[19]	Notes
Alternative 2. Alleviate Highway 1 Drainage Problems														
Install drop inlets and a 1,500-foot storm drain pipeline and improve or replace existing drainage infrastructure in and around Highway 1.	Storm drain would convey storm water from Paso Robles and 13th street southeast along Highway 1 to an existing open drainage channel that runs parallel to the railroad. Improvements to the existing drainage infrastructure would include removing vegetation and sediment from low gradient drainage channels and replacing undersized culvert at Creek Road and Sand Dollar Road.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	No	Possibly (see notes)	Yes	Yes	Yes	No	No	Because there is potential to impact threatened/endangered species, a ND would be required. A Corps permit will be required for sediment removal unless the "scoop and lift" technique is used. The Corps will consult with USFWS if threatened/endangered species will be affected by vegetation and/or sediment removal. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. A Coastal Development Permit will be needed for activities west of the railroad tracks. Depending on the result of a cultural records search and Corps involvement, Section 106 consultation may be required.
Alternative 3. Resolve Residential Flooding Problems														
Construct a network of curbs and gutters and install a underground storm drain system to collect and convey runoff to existing drainage.	Install 65,000 feet of new curb and gutter throughout city streets; install storm drain line to collect and convey water; reconstruct portion of roadway. Install subsurface infiltration chambers in smaller isolated areas within the community where there are swales or low points with no outlets.	ND (see notes)	No (see notes)	No	No	No	No	No	Yes	Yes	No	No	No	Because there is potential to affect cultural resources while installing the curbs, gutters, and storm drains, a ND will be required. However, since there are no federal permits required for the project, Section 106 Consultation is not triggered.

Table 4-3: Permitting Timeframe

Permit	Typical Timeframe [1] (months)	Notes
California Environmental Quality Act (CEQA)		
Exemption	< 1	
Negative Declaration (ND)	6 - 12	
Environmental Impact Report (EIR)	12 - 24	
California Department of Fish and Game (CDFG) 1601 Streambed Alteration Agreement	3 - 6	CEQA must be completed before the 1601 Agreement can be issued.
U.S. Army Corps of Engineers (Corps) Section 404		
Nationwide Permit	1 - 3	Section 7 and Section 106 consultations are required to be complete.
Individual Permit	12 - 18	National Environmental Policy Act (NEPA) compliance is required, which can take one year or more.
U. S. Fish and Wildlife Service (USFWS)/ National Marine Fisheries Service (NMFS) Section 7 Consultation		
Informal	1 - 3	
Formal	6 - 12	
State Historic Preservation Office (SHPO) Section 106 Consultation	6 - 12	
Regional Water Quality Control Board (RWQCB) 401 Certification	1 - 3	CEQA must be completed before the 401 Certification can be issued.
State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Construction Permit	< 1	A Storm Water Pollution Prevention Plan (SWPPP) must be prepared prior to construction and implemented during

Permit	Typical Timeframe [1] (months)	Notes
		construction.
SWRCB NPDES Phase II Storm Water Management Plan (SWMP) Modification	3 - 6	A SWMP must be modified and submitted with Notice of Intent (NOI) prior to construction. Because this program has just begun, processing times may vary.
Coastal Commission Coastal Development Permit	6 - 12	Public controversy could delay this approval. Projects within original Coastal Commission jurisdiction require review at the state level. A federal consistency determination, which might further delay approval, is required for projects with federal agency involvement.
Federal Aviation Administration (FAA) Notice of Proposed Construction or Alteration	1 - 2	
Air Pollution Control District (APCD) Permit to Construct/Permit to Operate	1 - 3	

1. Timeframes do not include time required to perform pre-applications studies, to prepare required applications, and to complete prerequisite approvals.

CHAPTER 5 FUNDING ALTERNATIVES

Chapter Synopsis: This chapter provides a summary of funding options, including criteria for qualifying projects, available funds, and cost sharing formulas. This chapter also discusses recommended funding sources that match the types of proposed projects. A funding review technical memorandum was prepared for this study and is presented in Appendix G.

5.1 Overview of Funding Responsibilities

The District is the responsible agency for managing, planning, and maintaining historical drainage and flood control facilities in unincorporated areas of the District. It is the District's policy that funding for these services comes from two sources. Planning costs are typically advanced or funded through the District's general flood control fund, with the intentions that the costs are reimbursed by the Assessment District or benefiting zone. However, design and construction costs of drainage and flood control projects are the responsibility of the community or area that benefits from the capital improvement. If budget constraints prevent the District from providing funds to pay for the planning and design, and the local community is unwilling to pay, then the project will not be advanced until funds become available.

In some communities, local agencies (e.g. community services districts) are legally authorized to provide drainage and flood control services by the Local Agency Formation Commission (LAFCo). In these communities, the local agency is responsible for implementing projects and can implement projects with the District. The Oceano CSD has drainage maintenance authority over the community's streets and drainages as per LAFCo Resolution 80-6, and could serve as the lead agency in implementing the proposed drainage and flood protection projects.

Funds to implement the drainage or flood control projects can be generated through various federal, state, and local sources through grants, cost sharing agreements, taxes, assessments and fees. This chapter provides a summary of funding options, including criteria for qualifying projects, available funds, and cost sharing formula. This chapter also discusses recommended funding sources that match the types of proposed projects.

5.2 Funding Sources

The various funding sources applicable to Oceano are presented in this section. For more detail on the types of funding programs, reference the technical memorandum included in Appendix G.

5.2.1 Recommended Funding Strategy

While many of the recommended projects may involve the need to leverage funding from outside the local community, the strongest applicants for leveraged funding have an established and effective local funding program.

The sections in this chapter are organized to outline first, the local funding options that the District and lead agency can establish, and second the outside Federal and State funding options that may be accessed to "match" local funding sources and help implement projects. Because the local match is critical to accessing outside funding, it is highly recommended that the District and lead agency[21] in Oceano begin to establish local funding mechanisms (even if these do not fully fund the recommended projects) in order to be more

[21] A "lead agency" to represent Oceano and carry out the recommended drainage improvements has not been approved. The lead agency representing the community would assume control of the projects at completion. The lead agency will be responsible for gaining a preliminary level of community support for projects prior to implementing the engineering planning phase.

competitive for outside funds. The recommended local funding mechanisms include 1) grants, 2) taxes, 3) assessments, and 4) fees (property based and development impact). The creation of a local funding source, plus the potential procurement of Federal and State grants, establishes the framework for a comprehensive community funding program. This approach also acknowledges the realistic nature of public projects that no capital improvement of this magnitude can rely solely on grants.

5.2.2 LOCAL FUNDING

As discussed previously, the District is the responsible agency for programming drainage and flood control services. The Oceano CSD could be responsible for the drainage and flood control services, however, if it chooses not to serve as the lead agency, then a separate community group would need to assume the role of lead agency to serve as the applicant and/or responsible agency for administering the funding options discussed in this chapter.

There are several options for providing funds to the communities involved in the Study. The options include grants, taxes, assessments, and fees.

5.2.2.1 Grants

The County's planning department administers Community Development Block Grants (CDBG) on a yearly basis. This program is funded by the US Department of Housing and Urban Development (HUD) and targets low to moderate-income communities. The funding for CDBG is guaranteed each year but the level of funding varies. There is no cap on grant applications, but the County is allocated approximately $500,000 on an average year from HUD.

Where CDBG funds are used to pay all or part of the cost of a public improvement, special assessments to recover the non-CDBG portion may be made provided that CDBG funds are used to pay the special assessment in behalf of all properties owned and occupied by low and moderate income persons. If the CDBG funds are not sufficient to pay the assessments in behalf of all the low and moderate income owner-occupant persons, then the CDBG funds need not be used to pay the special assessment in behalf of moderate income persons[22].

5.2.2.2 Special Taxes

Taxes are the most common means for a government to raise revenue. An existing tax can be raised, or a new tax can be levied on residents in a district to fund flood control projects. By definition, this is a special tax requiring approval from two thirds of the electorate (residents). If approved, the revenue generated would be allocated specifically for drainage and flood control projects in the district. It would be the responsibility of the district to determine where those funds would be spent.

This form of revenue requires all residents to pay the tax regardless of benefits received and the special tax formula does not need to be related to benefits received from the proposed projects. In order to establish the special tax, the District would need to develop and adopt a formula; the board of supervisors would approve placing the tax on the ballot. A special tax is approved by resident registered voters (except in the case of Mello-Roos CFD tax which can be approved by property owners in uninhabited areas). Figure 1 in Appendix G illustrates the special tax adoption process.

5.2.2.3 Benefit Assessments

A benefit assessment is a charge levied on a property to pay for public improvements or services that benefit the property. The difference between an assessment and a tax is that benefit assessment formula must quantify the relationship between the assessment charged and the benefit received by the property (if a

[22] 24CFR570.200(c) *Special Assessments Under the CDBG Program.*

property does not benefit, it cannot be assessed). The application of this funding mechanism would likely limit assessments to those properties within the immediate vicinity of constructed improvements.

All new assessments must conform to the requirements of Proposition 218, which was passed in November 1996. Proposition 218 specifically requires that property owners (not registered voters) be allowed to vote on new benefit assessments. New assessments may be approved by a simple majority approval of the property owners, with votes weighted in proportion to the assessment proposed.

In order to implement a new assessment, the lead agency must define those parcels that receive benefit and define the method of assessment in a Basis of Design Report. Figure 2 in Appendix G illustrates the benefit assessment adoption process.

5.2.2.4 Property-Based Fee

A property-based user fee is a charge levied on a property to pay for public improvements or services that are used by that property. The difference between an assessment and a user fee is that assessments rely on a demonstration of special benefit (which can be hard to prove) while user's fees require demonstration of use. In the case of drainage facilities, a user fee allows an agency to collect revenue from properties that contribute runoff into the system but may not flood because of their location.

A user fee can be structured proportionally to the amount each parcel uses the flood control facilities rather than how much each property benefits from the services or improvements provided. This allows program costs to be spread over a larger customer base. For flood control work, user fees are typically related to impervious area on the property, which can be equated to runoff. Like the benefit assessment, a user fee may also be implemented by a 50% vote; however, before the vote may be initiated, a noticed protest hearing must take place and less than 50% written protest must be received.

In order to implement a new user fee, the lead agency must define those parcels that use the various drainage facilities and define its method of calculating a fee proportional to use. Figure 3 in Appendix G illustrates the user fee adoption process.

There is current legislative effort aimed at exempting storm drainage fees from the Proposition 218 balloting test. Should this effort be successful, property based fees could be established with a fee study and protest hearing, as described for the Development Impact Fee below.

5.2.2.5 Development Impact Fee

Government Code Section 66000 et.seq., allows the County to collect development fees to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Development Impact Fees are tied to either General Plans or Capital Improvement Programs approved by the County. As regular updates of the General Plan and/or Capital Improvement Programs, additional storm drain infrastructure is identified to support the new developments and projects. The fees cannot be used to correct existing problems; although they can be used to fund a "fair share" of new projects. The collection of fees in lieu of the installation of curb, gutter and sidewalks in problematic locations must be approved by District Board of Supervisors as a new and separate action.

Development Impact Fees are not subject to vote. They can be approved by a majority of the Board of Supervisors or the Board of Directors after a protest hearing. Figure 4 in Appendix G illustrates the adoption process.

The implementation of a Development Impact Fee in Oceano may not benefit the community since it is nearly built out. However, redevelopment and larger remodels (improvements that exceed a certain percentage of the current property home value) could provide the nexus for collecting impact fees.

5.2.3 OUTSIDE (LEVERAGED) FUNDING SOURCES

Federal and State programs (e.g. cost sharing agreements or grants) provide an opportunity for communities to reduce the total project cost that will be funded through taxes, assessments, and fees. Grant applications often require detailed information regarding the project, the impact on the community and the environment, and project costs. Additionally, grant distributors prefer projects that provide multiple benefits including environmental restoration. Projects compete for existing funds and a majority of applications are not accepted because of this.

Once a grant is appropriated to a project, the recipient is required to complete additional paperwork including invoices, status reports, and project closeout reports. Grant management adds to the overall project costs and not all grant management costs are guaranteed to be recovered (not included as matching funding for project costs).

5.2.3.1 U.S. Army Corps of Engineers: Flood Hazard Mitigation and Riverine Ecosystem Restoration Program

Informally known as "Challenge 21," this watershed-based program focuses on identifying sustainable solutions to flooding problems by examining nonstructural solutions in flood-prone areas, while retaining traditional measures where appropriate. Eligible projects will meet the dual purpose of flood hazard mitigation and riverine ecosystem restoration.

Projects include the relocation of threatened structures, conservation or restoration of wetlands and natural floodwater storage areas, and planning for responses to potential future floods.

The Corps requires that the local sponsor[23] assist in the preparation of the planning, environmental, and design documents to ensure that the communities are involved in the project development and selection process. This requires the local sponsor to have an active role throughout the entire Corps civil works process, which can last up to seven years or more. The local sponsor is also expected to share in the cost of the project planning, design and construction (cost sharing depends on the program, but can be as high as 50 percent of the project). The local sponsor financial contribution can be in the form of in-kind service (e.g. staff time), which would offset the cash contribution requirements, but some of these costs would be in addition to the requirements defined by the Corps process. The local sponsor will incur project costs that are deemed ineligible and cannot be used as part of the local sponsor financial contribution. These costs are typically project management costs incurred for administrative tasks such as management of staff, preparation of invoices, etc. Refer to Appendix G for more detail on local sponsor cost sharing responsibilities for Corps sponsored projects.

The amount of structural and non-structural damage experienced by residences and business in Oceano may not qualify as a Federal project based on the Corps' benefit to cost ratio formula. The Corps would make this determination following the completion of an Economic Analysis as part of a Feasibility Study. However, based on the delineation of the FEMA 100-year floodplain and the objective of the proposed projects to mitigate more frequent flood events (and not 100-year flood protection), it is not recommended to pursue Federal involvement for projects in Oceano.

5.2.3.2 California Department of Transportation: Cooperative Drainage Projects

The California Department of Transportation (Caltrans) has established a process for cost sharing of drainage projects being implemented by a local agency that will benefit Caltrans facilities. Cost sharing would include the planning, design, and construction of drainage projects. The process for applying for a Cooperative

[23] A local sponsor is typically the local flood control agency or district responsible for providing drainage and flood control. Local sponsors share in the cost for planning, designing and constructing a project with the Corps.

Agreement is detailed in the Cooperative Agreement Manual. The cost to Caltrans is based on the benefit received from the project.

Caltrans has been approached concerning these drainage problems and has acknowledged that it would be willing to cost share in solutions to drainage problems adjacent Highway 1. A letter outlining Caltrans position is included as an appendix to the Engineering Technical Memorandum in Appendix E.

5.2.3.3 Governor's Office of Emergency Services: Flood Mitigation Assistance Program

FEMA provides funds on a yearly basis for each of the states to administer Flood Mitigation Assistance (FMA) grants. In California, the Governor's Office of Emergency Services administers these grants. The purpose of these grants is to provide local communities with funds to alleviate reoccurring flooding problems and to reduce claims on the National Flood Insurance Fund (NFIF). There are three types of grants available:

- FMA Planning Grants
- FMA Project Grants
- FMA Technical Assistance Grants

All projects that address flooding issues for areas within a Special Flood Hazard Area (SFHA)[24] are eligible for both FMA Planning and Project grants. In order to receive a FMA Project grant, a Flood Mitigation Plan (FMP) must be completed. A draft FMP has been submitted to the Office of Emergency Services (OES) for review and comment. The County anticipates an approved FMP by the end of calendar year 2004. The FMA Planning Grant can be used to fund the completion of the FMP. Refer to the Funding Assistance Technical Memorandum in Appendix G for more detail on typical grant eligibility and administrative requirements.

5.3 Recommended Funding Strategy

There are several funding opportunities available for the alternatives identified in this report, but it is unlikely that sufficient grant funding is available to pay for all projects. As stated previously, the local lead agency will need to fund the planning, permitting, environmental compliance, design and construction for all projects.

The lead agency should establish local funding mechanisms (even if these do not fully fund the recommended projects) in order to be more competitive for outside funds. The recommended local funding mechanisms include development impact fees, assessments, cost sharing agreements and grants. The lead agency will be supported by the District in their efforts.

Development Impact Fee

The lead agency should collect development fees on new development, redevelopment and larger remodels to fund the installation of storm drain infrastructure necessary to offset the impacts of development.

Benefit Assessments

A benefit assessment is one potential approach for generating funding. The proposed alternatives to mitigate flooding of Highway 1 will benefit the entire community of Oceano. A traffic study was not conducted as part of this study, however, it could be argued that all residents in Oceano travel along Highway 1 and are impacted negatively by flooding. The benefit assessment formula would assume that all property owners in Oceano receive benefit from a Highway 1 flood control project. This allows program costs to be spread over the entire community customer base.

[24] Any area within the 100-year flood plain as defined by FEMA is within a SFHA.

A benefit assessment is proposed over a property-based fee because an assessment requires a demonstration of special benefit, while user's fees require demonstration of use. Many of the parcels in Oceano do not contribute runoff to Highway 1 and do not experience flooding because of their location. It would be difficult or impossible to demonstrate the amount each parcel uses the flood control facilities on Highway 1. However, it could be demonstrated that the parcels benefit from the improvements.

California Department of Transportation: Cooperative Drainage Projects

Caltrans will cost share projects implemented by a local agency that benefit Caltrans facilities. The proposed pipeline to divert runoff from Paso Robles and Highway 1, the channel improvements and the culvert replacement projects are proposed for the primary reason of mitigating flooding on Highway 1. The cost to Caltrans is based on the benefit received from the project. While it is uncertain, at this point, the percentage of project cost that could be shared with Caltrans, it is likely that the community could leverage outside funding through a Cooperative Agreement.

Community Development Block Grants

The County's planning department administers CDBG on a yearly basis. The funding for CDBG targets low to moderate income communities[25]. Oceano currently qualifies for the funding (based on meeting one of the three national objectives as described in the Funding Technical Memorandum in Appendix G) and it could be used to partially fund the construction of flood protection projects. CDBG funds can be used for planning, design, or construction of a project, however, the County planning department's preference is that a project have plans and specifications completed prior to paying out funds. While matching funds are not required, the County looks most favorably on projects with a matching fund component.

[25] Personal communication with Mr. Tony Navarro, Planner III, with San Luis Obispo County. Oceano meets the criteria for the national objectives and qualifies for CDGB assisted activities. Based on year 2000 census data.

CHAPTER 6 IMPLEMENTATION STRATEGY

Chapter Synopsis: This chapter consists of the implementation strategy for constructing the drainage and flood control improvements. Recommendations are based on the alternatives discussed in Chapter 3. The preferred alternatives were determined by evaluating the different alternatives, ease of construction, easements and right-of-way requirements.

6.1 Local Control versus District Control

The most effective approach to improving drainage and flooding problems in each community is to identify the problems and then create a local entity to implement the solutions to solve those problems. The role of the District is to assist in determining the improvements necessary to reduce flooding, and then to assist the individual communities in implementing programs to improve flood protection.

The District will use its general funds to provide planning and programming assistance, so that local areas of benefit within the County can better understand the significant drainage problems they are facing and determine how those problems should be solved. However, the general property tax allocation provides the District with only about $550,000 per year in revenue. The District does not possess the programs, funds or staffing to address all the on-going flooding and drainage problems in the County.

The recommended projects for Oceano totaled approximately $12.0 million. If the lead agency in Oceano established a funding source, approximately $850,000 per year would have to be generated by the community in order to build all the projects and pay off a municipal bond[26].

The success of any project depends on the agreement between the District and the local agency advocating the project. In order for a project to proceed, it must be accomplished in a cooperative manner and must have property owner support.

6.1.1 OCEANO COMMUNITY SERVICE DISTRICT

It is recommended that the OCSD serve as the lead agency and manage the proposed project(s) since the OCSD has drainage maintenance authority per LAFCo Resolution 80-6. However, the OCSD has expressed little interest in serving as the lead agency. The implementation discussion below identifies, generically, a "lead agency" as the project proponent and it is not the intent of this report to classify the OCSD as the "lead agency".

Comments received during the information collection phase of this project illustrated that the OCSD will not participate in a lead role, but would observe and comment on proposed improvements. Another (existing or newly formed) group needs to assume the role of lead agency, or the OCSD should amend their position to initiate implementation. Otherwise, the recommended projects will not be implemented and the problems identified in this report will continue. Home owners must also be willing to fund a significant portion of the required capital costs. The potential for supplemental grant funding could reduce the financial burden on home owners, but grant funding is not guaranteed.

6.2 Near-Term Project: Detention Basin and Highway 1 Improvements

Mitigating flooding on Highway 1 would solve the most severe problems in Oceano. However, in order to manage the increased runoff associated with improved facilities, a terminal facility is also required. Therefore, it is recommended that a detention basin and Highway 1 improvements be implemented as the first phase of a comprehensive drainage and flood control project in Oceano. The detention basin would not

[26] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years.

be fully utilized unless upstream improvements to existing drainage facilities and new construction of Highway 1 drainage facilities were also implemented.

This type of project can best be implemented using funding from a Caltrans Cooperative Agreement, leveraged by a local benefit assessment and CDBG funding. Implementation steps are outlined below.

6.2.1 IMPLEMENTATION STEPS

6.2.1.1 Community Designates a Lead Agency

An existing or newly formed group needs to assume the role of lead agency. The lead agency representing the community would assume control of the project at completion. The lead agency will be responsible for gaining a preliminary level of community support for projects prior to implementing the engineering planning phase.

6.2.1.2 Lead Agency Prepares Basis of Design Report

The lead agency would fund and complete a Basis of Design Report within 12 months of start. The Basis of Design Report would include a description of the existing problem, proposed alternatives, recommended project, preliminary alignments, potential environmental impacts, and cost estimates.

Based on the engineering analysis, project cost estimates will be developed to determine the appropriate funding mechanism to construct and maintain the completed project. The cost estimates will continue to be refined and the level of accuracy will improve during the design phase. The Basis of Design Report should provide cost information in sufficient detail to initiate benefit assessment proceedings.

6.2.1.3 Caltrans Cooperative Agreement

Every effort should be made to identify cooperative features as early as possible in the project development stage. Upon conception of a cooperative project, Caltrans and the lead agency should enter into an agreement as soon as possible to outline understandings as to responsibilities for the various phases of project development to be performed. A formal agreement should always be executed prior to incurring any costs for design environmental studies, right-of-way activities, reviews, etc. Preliminary analysis indicates that approximately half of the storm drain pipes will located within Highway 1.

Caltrans may request assurance that adequate funding exists prior to entering an agreement. Coordination should begin during the preparation of the Basis of Design Report, however, the agreement will likely not be signed until a benefit assessment is passed or other adequate funding source is identified.

6.2.1.4 Conduct Benefit Assessment Proceedings

The lead agency would conduct a benefit assessment proceeding for the properties that benefit from the improvements. We assumed that the entire community would benefit from Highway 1 improvements. The benefit assessment would be in place prior to moving forward with permitting, environmental compliance, and design. Property owner support is imperative to the success of this project. Without this support, the project will not proceed beyond the preparation of a Basis of Design Report.

If approved, the benefit assessments would be used to secure bonds that finance a portion of the project construction. Bonds are typically sold shortly after the project construction bids are received. Under most assessment proceedings, property owners are given the option to either pay-off the principal amount of their assessment prior to bond sale or to finance the assessment over time at the bond rate and term. Currently, rates for municipal bonds are on the order of 5 to 5.5 percent and terms are typically 20 to 25-years.

6.2.1.5 Design Project, Prepare Environmental Documents and Permits

If the community supported the project by approving a benefit assessment, then the lead agency would proceed with designing the project, preparing the appropriate environmental document and securing resource agency permits to construct the project. The duration for the design, environmental documentation, and resource agency permit process is approximately 1.5 to 2 years from the approval of a benefit assessment.

6.2.1.6 Apply for CDBG Funds

CDBG funds can be used for planning, design, or construction of a project, however, the County planning department's preference is that a project has plans and specifications completed prior to paying out funds[27]. While matching funds are not required, the County looks most favorably on projects with a matching fund component. In this case, the benefit assessment and Caltrans agreement would provide the matching fund component. If the construction is phased over two seasons (e.g. first season-detention basin, second season-Highway 1 improvements), then CDBG funds could be applied for in two consecutive years. Funds are distributed in August of each year and applications are typically due October of the previous year. CDBG funds can be used to pay the special assessment in behalf of all properties owned and occupied by low and moderate income persons.

6.2.1.7 Advertise for Construction

The lead agency would advertise the project and oversee construction. It is assumed that the detention basin would be constructed in the first phase, the Highway 1 and drainage channel improvements would be constructed the second year.

6.2.2 COST ESTIMATE

The total project cost for the proposed detention basin, Highway 1 and drainage channel improvements is approximately $3.6 million. Table 6-1, below, breaks out this estimate.

Table 6-1: Near Term Project Cost Estimate

ALTERNATIVE	COST ($)
Detention Basin	1,753,000
Highway 1 Improvements	1,820,000
Total	**3,573,000**

6.2.2.1 Local Cost Share

This section is included for discussion purposes only and will likely be revised as cost estimates are refined, cost sharing agreement are negotiated, and grants are awarded.

In order to determine the local cost share of the proposed projects, simplifying assumptions regarding Caltrans involvement and CDBG funding must be made.

- Assume Caltrans funds 25 to 50 percent of Highway 1 improvements
- Assume CDBG funds $100,000 over two year construction ($50,000 per year)

Based on these simplifying assumptions, the local cost share to be funded via a benefit assessment could range between $2.6 to $3.0 million, which equates to approximately $85 to $100 per parcel per year[28].

[27] Personal communication with Tony Navarro, Planner III, San Luis Obispo County, January 30, 2003.
[28] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years. Also assumes that approximately 2,100 parcels in Oceano would be assessed to pay for the improvements.

6.2.3 TIMEFRAME FOR IMPROVEMENT IMPLEMENTATION

Instead of approximating completion dates for the implementation steps, an estimated timeframe for each milestone was developed. In order to establish a completion date, add the cumulative durations to the initiation of the project. The timeframe is shown in Table 6-2. If this project was implemented from initiation to completion without delay, then the detention basin and Highway 1 improvements could be completed in approximately five to six years.

Table 6-2: Forecast Completion Dates

MILESTONE	DURATION
Community Designates Lead Agency Role	9 months
Lead Agency Prepares Basis of Design Report	12 months
Benefit Assessment Election [1]	6 months
Caltrans Cooperative Agreement [1]	6 to 9 months
Design [2]	9 months
CEQA/ Resource Agency Permits [2]	21 months
Approvals and Advertise for Construction	4 months
Construct Detention Basin	6 months
Construct Highway 1 Improvements	12 months
Total	**~ 5.8 years**

Notes:
1: Benefit assessment election and Caltrans agreement occur concurrently
2: Design and CEQA occur concurrently

6.3 Long Term Project: Storm Drains, Curbs and Gutters

The second step for completing a comprehensive storm drainage and flood control project would be the mitigation of flooding problems in the residential neighborhoods of Oceano. A series of curbs, gutters, storm drains, and culverts would collect and convey storm runoff from the residential neighborhoods of Oceano to a terminal detention facility west of Highway 1, and eventually discharge to the Arroyo Grande Creek Channel or percolate into the groundwater.

6.3.1 IMPLEMENTATION STEPS

The implementation of a storm drain, curb and gutter system in Oceano would be similar to the process described above for the detention basin and Highway 1 improvements. The major and, from a funding perspective, most fundamental difference is that the highway improvements benefit the entire community. A curb and gutter project will only benefit those properties on streets receiving the improvement. Also, there is no opportunity for cooperative agreements with Caltrans to cost share the project.

From an implementation perspective, there is benefit to planning and designing a complete storm drain system for Zones F and G, instead of segmenting the projects by streets or blocks. The benefits of a complete system include:

- One consistent set of design criteria
- One environmental document
- Cumulative impacts can be assessed and mitigated prior to construction
- Alternative alignments and options can be evaluated
- Master design for community is developed
- Lower construction costs

If each home owner or a collection of owners on a street is responsible for implementing improvements, then little or no coordination will exist and the likelihood of a comprehensive functioning system being implemented is minimized.

From a construction perspective, there is also financial benefit to constructing the entire drainage system as one project, versus segmented individual projects. Lower unit costs are obtainable on a larger project, when compared to the same total size of smaller, individual projects.

6.3.1.1 Lead Agency Prepares Basis of Design Report

The lead agency would fund and complete a Basis of Design Report within 12 months of start. The Basis of Design Report would include a description of the existing problem, proposed alternatives, recommended project, preliminary alignments, potential environmental impacts, and cost estimates.

Based on the engineering analysis, project cost estimates would be developed to determine the appropriate funding mechanism to construct and maintain the completed project. The cost estimates will continue to be refined and the level of accuracy will improve during the design phase. It would also provide sufficient description to conduct a benefit assessment.

6.3.1.2 Conduct Benefit Assessment or Property Based Fee

A property-based user fee may be more appropriate than an assessment fee and would also be easier to prove since, in the case of drainage facilities, a user fee allows an agency to collect revenue from properties that contribute runoff into the system, but may not flood because of their location. The user fee could be structured proportionally to the amount each parcel uses the flood control facilities, rather than how much each property benefits from the services or improvements provided. The user fee could be related to impervious area on the property, which can be equated to runoff.

If approved, the property-based fee could be used to secure Certificates of Participation ("COPs") that finance a portion of the project construction. COPs are similar to bonds and are typically sold shortly after the project construction bids are received. COPs typically do not provide provisions for principal payoff, hence the property-based fee is set to cover the costs of both principal and interest. Currently rates for COPs are similar to those described for municipal bonds.

6.3.1.3 Design Project, Prepare Environmental Documents and Permits

If the community supported the project by approving a property based fee, then the lead agency would proceed with designing the project, preparing the appropriate environmental document and securing resource agency permits to construct the project. The duration for the design and environmental documentation process is approximately 12 months from the approval of a property based fee.

6.3.1.4 Apply for CDBG Funds

The benefit assessment would provide the matching fund component when applying for CDBG funding. CDBG funds can be used to pay the special assessment or property-based fee in behalf of all properties owned and occupied by low and moderate income persons.

6.3.1.5 Advertise for Construction

The lead agency would advertise the project and oversee construction. It is assumed that the duration would be approximately one year.

6.3.2 COST ESTIMATE

The total project cost for the Zone F and G storm drainage system is approximately $1.8 million and $5.3 million, respectively. An additional $1.3 million would be required to construct subsurface infiltration chambers on Holden Street, La Verne Street, 16th Street and Casitas/Highway 1. Table 6-3 provides the breakdown of these cost estimates. The local cost share to be funded via a benefit assessment or property based fee could be as high as $380 per parcel per year[29]. The entire cost would be borne by the property owners.

Table 6-3: Long Term Project Cost Estimate

ALTERNATIVE	COST ($)
Zone F	1,792,000
Zone G	5,312,000
Subsurface Infiltration Chambers	1,303,000
Total	**8,407,000**

6.3.2.1 Local Cost Share

The lead agency will identify the drainage and flooding issues, and determine solutions to those problems. The property owners that contribute runoff to the proposed drainage facilities must agree to pay for the construction and future maintenance of them. The property owners in Zones F and G will assume the financial responsibility by approving the property based fee.

6.3.3 TIMEFRAME FOR IMPROVEMENT IMPLEMENTATION

Instead of approximating completion dates for the implementation steps, an estimated timeframe for each milestone was developed. In order to establish a completion date, add the cumulative durations to the initiation of the project. The following timeframe assumes that the first step in the implementation process begins after the detention basin and Highway 1 improvements are complete. The timeframe is shown in Table 6-4. If this project was implemented from initiation to completion without delay, then a complete curb, gutter and storm drain system could be completed in approximately four years.

Table 6-4: Forecast Completion Dates

MILESTONE	DATE
Lead Agency Prepares Basis of Design Report	12 months
Benefit Assessment or Property Based Fee Election	6 months
Design [1]	12 months
CEQA/ Resource Agency Permits [1]	6 months
Approvals and Advertise for Construction	4 months
Construct Drainage System	12 months
Total	**~ 3.8 years**

Notes:
1: Design and CEQA occur concurrently

[29] Assumes a municipal bond rate of 5 percent, paid off over a period of 25 years. Also assumes that approximately 1,500 parcels in Zones F & G would be assessed to pay for the improvements.

REFERENCES

1. San Luis Obispo County Department of Public Works, "San Luis Obispo County Flood Protection and Drainage Policies, Programs, Permitting and Funding," April 17 2001
2. County of San Luis Obispo, "Oceano Specific Plan & Environmental Impact Report," August 2001
3. Code of Federal Regulations for Community Development Block Grants
4. Questionnaires and letters provided by private residences in Oceano

Appendix A

FIGURES

APPENDIX A

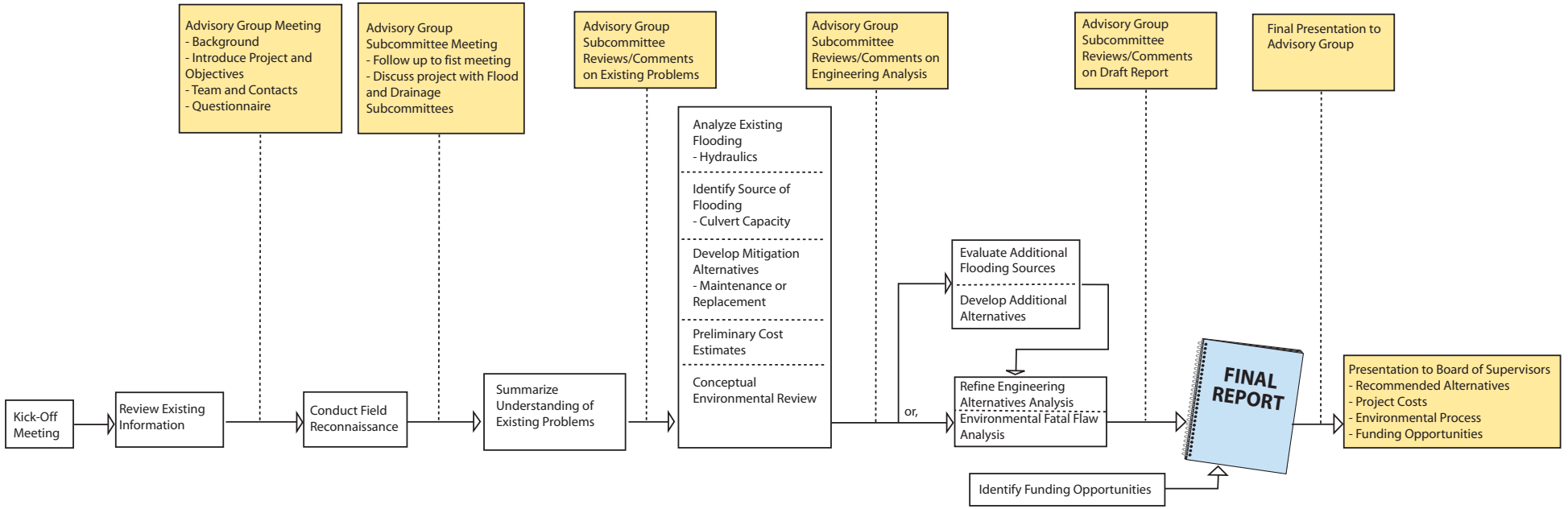
FIGURES

COUNTY OF SAN LUIS OBISPO

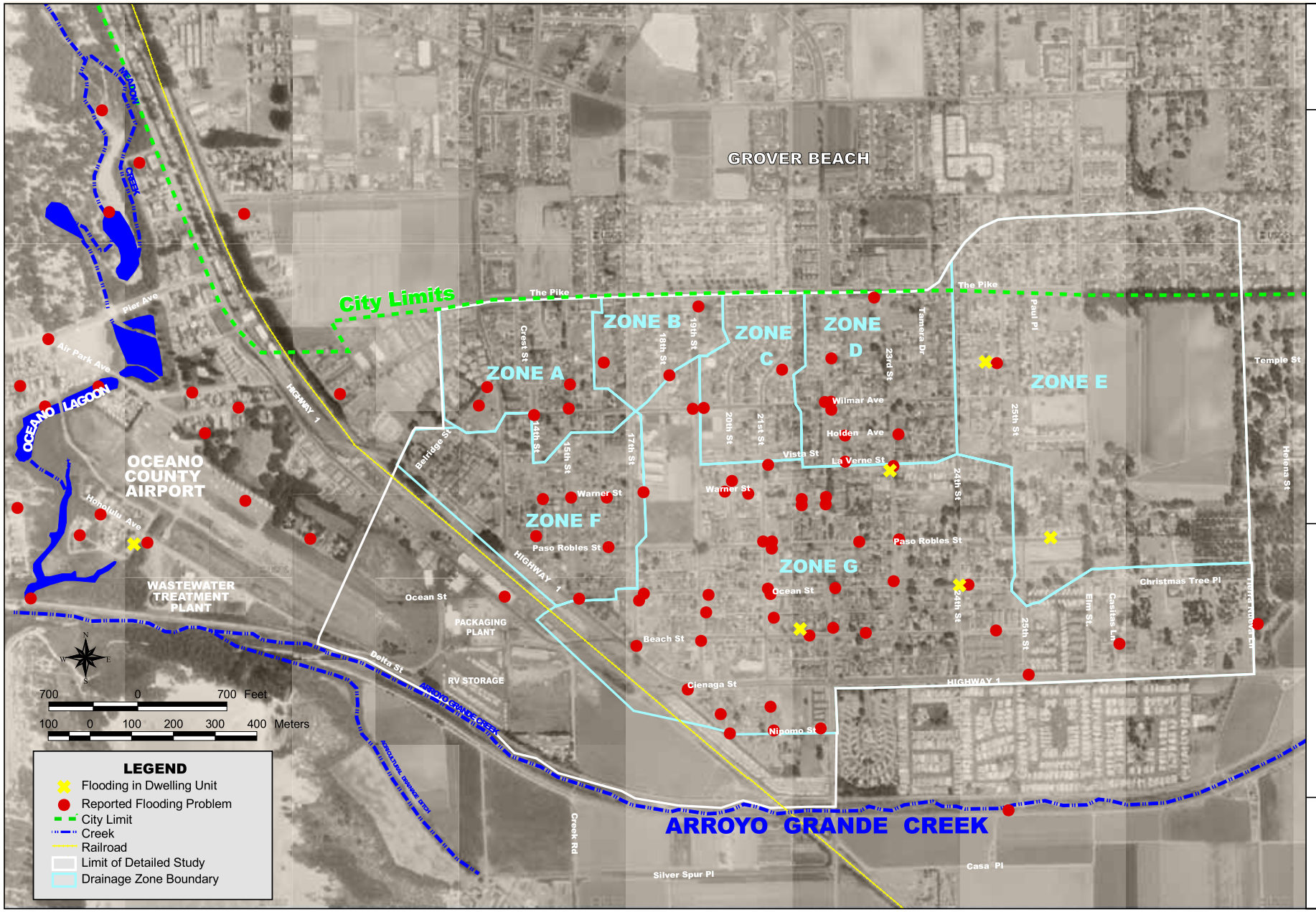
Community Drainage and Flood Control Studies

Cambria, Cayucos, Nipomo, Oceano, San Miguel and Santa Margarita

Study Flow Chart



RMC



COUNTY OF SAN LUIS OBISPO

OCEANO DRAINAGE AND FLOOD CONTROL STUDY

IDENTIFICATION OF PROBLEMS

Based on 2001 Community Survey

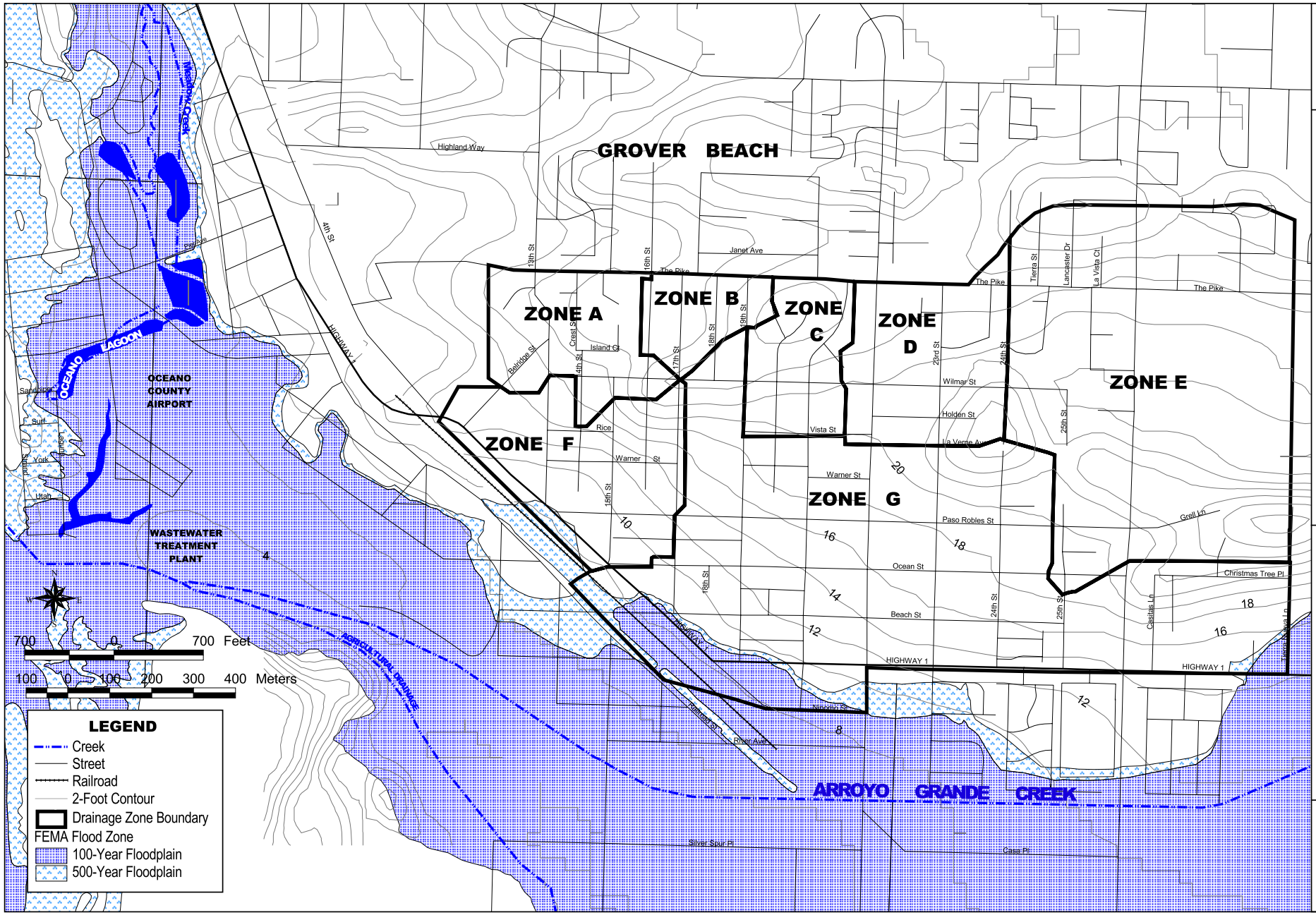
Appendix A

Figure 2

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

Modified by RMC, July 2003



Appendix A

Figure 3

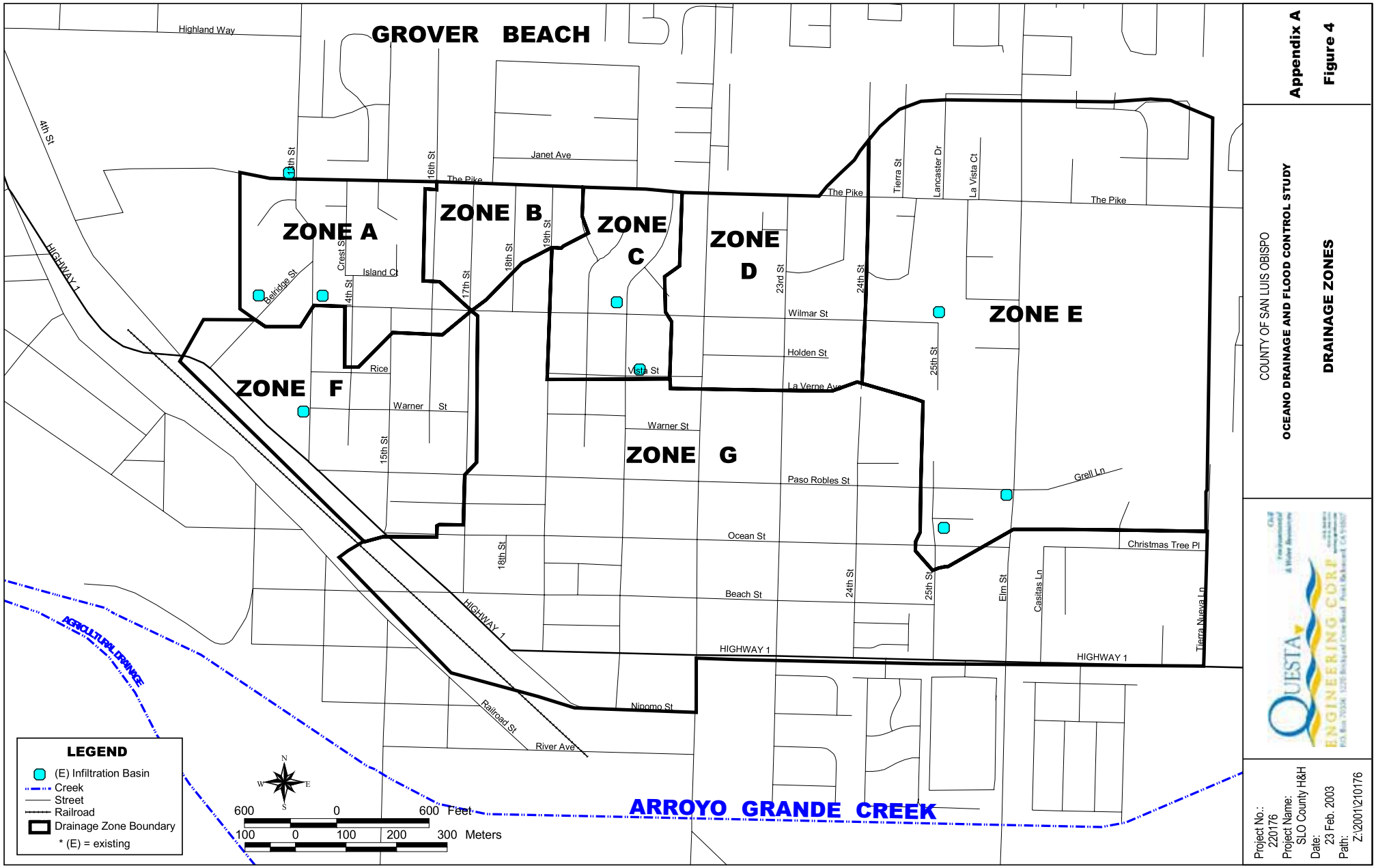
COUNTY OF SAN LUIS OBISPO

OCEANO DRAINAGE AND FLOOD CONTROL STUDY

FEMA FLOOD ZONES

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176



Appendix A

Figure 4

COUNTY OF SAN LUIS OBISPO

OCEANO DRAINAGE AND FLOOD CONTROL STUDY

DRAINAGE ZONES

QUESTA ENGINEERING CORP

Project No.: 220176

Project Name: SLO County H&H

Date: 23 Feb. 2003

Path: Z:\2001\210176

Modified by RMC, July 2003

Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP

COUNTY OF SAN LUIS OBISPO

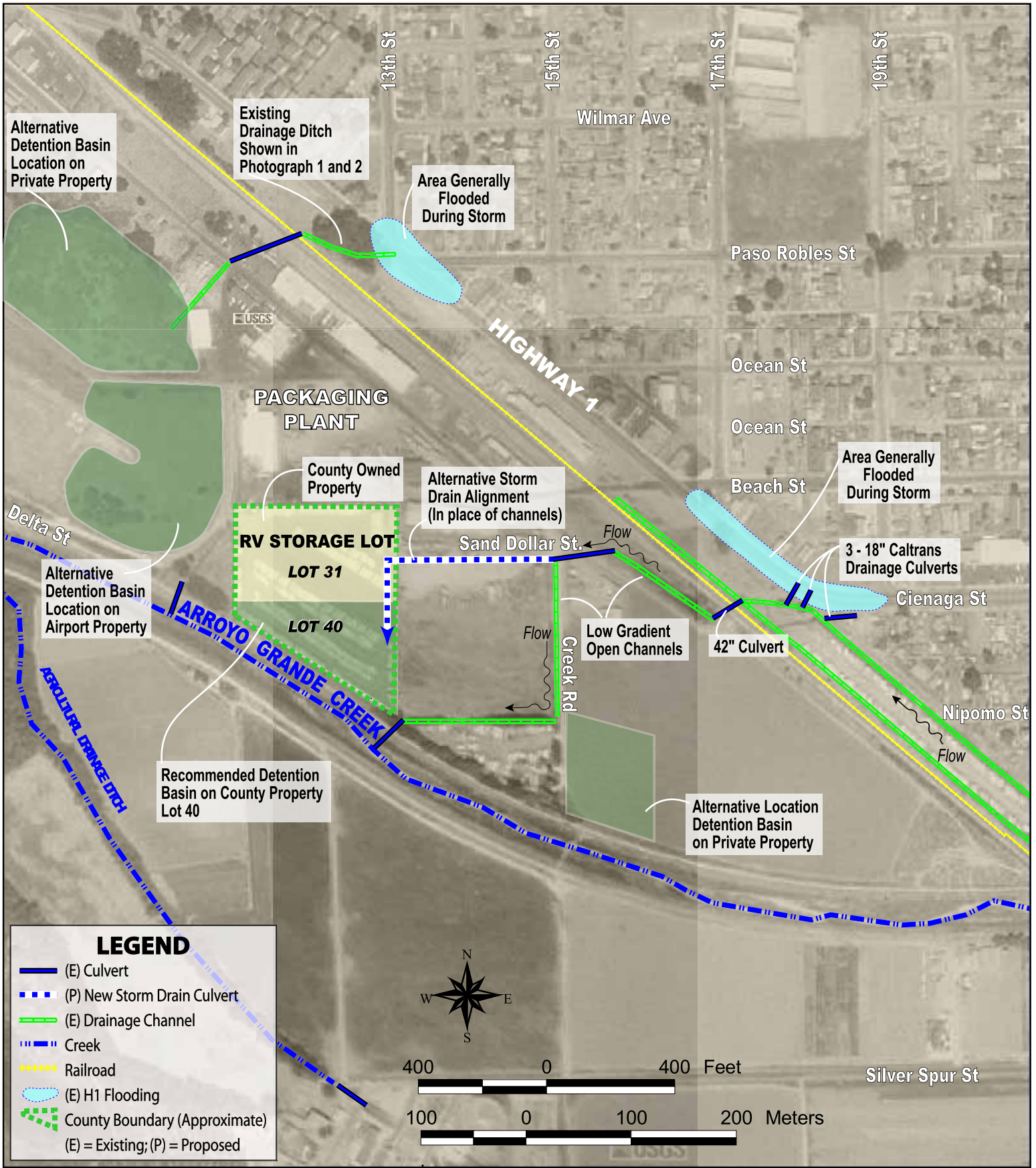
OCEANO DRAINAGE AND FLOOD CONTROL STUDY

EXISTING INFRASTRUCTURE AND AREAS OF FLOODING

Appendix A

Figure 5

Modified by RMC, July 2003



Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP

COUNTY OF SAN LUIS OBISPO

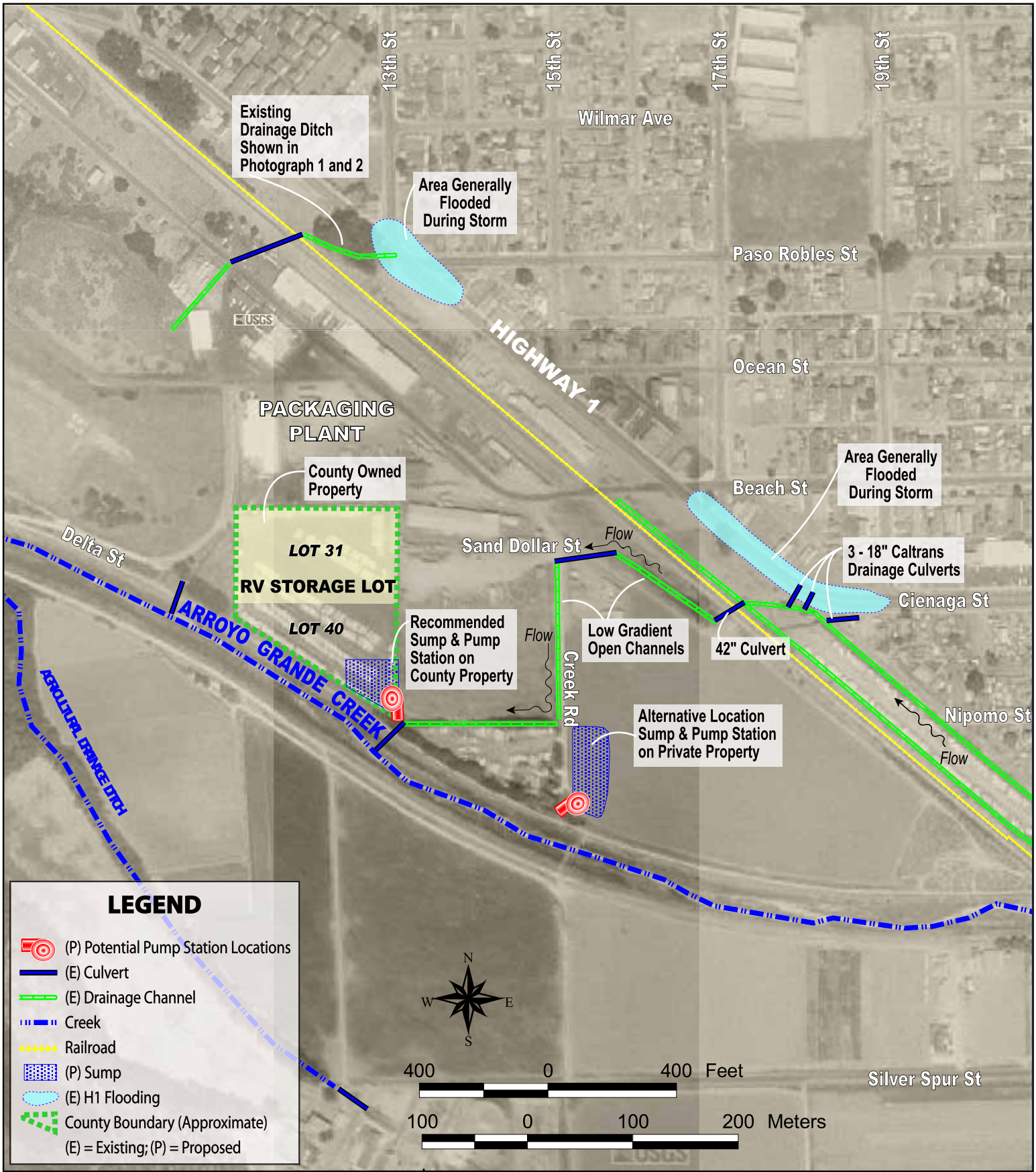
OCEANO DRAINAGE AND FLOOD CONTROL STUDY

PROPOSED DETENTION BASINS ALTERNATIVE 1A

Appendix A

Figure 6

Modified by RMC, July 2003



Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP

COUNTY OF SAN LUIS OBISPO

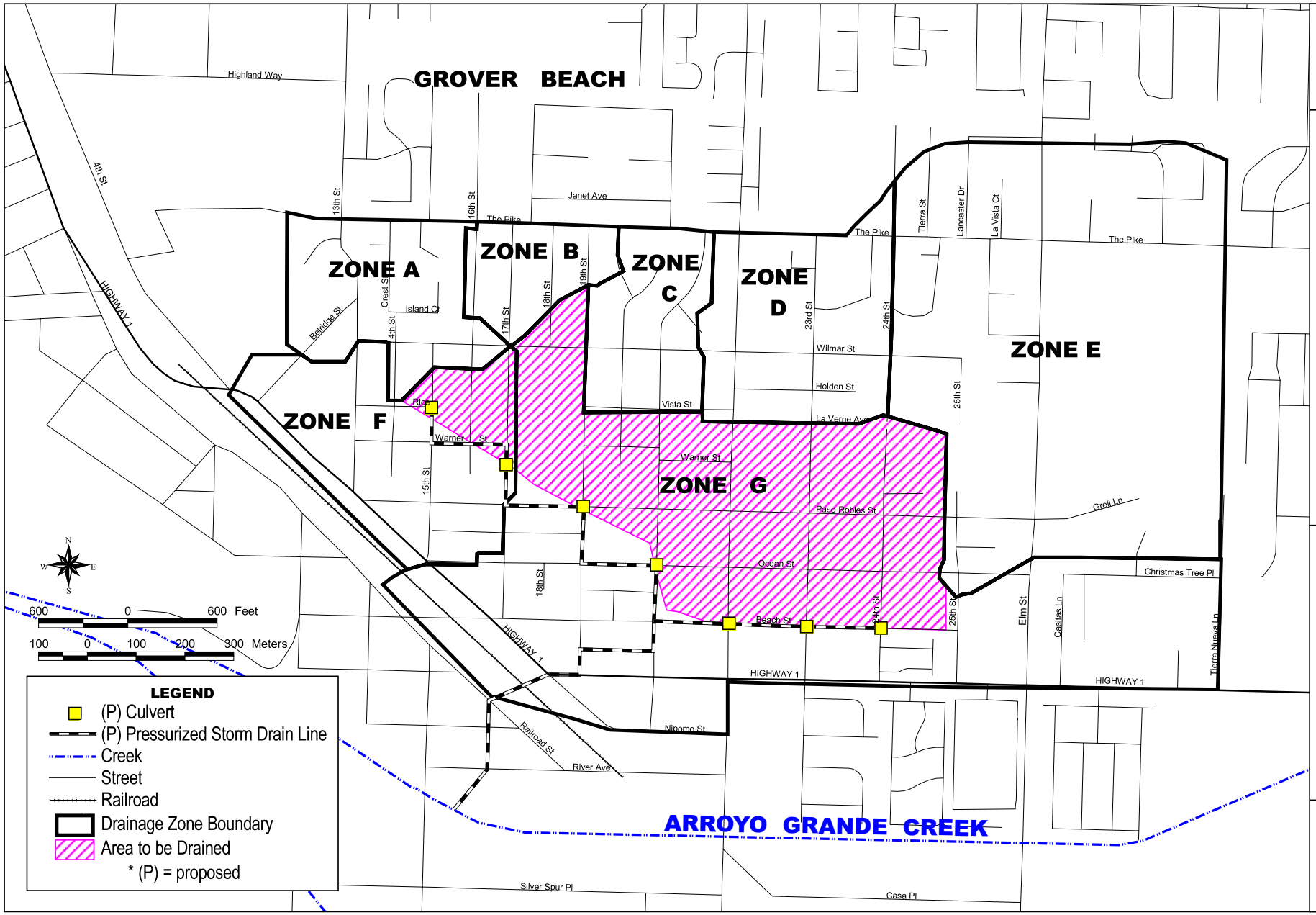
OCEANO DRAINAGE AND FLOOD CONTROL STUDY

PROPOSED PUMP STATIONS ALTERNATIVE 1B

Appendix A

Figure 7

Modified by RMC, March 2003



Appendix A
Figure 8

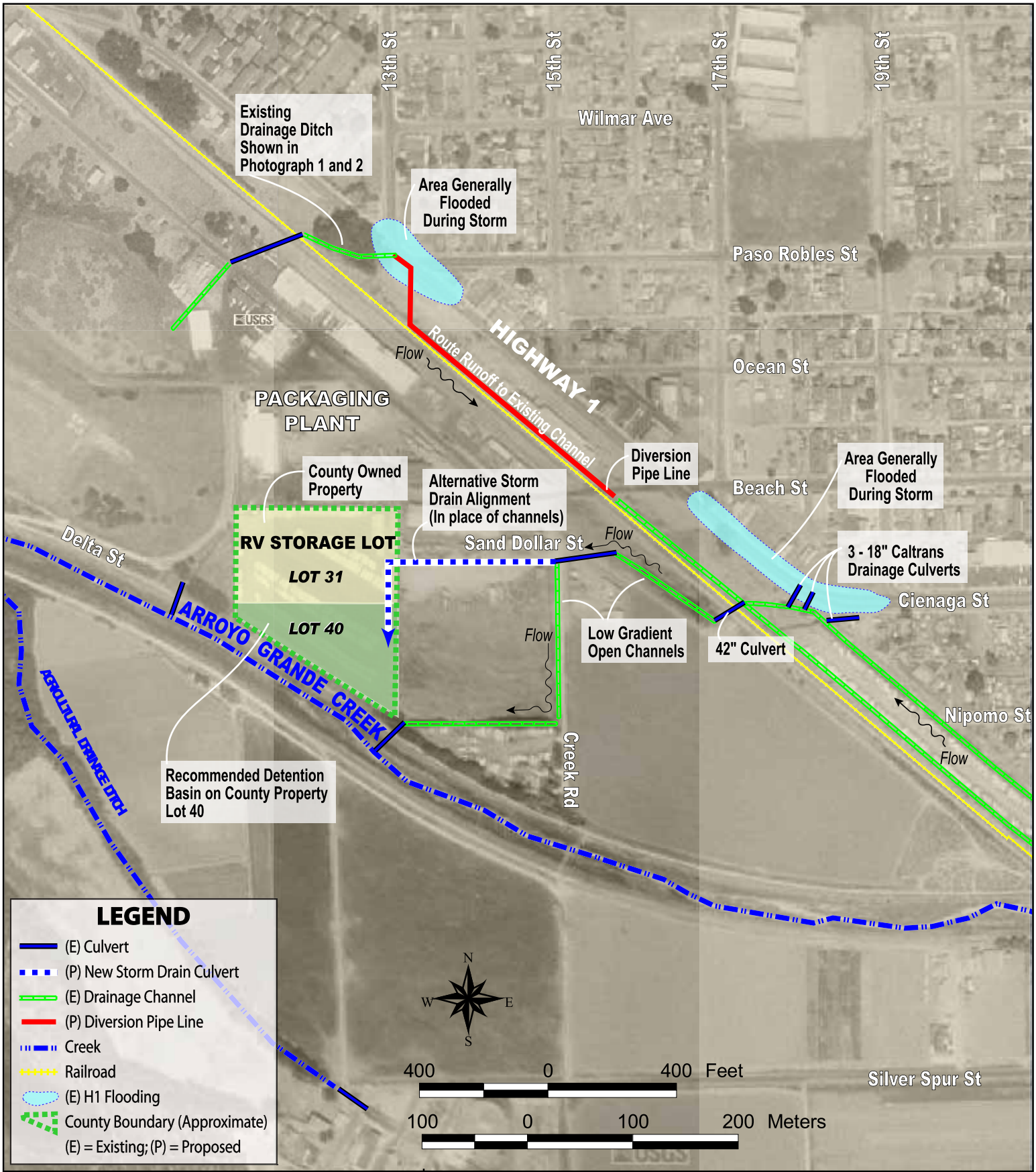
COUNTY OF SAN LUIS OBISPO
OCEANO DRAINAGE AND FLOOD CONTROL STUDY

AREA DRAINED BY PRESSURE LINE
ALTERNATIVE 1C

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 3 Jan. 2003
Path: Z:\2001\210176

Modified by RMC, July 2003



Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP

COUNTY OF SAN LUIS OBISPO

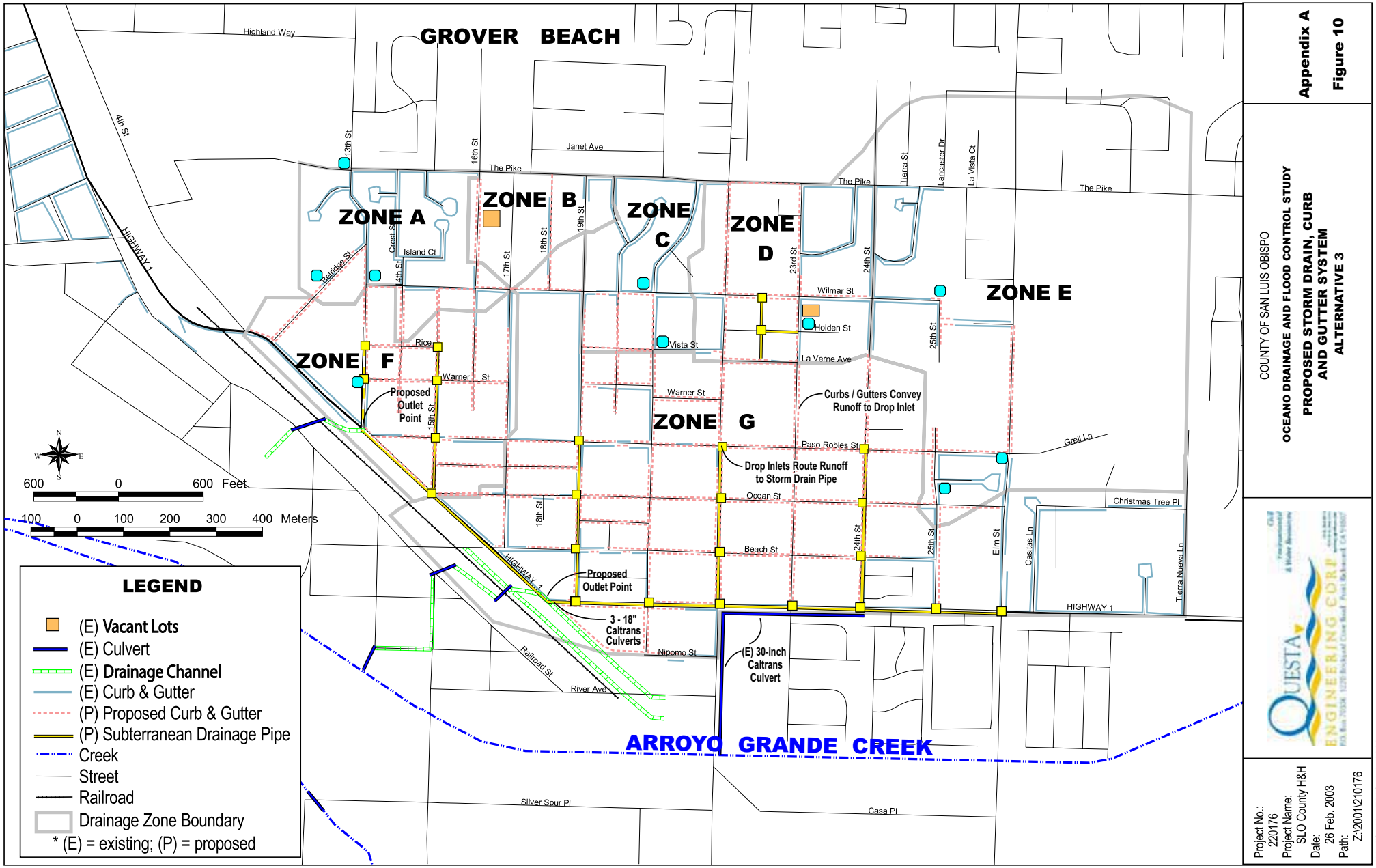
OCEANO DRAINAGE AND FLOOD CONTROL STUDY

HIGHWAY 1 AND CHANNEL IMPROVEMENTS ALTERNATIVE 2

Appendix A

Figure 9

Modified by RMC, July 2003



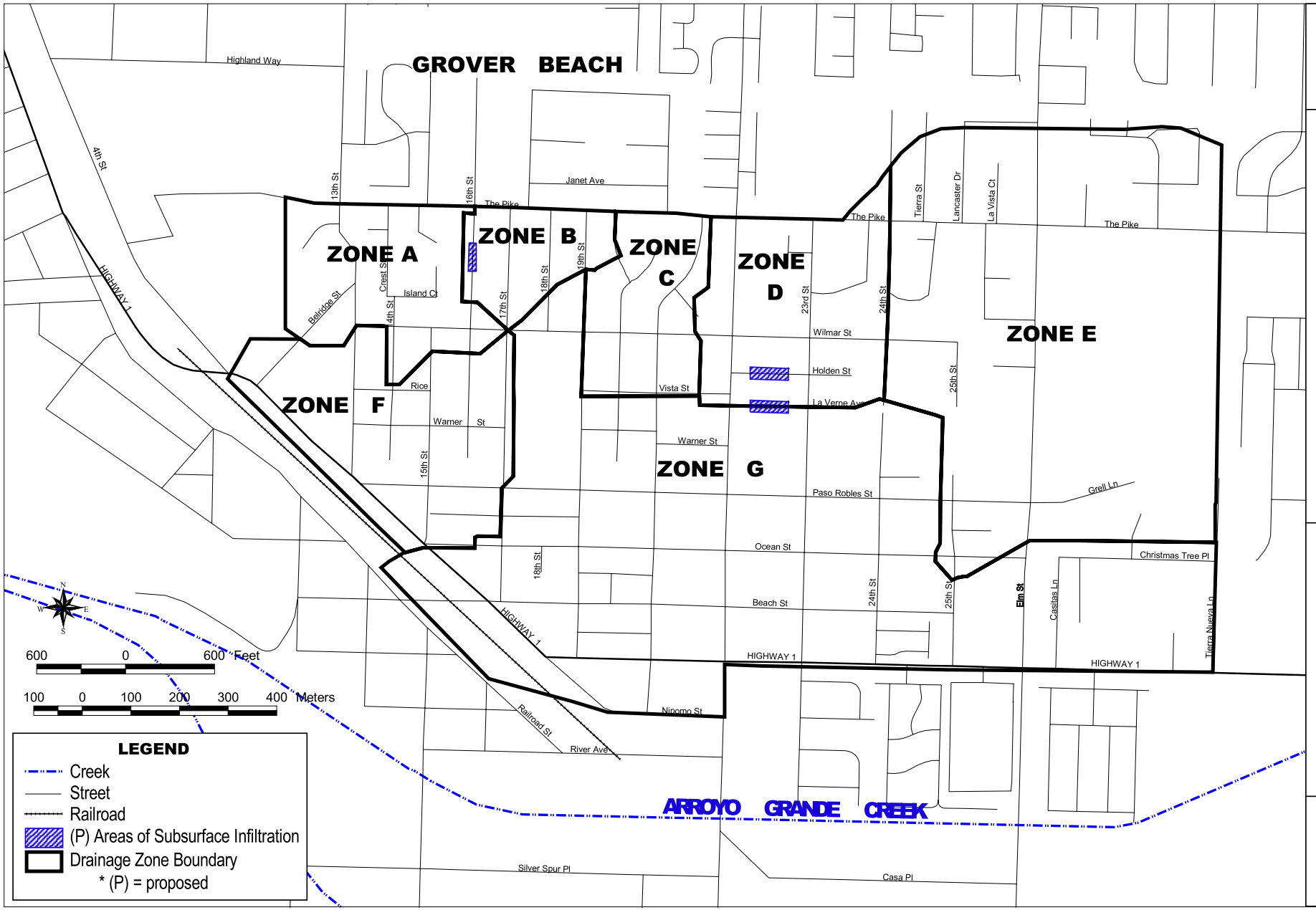
Appendix A
Figure 10

COUNTY OF SAN LUIS OBISPO
OCEANO DRAINAGE AND FLOOD CONTROL STUDY
PROPOSED STORM DRAIN, CURB AND GUTTER SYSTEM
ALTERNATIVE 3

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 26 Feb. 2003
Path: Z:\2001\210176

Modified by RMC, July 2003



COUNTY OF SAN LUIS OBISPO

OCEANO DRAINAGE AND FLOOD CONTROL STUDY

LOCALIZED INFILTRATION CHAMBER ALTERNATIVE 3

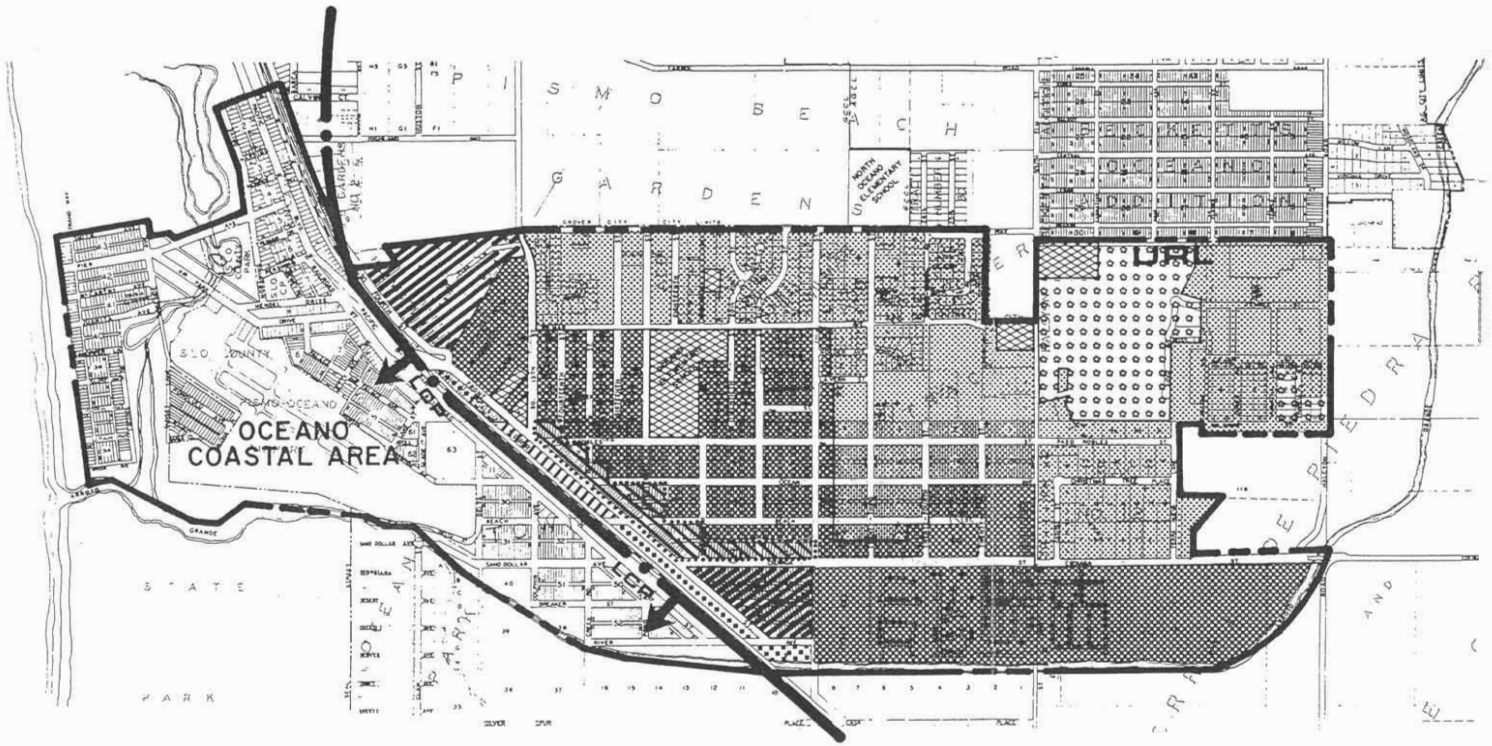
Appendix A

Figure 11

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 26 Feb. 2003
Path: Z:\2001\210176

Modified by RMC, July 2003



LEGEND

LAND USE CATEGORIES

- AGRICULTURE
- RURAL LANDS
- RECREATION
- RESIDENTIAL RURAL
- RESIDENTIAL SUBURBAN
- RESIDENTIAL SINGLE FAMILY
- RESIDENTIAL MULTIPLE FAMILY
- OFFICE & PROFESSIONAL
- COMMERCIAL RETAIL
- COMMERCIAL SERVICE
- INDUSTRIAL
- PUBLIC FACILITIES
- OPEN SPACE

BOUNDARIES

- URBAN RESERVE LINE (URL)
- URBAN SERVICES LINE (USL)
- VILLAGE RESERVE LINE (VRL)
- PLANNING AREA
- CENTRAL BUSINESS DISTRICT

SCALE 0 800'

NORTH N

NOTE:
This map is for reference purposes only. Official maps, showing precise property lines and land use category boundaries, are on file in the Planning Department.

OCEANO - Inland Area

LAND USE CATEGORIES

San Luis Obispo County Planning Department
Revised: 5-2-02

Appendix B

PHOTOGRAPHS

APPENDIX B

PHOTOGRAPHS

Photograph 1: Existing drainage channel located west of Highway 1 near 13th Street intersection

The photograph was taken looking east from within the drainage channel. A nursery is located on the east side of Highway 1 and experiences periodic flooding.

Photograph 2: Existing drainage channel located west of Highway 1 near 13th Street intersection

The photograph was taken looking west from within the drainage channel. The channel conveys flows to a culvert that crosses under the railroad tracks seen in the picture. Caltrans maintains the channel.

Photograph 3: Existing culvert crossing under the railroad tracks

Storm water runoff is conveyed in the drainage channel shown in Photographs 1 and 2, and flows through the culvert west through the packaging plant. The runoff eventually flows to an open field located west of the packaging plant where it ponds and eventually percolates into the subsurface or evaporates.

Photograph 4: Two 18-inch Caltrans culverts crossing under Highway 1 between 17th and 19th Streets

Storm runoff is conveyed from a drop inlet located on the east side of Highway 1 through the two 18-inch pipe culverts. Runoff then flows in an open channel to the railroad culvert crossing.

Photograph 5: 42-inch culvert crossing at railroad downstream of Highway 1 and 19th Street

The culvert is difficult to see in this picture. Runoff from Highway 1 is currently conveyed through this culvert, which eventually flows downstream to a series of open ditch channels and pipeline culverts.

Photograph 6: La Verne Avenue Between 22nd and 23rd Street

No outlet for water collecting in the low spot in the middle of this block.

Appendix C

COMMUNITY QUESTIONNAIRE AND RESPONSES

APPENDIX C

COMMUNITY QUESTIONNAIRE AND RESPONSES

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDY QUESTIONNAIRE

Oceano

Why should I complete this questionnaire? We need your help in identifying existing flooding problems in Oceano. We will use this questionnaire to 1) gather local knowledge of the location and severity of existing drainage and flood problems, and 2) identify likely causes. Your time and effort is appreciated?

Please complete this questionnaire and return it in the enclosed self addressed envelope, so we can address all your community's problems as comprehensively as possible. A map of your community is on the reverse side of this form. Please use it if it will assist you in locating or describing problems to us. *We will not be able to respond to each person individually submitting a questionnaire, but your response will enable us to evaluate your specific concern, assure we are aware of all drainage problems in your community, and possibly develop specific solutions depending on the location and type of drainage problem which exists.*

Contact Information (optional):

Name:	
Address:	
Phone Number:	
Email:	

Where have you experienced or observed flooding? Please provide the amount of flooding (e.g. a few inches, 1 foot, severe), the location, year and observed damage to homes or property. A map is provided for you to indicate the location. Photographs of the flooding would be very helpful to us.

How often does the flooding you observed occur? Every time it rains, once a year, once every five years, once in my lifetime.

Did you observe likely causes of the flooding, such as clogged culverts under roads, catch basins filled with dirt, no place for water to flow?

Are there any other comments regarding drainage and flooding that you would like to make?

Oceano Resident Identified Drainage Problems and Locations

	Property Address	Comment
1	2565 Basin St.	Have no problems. Basin at rear of house off S. Elm St.
2	373 Juanita Ave.	Severe flooding on Juanita Ave. & Lakeside Ave. every time it rains. Water has no place to flow. Street is sloped towards house instead of towards lagoon.
3	2150 Ocean St.	Observed standing water on corner of 13th St. and H-1 every time is rains. Lack of drainage causes water to pond.
4	2260 The Pike 1310 23rd St 1318 23rd St	None observed or experienced on my rental property at 2260 The Pike, 1310 23rd St, and 1318 23rd St in Oceano
5	1519 Fountain Ave 1525 Fountain Ave	6" up to approx 18" every season in house and surrounding area when it rains every year. The likely cause of flooding is the unmaintained culvert by airport road. Swale from Fountain Ave to Oceano Lagoon is non existent due to lack of maintenance. A great percentage of water flows through this wetland and the drainage facilities do not work. Due to the wetlands, fish and games won't allow work in this area parallel to airport hangars. **Maintenance Response:** County culvert inlets have been kept clean.
6	1330 Fifth and Oceano	Almost everything goes downhill from 19th Street. This study is a waste of tax payer's money. Clean out the creeks with earth moving equipment and flooding will go away. We never had problems until you let the creeks overgrow with weeds.
7	1311 Paso Robles & Hwy 1	1 foot+ of flooding with heavy rains; once a year. No adequate drainage on Hwy 1 under the train tracks. Highway 1 pavement in 2001 by Caltrans contributed to the problems.
8	652 Air Park Dr	I live in Fresno so do not see all the events; however, I do see the aftermath. It appears that water reaches depths of approx. 6" annually and up to 12" on occasionally. This I can determine by the water mark on the foundation of our dwelling.
9	2280 Palo Robles St	It floods in front of my house every time it rains. There is so much water that you cannot get from my house to the mailbox on the other side of the street without stepping in water that is several inches deep. The flooding problem is intense on Paso Robles Street between 23rd & 22nd Avenues. If you look at the road from any distance, you can see it undulates with numerous low spots where water congregates. There is no drainage at all other than natural percolation. I'm willing to join an assessment district to pay for an improved drainage system in this area. Can county take initiative and get one started?
10	1675 S. Elm St	6" of flooding at 13th & Hwy 1 at old fire station and 6-12" on 4th St between Highland and Hwy 1 every time it rains. On 4th Street between Highland and Hwy 1 raise road above flood line and put culvert under road.
11	PO Box 188	It floods in my yard and driveway ever since 21st St was raised between Beach and Ocean. Flooding to a depth of 10-18 inches. Flooding occurs when it rains really hard or for several days. 21st Street was raised too high. The deepening of the intersection doesn't help much as there is no place for the water to go.
12	2121 1/2 Ocean St 2221 Ceinaga	Flooding occurs once a year. Poor grading and drainage; flat topo with low areas. I did some grading in alley at 2121 1/2 Ocean and corrected some of the problem.
13	1778 Aloha Pl	Severe flooding during winter/spring of 1997, 1998 and 2000 sometimes lasting 4-5 days. Caused water to leak through the floor and into the house. More frequently, the water floods over the lagoon bank and pools several inches deep on the south and west side of the house. Flooding occurs during periods of considerable rainfall nearly every year and it seems to be getting worse. In the Oceano Lagoon where I live the key issue is lack of drainage out of the lagoon.
14	1025 Grand Ave Arroyo Grande	Flooding at Hwy 1 @ Paso Robles; 1960 Beach - a foot when it rains; Warner between 21st & 22nd when it rains. Likely cause may be clogged culvert @ Beach.
15	2231 Paso Robles St	A few inches of flooding on unpaved shoulder in front of my house & neighbor to the east. Happens every time it rains. Paso Robles St. undulates vertically on this block. Drains a few inches of water against pavement edge. Soft depressions & exposed pavement edges result.
16	1445 14th	Flooding occurs during big rains. Flooding near my house experienced in 2001. Propose installing a bigger culvert. Where does water go west of the tracks?
17	2400 Clenaga, Sp 11	Flooding on Hwy 1 between Beach and 21st every time it rains. The water goes over the sidewalk on the north bound lane. There doesn't seem to be a means of draining the water off the Highway.
18	1740 Laguna Dr	The area drains into the lagoon and flows into the creek via flap gate outfalls. When the lagoon fills, which shouldn't be too long, then flooding will occur on Laguna Drive and surrounding area. The lagoon needs to be dredged.
19	1740 Peacock Pl	Flooding on 13th & Hwy 1 few inches 2000-2001 once a year. No place for the water to flow. Drains need to be installed in older areas, sumps in newer areas seem to be working.
20	571 Security Ct	A few inches of flooding observed between the road and my house. Flooding does not occur every time it rains. Water collects at low places where no storm drains exist

	Property Address	Comment
21	1810 Laguna Dr	The lagoon is 30 feet in front of house. Observed water flowing past my house in both good weather and bad. In heavy rains, the lagoon appears to flow like a large river south toward the Arroyo Grande channel. During some storms the debris would accumulate at the entrance to the channel and the water in the Lagoon would back up and the level would rise considerably. Lagoon outflow location has potential of being a significant flood problem. If the level of the Arroyo Grande River were to rise due to a large storm, coupled with the unusually high ocean tide backing seawater into the channel, it would flow into the lagoon instead of draining out to sea. The outflow gate is a bottleneck and should be carefully studied during your review of potential flooding problems in Oceano. Considerable level of silt has built up on the Lagoon over the years. Lagoon appears to be very deep, but is really shallow - no deeper than 1 or 2 feet. So when a storm brings heavy flow there is no place for the water and debris to go. Your review should study the benefits of dredging the water channel in the Lagoon to provide greater flow capacity and protection against water flooding our homes.
22	1338 16th St	Pike needs fixing the most of any street
23	1484 23rd St	No problems at my property. I have old pictures of flooding "downtown". These probably go back to 1909 & 1911 floods. I might also have movies of flooding during the 1920's & 1930's. Poor planning for moving water from Front Street to Ocean. Past years problem was caused by failure to keep the trees & bushes from growing into the stream area and ignoring the maintenance for the levees, stream bed, etc.
24	1720 Laguna Dr	Every rain the following areas collect between 6" - foot of water and at all locations there is no drain facility: Hwy 1 & Cabrillo; Hwy 1 & Paso Robles; McCarthy St off Strand Wy; Strand Way at Pier. Problem is there are no drain facilities and there is needed engineering at all the mentioned locations.
25	1545 24th St	Sewer line from street back up into my home. We've lived here for 6 years and it happened once approx 3 years ago. My contractor and plumber stated there is probably a low spot in front of my home. The plumber found an obstruction 40' from my sewer connection. I believe the sewer line should be cleaned out on a regular basis.
26	316 McCarthy	There's a huge dead tree on county property on Strand (foot of McCarthy). Branches into electrical wires should be cut down. **Maintenance Response:** Not a drainage problem.
27	2424 Ocean St 2478 Ocean St	No flooding has occurred on two properties. Recommend having more clean up days over flood problems and more law enforcement.
28	1627 Front St, #6	
29	2140 Beach St	Observed a few inches of flooding on street across from address during a "notable" rain shower. Cause is "intermittent" sidewalk.
30	616 Coolidge Dr	Observed flooding at corner of Coolidge & Norsewing. Any amount of rainwater or monthly water system drainage flows to this corner and doesn't drain for days. Can be up to a foot deep and 30'-40' long, 6'-8' wide. No drainage to homes. Happens ever time it rains and every time the community service district drains the water line. Collects in the lower slope to both roads.
31	1100 Belridge St	I just moved to this address - I have no idea what the flood history is.
32	608 Air Park Dr	Stormwater drainage ditch next to Oceano Airport East side. No county agency or dept. will accept responsibility for maint. At the inlet at Air Park is approx 4' under sea level and 4 1/2' under culvert. Flooding occurs every hard rain, sometimes lasting all winter. Years of neglect by SLO County have made drainage of flood water and runoff impossible. In 19 years I have owned my own property next to ditch. It has been cleaned once. This was once by a work crew from CMC and that winter it worked perfectly. The ditch contains water year round. This probably the largest mosquito breeding are in south SLO county. **Maintenance Response:** County culvert inlets have been kept clean.
33	1627 Front St, #9	It usually floods every rainy season on the corner of 13th & Front. Also it floods on 4th between Front & Farrol. It floods usually when it rains.
34	1764 Tierra Nueva Ln	Observed flooding at 22 Street along the path next to A.G. creek. I have only seen the creek rise that much with the rains two years ago. The rest of the time it's fine. I think it is reasonable to expect severe flooding once in a while. It is unreasonable to expect that there won't be damage to land or property in a flood plain. I believe A.G. creek should be kept as natural as it is now so that the many species living there can continue to do so. I also believe we need to stop poison runoff from A.G. fields draining onto the creek.
35	1130 Pike Ln	Never observed flooding
36	590 Honolulu St	Observed flooding in my front yard & carport in El Nino in yearly 80's. I'm usually not there in rainy season, but neighbors complain flooding in their homes during heavy rains. Several times in the last 5 years I got a call from my neighbors winter of 2001 notifying me of flooding in my storage shed. No place for water to flow. There is a drainage ditch across the street on Honolulu, but I don't know if there is a culvert under Aloha leading from that ditch into one which parallels Aloha and empties into the lagoon not far from its drainage into Arroyo Grande Creek. The one time we experienced the flooding we could not use our carport and parked on the street. Waded to our gate, our front yard was under one foot of water.

Property Address	Comment
37 1353 20th Street	Any time there is a steady rain, the pike between 19th & 20th St water runs over sidewalk and most of the driving lane on south side of street. Caused by clogged drain to catch basin.
38 1622 ? Wy	no comments
39 1327 22nd St	Not so much flooding as drainage. After every downpour sediment and water comes from west side of 22nd st to east side and pours down my driveway. Also flood at 1325 22nd. Is there a plan to create asphalt curbs to control this area? I just found out that the county is responsible for this and has blind-eyed it for years. I refuse to clean this up any more.
40 1410 23rd St	Light rain a few inches standing in yard. Heavy rain 5 to 6 inches standing in yard. 1997 (heavy rain year) water standing in garage. No place for water to flow.
41 2680 Christmas Tree Pl	On Lower Casitas St, observed 6 inches of ponding during heavy rain fall. Each winter during heavy rains ponding occurs. Either there is nowhere for water to drain from swale in the road or the drainage is blocked (can't tell which is the case)
42 2290 Beach St	The water flows down 23rd & Beach St. Floods side of the house on 23rd. Makes trench next to the road. Cause could be clogged culverts. **Maintenance Response:** Culvert inlet is kept clean. Area needs curb/gutter and sidewalk. County backfills and grades shoulder.
43 1551 20th St	Every time it rains, ponding up to 6" deep on the corner of 20th & Warner because there is no place for the water to flow. All the grading that was done has made the matter worse. Plus the dust created has not been appreciated.
44 1850 Laguna Dr	My main concern after living here for 25 years is condition of Arroyo Grande Creek which has not been properly maintained during this time. Due to sediment load around 22nd St and West of SP Rail Bridge, water over ran north bank and flooded north area east of Creek Rd just before south bank failed, which saved major flooding to housing and sewer plant. The reason is lack of dredging that area of river bottom to lower the high water/flood crest. Fix the creek ASAP before waters back up at railroad bridge causing another levee failure
45 1332 Tamera Dr	Having just moved into the area in the last two months I haven't been here long enough to observe any flooding or any other damage from flooding.
46 1770 24th St	6"-8" of water that drains off that pond into my home. Occurs several times a season. Ponded water has no place to flow. No drainage on the opposite street so water falls from areas east of OS into this low spot. Water then overflows across the street, which is lowest at that point, and begins to flood my property. The county will not address this issue. The owner of property across from me blames development strategies. The person I bought from lied. I just want to solve the problem without all the costs on me.
47 1348 19th St	Every time there is more than a drizzle of rain, there's severe flooding at 19th & Pike for the last 16 1/2 years that we have lived here. Catch basin doesn't seem to overflow but the drainage ditch doesn't seem to be able to drain like it should. 19th & Pike has been a problem for years. Has been in the paper.
48 2700 Cunaga, Sp 18	Experience flooding at Arroyo Grande Creek which runs in back of Rancho del Arroyo Mobile Home Park. We've lived here 27 years and residents in the back have had to sand bag twice during that time. Clogged creek bed - I think the worst was in 1984. If A.G. Creek is kept clear of weeds, growth, etc. that helps.
49 1311 South 4th Ave	During big rains one year ago it flooded near my house. Need a bigger culvert. Where does water do on other side of tracks?
50 1520 23rd St	Every time it rains, water runs from trailer park across street from their drive way into my front yard. It then flows down steps & sidewalk into the front of the house. Gets 3"-4" deep. No way to divert water down 23rd st. The drainage basin on 23rd st does not catch water due to poor water catch at curb. **Maintenance Response:** Property needs to install a curb and gutter.
51 2400 Cunaga, Sp 39	Severe flooding at 13th & Cienaga when heavy rains & behind our mobile Duna Vista Park. The river hasn't overflowed yet but close. There is no place for water to flow on 13th. River needs to be cleaned out more thoroughly.
52 2300 Cunaga, #61	1) During severe rain storm, Arroyo Grande Creek. Needs removal of weeds & willows every year & occasional dredging of sediment that fills the channel. 2) Every rain 13th & Hwy 1 runoff drains over the street. 3) 3 or 4 times a year 18th & Hwy 1 whenever culvert clogs puddle over 1 foot deep occurs. 1) Willow & weeds growth & sediment decreasing volume of creek. 2) No place for water to flow. 3) clogged culvert (catch basin).
53 2515 Lara Ln	1) Once a year, severe flooding after heavy rains, 4th between Highly and Hwy 1. 2) Whenever it rains heavy, 1 foot of water on Hwy 1 across 19th where the curve is. 3) All the time, a few inches, on Hwy 1 at 13th & Paso Robles even when it doesn't rain.
54 2691 Cienega Rd	Across from house, between the 12st & 2nd house on the east side of the street, a ditch exists. Water fills the ditch, runs across the street and floods the vacant lot next to him threatening his home. Water comes down Canitas. Twice in 8 years. Too much water to flow in ditch.

	Property Address	Comment
55	821 Visalia St	North west corner Cienaga (Hwy 1) and 22nd St large puddles and several inches deep every time it rains. When state hwy dept widened hwy 1, a depression was formed and left undrained. I had gravel dumped to level it, but it won't stay.
56	1295 Sand Dollar Ave 2030 Front St	Approximately 1 time per year (not 2002 though) on corner of Hwy 1 & Front and Delta & Railroad area. Corner of hwy 1 & Front there is no place for water to go. This may be fixed now. Also culvert into A.G. Creek at the end of Delta slow to take water. Backs up into our property. Arroyo Grande Creek needs ongoing clearing and maintenance.
57	1839 Strand Wy	Existing problems: a minimum volume of 35 feet by 45 feet, by up to 14 feet deep of our beach front land is presently under your flood water. Some causes - I. Human error: A) lagoon gates have been chained open when the lagoon is lower than the outlet gate to the creek. This has caused back-flooding in the lagoon. High tide has additionally contributed to this back flooding. B) ineffective monitoring of flood gates and lack of proper flood gate control. C) water contribution actions upstream contribute to water issues. II. Lack of equipment functioning properly: A) flap gates not operating properly, causing a back flow effect. B) flap gates failing to swing shut when levels in the creek exceed levels in the lagoon. C) the transport pipes are not large enough D) old and ineffective flood control equipment which is non-automated. III. Lack of maintenance: A) beaver dams and debris have increased flooding. B) failure to clean and/or maintain bar screens in working order. C) transport pipes are at least 1/2 full of silt/sludge D) lack of trenching. E) lack of weed control. IV. Lack of corrections: A) regular maintenance needed B) additional flood gate should be installed C) the levy failed and our property was flooded.
58	1200 Price St	When we have rains that bring couple of inches in a day, flooding occurs at: 1) 1531 22nd St. North/East corner floods. Has flooded house & duplex. 2) 2163, 2157, 2143 Warner - back alley & parking lots totally flood. 3) 2411 Ocean/across street - fills parking lot - flood across street. No drainage provided and the lowest point of the block get the brunt. It is a very real problem. I have seen where neighbors get very hostile towards each other over this problem. It would be great to have solved.
59	2130 Warner St	Every time it rains, there is 1 foot of water every year since 1976.
60	1334 20th Ct	I live here since 1984 and have not yet experience any flooding in my street or neighborhood. There is a drainage at the end of 20th court which is often clogged with tree leaves. Dumping of leaves by lazy neighbors. Likely cause could be clogged culvert on end of 20th court.
61	1650 Ocean St	It floods every time it rains between 15th & 17th St. on Ocean St. Will get up to a foot of water. The water has no place to go.
62	2300 Cienaga St., #31	Up to 1 ft. of flooding at park up stream from our Cienaga Sea Breeze. Need pumps to get the water into the creek. Happens once every 10 years. Need more outlets into creek. Creek needs annual cleaning out to assist flow to ocean.
63	1440 Island Ct	I have experienced mild flooding (less than 10") where crest and Island Court join. Only three time in the seven years I have lived here. It takes a heavy rainfall.
64	1950 Ocean St, #2	Every time it rains it floods between Ocean and Beach St. on 19th and also in alley between 19th and 21st St up to 1 foot of standing water. On 19th Street there is no where for the water to flow. In alley, entire alley needs to be graded due to apts. and Boys & Girls Clubs parking lots asphalt too high.
65	610 Pier Ave	
66	1700 22nd St 1710 22nd St 1720 22nd St 1730 22nd St	No flooding experienced on our rental properties. We have appropriate drainage.
67	PO Box 17152 Halcyon, CA	Only on Hwy 1 going thru "downtown" Oceano. Only during heavy rains. Water has no place to flow.
68	616 Air Park Dr	Haven't observed any flooding
69	1500 21st St	Every year flooding occurs in 20th St between Vista and Warner. Another place is 21st. Every time it rains both places flood. No gutters or other drainage systems to convey flow. No sidewalks or gutters. Road are high. Water goes into property.
70	1277 Belridge, #10A	At least twice a year have noticed flooding on Belridge St. Approx. a few inches after a good rain. Makes it difficult to drive down this street as it's already somewhat narrow. No place for water to flow. Would be nice for Oceano to get on board with proper drainage for safety and health reason.
71	1353 21st St	We have only lived her a few years, but there is one spot we have seen slight flooding on the corner of 21st Street and 21st Ct. Every time it rains, the sand, leaves, & water pools up at the corner. It also occurs when someone washes their car. There is just no place for the water and sand, etc. to flow.
72	1323 20th Ct	I find it amazing that the county would spend money studying drainage and flood control in a community that is largely umaintained even at a minimal level - most of the large potholes and eroded streets fill with water every time it rains. The run off cannot disperse to the gutters because there are no gutters nor side walks to keep pedestrians safe and dry. Fix and maintain the streets! We are completely opposed to spending money on a study. The street maintenance needs of this community are obvious without wasting money on consultants.

	Property Address	Comment
73	2400 Cienaga St, #45	Street flooding in mobile home park (2001); flood sump was overflowing also. Only 1 time in 14 years. A few time the water flowed near the top of the creek dike. Arroyo Grande Creek which flows directly behind my mobile home usually is filled with vegetation and much silt. The last two years goats were used to lessen the thick undergrowth. Vegetation followed and silt slowed the water flow. Animals and birds adopted the creek bed as permanent habitat which was approved by the EPA. It appears that the habitat is more important than the danger of flooding. If the Arroyo Grande Creek channel was kept reasonably cleaned it should normally be able to contain the water flow.
74	345 Juanita Ave	Juanita Avenue next to lagoon - when creek is high 1'. Fountain Ave at end - whenever it rains hard 2'. Houses flooded south of A.G. Levee when waters overtopped the levee. The main problem is allowing Arroyo Grande creek to silt up and be over grown with vegetation. Even if the creek itself doesn't flood, there is no place for runoff to go. The lagoon over flows. Upstream trees and other garbage falling into the creek during heavy storms cause major problems. Levee break in '01 if the levee had given on the north side, 150 properties would've flooded. Arroyo Grande Creek channel needs to be kept clear and when a berm is present at the ocean it must be opened during heavy rains.
75	270 Cienaga St, #34	North corner of Cienaga once every 5 years. Same are clogged culvert.
76	2640 Grell Ln	Flooding every time it rains on Paso Robles near the school, on Hwy 1, in the dirt alleyways throughout Oceano. We need sidewalks and alleyways paved with proper drainage. When ever it rains the school children have to walk in the street on Paso Robles. I have observed that many times they almost get hit by cars. We have many problems with drainage, but I feel that Paso Robles Street should get sidewalks and proper drainage from Elm St to Hwy 1, before a child gets killed by a car.
77	1474 23rd St	Every time it rains - East Palo Robles & 23rd at least 1 foot; East Ocean St & 23rd severe close to property line; West Holden St & 23rd sever 1 foot at least; Pike & 23rd 1 foot at least. No place for water to flow. We need drainage so water can flow on sidewalks with drainage.
78		Noticed and investigated up close the spread of tulle grass in the lagoon along with its accompanying impediment to flow, degradation of water quality, and higher risk of flooding in the Oceano Airport neighborhood. Of course, if our neighborhood floods, so does the sewage plant. Then the whole town is in trouble. I believe that a study of county aerial photographs will demonstrate dramatically this change. I plan to do this documentation this summer, so I shall keep you apprised of my efforts.
79	411 Desoy St	no comments
80	2300 Cienaga St, #67	When the Arroyo Grande Creek overflowed and flooded the farmland behind our park. When the creek got clogged up with debris. Large amount of rain and the creek could not be cleaned out because of environmental wackos. Get a bulldozer into the creek and clean it out so the water can flow into the ocean. Clean out all of the logs in the creek bed.
81	2591 Paso Robles	During heavy rains usually at beginning of rainy season, run off from my neighbor's property. Over past 4 years we've tried to make trenches to ward off run off. If trench isn't maintained water puddles. No place to go other than house (approx 3-4 inches.)
82	2341 Beach St	When it rains, observed flooding at Hwy 1 and 13th. Poor county planning. Since the condo's built between 24 & 25 St and the catch basin in that block was covered with building, a problem was created by county engr. Even when told this would happen. I have pictures to prove this!!!
83	2531 Cienaga, #43	Flooding Cienaga and 25th St corner up to 1 foot. Have cleaned up mud and water for approximately 30 yrs in my mobile home park have paid for drainage culvert across 25th St. Have paid for black top berm - a real mess- every rainstorm. Every time it rains water runs into my property from 25th St. No place for water to flow. Oceano need improvement in this regard immediately. Water from the street run onto property and have no where to drain.
84	1087 Santa Rosa St. San Luis Obispo	Observed flooding annually during the winter northeast side of Oceano airport runway, adjacent to Fountain Ave. approx 30,000 sq. ft. several inches deep. drainage channel (Meadow Creek) running along the northerly airport boundary appears to be impeded by vegetation. The airport removes vegetation from the section of channel on airport property annually under approved permits. This study is a major concern for the Oceano airport and the need to protect and preserve the airport.
85	2700 Cienaga, #36	Behind Rancho Dr Arroyo Mobile home Park.
86	2010 Wilmar	Every time it rains, on 19th St between Beach and Ocean. While walking to post office I have to get nearly to the middle of the street to avoid huge puddles.
87	1341 Scott Lee Dr	Every time it rains observed flooding at Scott lee Dr @ curve by drainage ditch. Hole too small for water run off. Also on The Pike at drainage near 20th. Always floods because it is never cleaned before rainy season. I have been observing this for as long as we've lived here - 1980. No place for the water to flow. Needs to be kept clean.

Property Address	Comment
88 2350 22nd St	1. The A.G. Creek is a disaster in the making as I am sure you are well aware from 3 years ago. Wait till it takes part of the town & sewer plant. I hope you have the $ to cover the law suits. 2. The end of 13th St at Cienaga floods every hard rain. 3.The curve on Cienaga at the pay laundry & Chacho's Restaurant floods every hard rain. The creek needs cleaning. That area is a depression no where for water to go.
89	We cannot drain an area that is at or below sea level.
90 1610 15th St	Flooding occurs once a year with heavy rain at Warner & 15th. Water travels down 15th & Warner and detours into our yard flooding from street to back door on opposite side of house. Temporary dirt burm has slowed this. No place for water to flow. Curbs and gutters would help direct flooding away from residential property.
91 2400 Cienage, #41	Brush and weeds are heavy and hinder water flow in creek. Overflowed in some areas were flooding in 2000.
92 350 McCarthy Ave	On McCarthy Ave in front of #353 (a few inches) and #380 (big puddle). The one at 353 occurred last year when a private contractor tore up the street and didn't put back level. The one on lower McCarthy #380 has been there for years after the rain. It would be nice to have the low spots filled in. Thanks for the meeting last night. You did a good job despite the crowd anger.
93 1611 Paso Robles	Every time it rains, Paso Robles and Hwy 1. Plus each time Oceano Nursery washes road way. Filled with dirt. No place for water to flow. The alley way behind 1611 Robles dumps water throughout our property with the rains 2-4".
94 1841 Beach St	Our back yard area & some of our walk way area floods due to excessive rain & bad drainage. Happens almost every time it rains. I've seen a lot of that throughout Oceano which does cause drains off into yards, etc. Clear out drains and culverts and catch basins so that our yard, walkways & streets would stay clear.
95 2700 Cienaga, #19	Every time it rains observed flooding 1 foot & severe at 13th & Cabrillo Hwy and 19th & Cabrillo Hwy. No place for water to flow.
96 561 Security Ct	Always floods every time it rains in front of homes on Security Ct from several inches to 1 ft depending on amount & length of rain. No place for water to flow.
97 547 Security Ct	Each year, always during rainy season, whenever the water rises in the lagoon it floods. Outlet gate wasn't opened in time. Street in front of my Property was flooded by rising water in the lagoon. Rose to one inch below door sills, despite our sandbags at the first floor door entries. Spill-gate in lagoon at dike is probably inadequate for fast lagoon drainage run-off. Or usually blocked with floating debris and branches. Install larger flood gates! Also, instruct person in charge of gate responsibility of this condition and the urgency of prompt action and watchful attention during rainy periods.
98 1365 Scott Lee Dr	There is a drainage basin behind our house and the channel to the basin passes alongside our house. When there is a heavy rain (at least once a winter) the culvert from the street to the channel backs up and our driveway and house flood. Ours is the closest house to the culvert. We live behind sandbags all winter, losing use of our garage and making entry into the house inconvenient. Before we learned to sandbag, we flooded about 10' into the house once, and several times we have been caught unawares and flooded through the garage. After a few times of this, we have sandbagged ourselves "out" rather than face the dirty street mess that floods through the property. The water line on the house is at least 6" deep when this happens. The water collects all the way down from The Pike, down Scott Lee Drive, and collects all the water from Mona Lei Court, then continues down Scott Lee Drive and drains through one small opening under the sidewalk. The opening isn't aligned with the channel, and it's much too small. Steady gentle rains are not a problem - it occurs during quick heavy downpours. The culvert seems to be wrong size/alignment for all the water that must pass through there to the drainage area behind the subdivision. There is no catch basin. **Maintenance Response:** County cleans and checks the location to make sure debris is not blocking the inlet under the sidewalk.
99 1541 Wilmar Ave	Some flooding on Wilmar between 14th & 16th Ave - the year of El Nino. Once since we've moved here in 1996. Heavy rain coming downhill (Wilmar) No place for water to flow.
100 2320 Ocean St	Corner of 23rd & Ocean in front of 2310 & 2320 in front of vacant lot there is usually about 8"-1' of water at deep part point but it fills the whole road. No place for the water to flow. Not enough fall on area around that point. Need new drainage in & curbs & gutters. **Maintenance Response:** County maintenance staff enlarged the area across the street from this address to hold more water and they also hand shoveled out the ditch that runs along her fence and down 23rd. There may be relief for this property once the vacant lot across the street is developed and an under drain is installed.

Property Address	Comment
101 2285 Beach St	Every time it rains, clogged culverts create flooding problem. The other side of the street has flooded when it rains 1" or more. It will over flow the berm. Then it flows through the yard to the alley and floods the alley.
102 2261 Cienaga	Every time it rains, flooding, puddles, alley way behind the residences whenever it rains. Muddy needs paving. No place for water to flow. Dirt, muddy alley needs a swale in the middle. During rainy season tenants cannot access or leave the parking area behind the property.
103 2700 Cienaga, #64	During any and all heavy rains, so at least yearly, the corner of 21st St. & Hwy 1 the adjacent drain seems to clog during every measurable rain and Hwy 1 becomes flooded and occasionally impassable. Plugged drain sometimes above ground clearing fails to unclog the drain.
104 1270 Lakeside Ave	Every time it rains, corner Pier Ave & Lakeside. Water doesn't go away after rain or other times. No place to flow.
105 567 Honolulu 571 Honolulu	Every medium to heavy rain. Floods houses up to 6-12'. Clogged drains and lagoon. Please fix
106 1661 Ocean St	Every time it rains, it even floods when someone wash there car up the road. About 1 foot. No place for water to flow. Cars even flood out going through the water sometimes. I have been told more than one time it would be fixed, but nothing has been done to help.
107 2181 Beach St	One time when the road crew was working at 22nd St & Beach, the water came across the front of the house and around to the west side. Last 2 years ok. There is always a big puddle at the mail boxes. No place for water to flow. That's all around my property.
108 2431 Paso Robles St	Only at intersection of Paso Robles St and Highway 1 with heavy rains. My property slopes toward ocean gradually.
109 PO Box 563	22nd Street at the creek and Hwy 1. Mobile Home Parks. Several spots Hwy 1 in Oceano. Flooding occurs during heavy rains. Most problems are delt with in a timely manner.
110 2550 Cienaga, #2	Have not experienced any flooding. Have noticed a problem on Hwy 1 near 13th St & 15th St & 4th St. This is when it rains a lot!
111 1746 Tierra Ln	East side of Tierra Nueva Ln past X-mas Tree Lane. Swale washed out. Needs drain/culvert leading to drain at Cienaga & Tierra Nueva. 1-2 times per year, after 1/2" or more of rain. **Maintenance Response:** Shoulder needs more substantial material or needs to be developed.
112 1365 Scott Lee Dr	1) 1365 Scott Lee Drive house flooded circa 1980, again (partly) 1995. 2) Street, driveway, sidewalk & culvert & drain outside/front of 1365 Scott Lee Drive. 3) Scott Lee Drive "turn" (S.L.D. turns 90"). Every hard rain. See attached letter from Cliff Howe of Dept of Public Works - SLO Co. The main cause is that the county should never have approved the undersized drain & culvert when designing the street drainage. This flooding is clearly caused by the county & developer & they should correct it.
113	4th St south of Highland floods every time a substantial rain occurs. Street becomes dangerous and/or is closed. Road also needs sever repaving and speed limit signs posted. Also floods on Hwy 1 @ 13th St & between Caraballa & Chacos on Hwy 1, too. Crude culverts made out of holes dug in earth are not large enough. Water does not permeate fast enough, no place for water to flow. Every time 4th St. gets flooded, road gets worse and all that is done is hose patch, months later.
114	Oceano Community Services District Staff, Gina Davis, advised they have taken photos of drainage & flooding problems over the years and could assist in locations of problems.
115	Every time it rains, 13th St. & Hwy 1 is the worst. During the rainy season up to 1 foot of water will flood. There is poor drainage & the water has nowhere to go. A low spot in the entire intersection.
116	Every time it rains, 14th Street & Warner 4-6 inches backs up on side of street, comes down hill on 14th St., then on to Warner. Settles there. No place for water to flow!
117	Every time it rains, Cabrillo Hwy, every year as far back as I can remember. 23 & Ocean St - at least 1964. On Faccoli Ave close to 14th St. 23rd and Ocean St no place for it to flow. Cabrillo Hwy culvert is clogged. All they would have to do it clean drains often and fix the drainage on the streets.
118	A lake on 17th & Ocean St. Does not drain for days. When county graded by Oceano Elm. School on 19th St water drains down to Ocean St west to 17th St. like a river. So 17th & Ocean St is hit by 2 sides. Every time it rains, also when Oceano Elem. School over waters playground. No place for water to go.
119 1319 12th St	When it rains hard or a lot - catch small basin 19th & Pike. Also when it rains hard or a lot in front of my front door 1319 12th St I have a drain, but the drain with hard rain doesn't carry it away fast enough.
120	When it rains heavily on the Pike between 19th & 20th St. Several inches. The damage to the pavement - the entire pike is in unacceptable disrepair. As a motorcyclist, it is extremely dangerous.
121	Our property is on 20th St. between Pike & Wilmar. We have not observed any flooding on that street. There may have been some on streets w/out curb and gutter.
122	On the corner of 21st & Ocean St, about 1 foot every time it rains. Unlevel land.
123 1490 24th St. 1633 Front St, #5	No flooding
124	Every time it rains, beautiful downtown Oceano on Front St. No place for water to flow.

Property Address	Comment
125	When there is heavy rain, Front Street & Hwy 1 near Oceano Nursery.
126 531 Honolulu St	Every time we have fairly heavy rain, we have flooding near our residence. Will try to make it to meeting and comment on our problem. No streets listed in our vicinity - so hardly know how to respond to some of the questions.
127	None in our neighborhood off the Pike
128	In the front of my house and on the street in front of my house every time it rains. There is a place for the water to flow, but it gets clogged.
129	Corner of Norswing & Mendel 6-8" every time it rains. Road is lower than drain.
130	Cabrillo Hwy & 22nd & 21st Street every time it rains. No place for water to flow.
131	Hwy 1 & too many locations within the community every time it rains. Cause of flooding is SLO County Planning.
132	Pike & 23rd - a bus stop & crosswalk for kids going to No. Oceano School - washes out every year - 1 ft or more deep. Homeowner has been refilling with dirt. Every time it rains the six years I lived here. Wilmer Ave & 22nd - 1 ft plus puddle every time it rains. Road visually low on that side.
133	On Wilmar Avenue between 18th & 19th Streets there is a large puddle when it rains, every time it rains. No place for water to flow.
134	No significant flooding occurs at Oceano Park or the campground.
135 2411 Ocean St.	NE corner 24th & Ocean St 6 to 10 inches. Sometimes higher and inundates property on NW corner 24th St. Also water goes to lower living unit at 2411 Apt C. Owner has done nothing to alleviate. Every time a regular rainfall occurs. No place for water to flow. County has made an attempt to divert, but it didn't last long. **Maintenance Response:** County placed a small pond on Ocean Street 2 years ago and cut a ditch from the driveway to lead to the pond. It has worked well until the renters drive over the ditch blocking flow.
136 2550 Cienaga - Porticos Mobile Home Park	Every year for 15 years, looks like a reservoir. Severe flooding & water becomes stagnant. Several times a year, every time we get a good rain. Flows from both streets & parks and creates a lake in middle of park which creates a good breeding place for mosquitoes.
137	I only saw the results of governing agencies not allowing the creek to be cleaned out causing the flood. Only when State and Federal offices refuse permits. They only clean to the railroad crossing of this one a couple of years ago. It needs cleaning to the beach to prevent floods.
138	McCarthy Ave. severe flooding every time it rains. Have to drive across the street or else take shoes off and wade in water. No place the whole street to cross. No place for water to flow.
139	Only been here 2 years. It flooded 2001 the creek & part of the park. Lots of debris floating down.
140	On Front St. in Oceano (Hwy 1) by 13th/Paso Robles and even worse between 17/19th at the curve in the road near the bar. Several inches at 13th/Paso Robles. Honda Accord floorboard high at the 17-19th location. Once a year or more if it's a rainy year. Takes a hard steady rain to produce high water. Always big puddles even in light rain. Dip to road. Don't see any culverts for water.
141	Marked on map (Cabrillo Hwy & Highland Wy, 4th St. & 13th St.) severe flooding every time it rains.
142	Between Wilmar & The Pike on 18th St. and on The Pike between 18th & 20th St. Whenever we get 1/2' of rain. Just forms puddles - no storm drains on 18th.
143 548 Honolulu	Heavy rains cause overflow on lagoon once a year. Stuck flood gate.
144	Few inches - 4th St. 1-2x/year. The town is right in a flood plain. Do not redevelop Oceano - it is built in a flood plain.
145 1875 Front St	6-8 inches multi-street intersection every time it rains. No place for water to flow.
146 2400 Cienaga, Sp 22	I just moved into Duna Vista Mobile Home Park in April and was told by the seller's real estate person there are no flooding problems. As I walk behind the mobile home park I notice that the creek really needs to be cleaned and may be dredged out.
147	Oceano Campground floods from Meadow Creek with heavy rains. Flap gates get clogged and water cannot escape from the lagoon. Pismo State Beach upstream on Meadow Creek also floods.
148	1) 1 1/2 foot on 19th Street & Beach. 2) 1 1/2 every time it rains by the corner of 20th/Hwy 1 by the laundry mat. 3) 1 1/2 21st and Beach every time it rains. Puddles & caution signs.
149	Corner of 19th and the Pike. Severe flooding during winter. Causing pot holes and road damage anytime it rains heavily. Catch basins filled with debris. Also heavy flooding on 17th St. cross streets are Wilmar & the Pike. Heavy flooding during rainy season/winter.
150 1539 Fountain Ave	Mar 2001 flooding on entire street. Sporadic - some flooding every year. Clogged culverts under roads, no place for water to flow. Inadequate drainage for volume of water. A major drain culvert system is required in my estimation.
151 1336 Care Caufi	The Pike between Avanita Pelicans & 19th St. a few inches during winter. No damage, just big puddles on the road. During heavy rain every year. I suppose it flooded due to being a low spot. Sidewalks with drains would be helpful. Thank you for your consideration.

Property Address	Comment
152	With regrading of Cross Canyon Rd the prior drainage problem will no be much worse. No place for water to flow. Very poor engineering. Please call me.
153 1361 24th St.	Wilmar Street between 23rd & 24th. A few inches to one foot following heavy rain. No place for water to flow.
154 2450 Paso Robles St	Water runs into my yard from the street once in the last two years I lived here. No place for water to flow or be directed. I would like to see curbs on Paso Robles Street to help direct the rain water to drains.
155 310 Juanita Ave	Juanita Ave 6"-1' every time it rains. No place for water to flow.
156 1561 16th St	16th St between Warner and Wilmar. Erosion problem on sides of street. Needs a small berm or curb to keep water from eroding dirt rocks. Washes in to my driveway and settles there. I have to wheel barrow it out every time it rains. Deposits at the intersection of Warner & 16th St. No curb or berm on edge of road. All it would take to fix this problem is a 2" berm on the edge of the road. Puddle or pond that forms on Warner at 15th St intersection after pond with very little rain. Covers half the road.
157 1778 Aloha Pl	Severe flooding occurred at my address during Winter/Spring 1997, 1998, and 2000. Water flooded over the lagoon banks, over the street and up to the bottom of the front and side doors of my house. Sometimes this lasted for 4-5 days (I have photographs.) More frequently, the water floods over the lagoon bank and pools several inches deep on the south and west side of the house. Also, about 30 meters down Security Court from Aloha Pl. it also forms a large pool. Flooding also occurs at the north end of Security Court near the lagoon. More flooding also occurs on Lakeside in front of Guiton Realty. Flooding as described above occurs during period of considerable rainfall nearly every year and it seems to be getting worse. In the Oceano Lagoon area the key issue is lack of drainage out of the lagoon. This result is the pooling of water for many days at the areas noted above. During the summer, the ground water level may be so high that many pools of stagnant water result and form active breeding areas for mosquitoes.
158 1895 Casitas	Channel between Railroad Street and Fountain Avenue overgrown. **Maintenance Response:** County culvert inlets have been kept clean.
159 Flap gates at lagoon	Flap gates get clogged and water cannot escape from lagoon. **Maintenance Response:** Flap gates are cleaned by County. Back pressure from heavy flow in Arroyo Grande keeps gates closed. Once the flow recedes, the lagoon drains.
160 Meadow Creek	Drainage channel (Meadow Creek) is overgrown along northerly airport boundary near Fountain Avenue. **Maintenance Response:** Drainage channel through a wetlands along airport property. County culvert inlets are kept clean. Permits for cleaning channel are secured by airport personnel to clean Meadow Creek.

Appendix D

RESOLUTION ESTABLISHING POLICY

APPENDIX D

RESOLUTION ESTABLISHING POLICY

BEFORE THE BOARD OF SUPERVISORS

of the

SAN LUIS OBISPO COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

Monday May 20, 1968

PRESENT: Supervisors M. Roland Gates, Elston L. Kidwell, Fred C. Kimball, Lyle F. Carpenter, and Chairman Hans Heilmann

ABSENT: None

Resolution No. 68-223

RESOLUTION ESTABLISHING POLICY OF THE SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT RELATING TO THE APPORTIONMENT OF LOCAL COSTS OF PLANNING, DESIGN, CONSTRUCTION, OPERATION AND MAINTENANCE OF DRAINAGE AND FLOOD CONTROL FACILITIES

The following resolution is now offered and read:

WHEREAS, the San Luis Obispo County Water Resources Advisory Committee has proposed the adoption of a policy relating to the apportionment of local costs of planning, design, construction, operation and maintenance of drainage and flood control facilities by letter dated May 8, 1968.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, State of California, that the following shall be the policy of the San Luis Obispo County Flood Control and Water Conservation District relating to the apportionment of local costs of planning, design, construction, operation and maintenance of drainage and flood control facilities until further notice:

1. The San Luis Obispo County Flood Control and Water Conservation District shall maintain surveillance of water problems throughout the County and advise the landowners of present or potential drainage problems in the areas where found. Where remedial action is deemed necessary, the Board of Supervisors shall call an informal hearing for the purpose of informing property owners in the areas causing the problem and in the areas of damage or potential damage.

2. If a program of correction is indicated, the Board of Supervisors shall provide assistance in the formation of a suitable zone of the County Flood Control District. Once a zone has been formed, it shall bear the cost of the planning, design, construction, financing and maintenance of drainage facilities. If the zone is formed, the cost of formation of the zone should be reimbursed from the initial budget of the zone. If the zone formation proposal is rejected, or otherwise abandoned, then the cost of the zone formation proceedings should be absorbed by the County Flood Control District.

3. Applications for the formation of a drainage district or zone should be discussed with the County Hydraulic Engineer so that the applicants will have available to them all current and pertinent information for their guidance.

4. Provision should be made for reimbursement to a developer, or his successors in interest, of his costs of off-site drainage facilities in excess of his pro-rata share, as determined by the County of San Luis Obispo, when adjoining properties develop and require the use of facilities financed by said developer. The period of eligibility for reimbursement should be flexible and based on the size of a project. It is anticipated that the normal period of reimbursement would be from five to ten years and in no event would it exceed 20 years.

5. The Board of Supervisors shall maintain a revised project priority list, giving preference to those projects approved by the people within the areas affected, in the order of approval.

6. Local costs of drainage projects should be spread within the area of benefit in accordance with benefits received, insofar as possible. Where pay-as-you-go financing or general obligation bond financing is contemplated, the total assessed valuation is an equitable basis for spreading project costs under the assumption that benefits are in accordance with assessed valuation. Where assessment bond proceedings are contemplated, and only in such cases, land area, front or abutting footage, number of developable sites, as well as assessed valuation, shall be used as bases of spreading costs among beneficiaries, either separately or in combination. In such instances the proper basis of assessment spread should be determined primarily from engineering considerations.

On motion of Supervisor Kidwell, seconded by Supervisor Carpenter, and on the following roll call vote, to-wit:

AYES: Supervisors Kidwell, Carpenter, Gates, Kimball, Chairman Heil
NOES: None
ABSENT: None

the foregoing resolution is hereby adopted.

Chairman of the Board of Supervisors

ATTEST:

Clerk of said Board of Supervisors

SLO CO FC & WCD
m

STATE OF CALIFORNIA, }
County of San Luis Obispo, } ss.

I, RUTH WARNKEN, County Clerk and ex-officio Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, do hereby certify the foregoing to be a full, true and correct copy of an order made by the Board of Supervisors, as the same appears spread upon their minute book.

WITNESS my hand and the seal of said Board of Supervisors, affixed this 23rd day of May, 19 68.

RUTH WARNKEN
County Clerk and Ex-Officio Clerk of the Board of Supervisors

[SEAL]

By _____ Deputy Clerk.

Appendix E

ENGINEERING TECHNICAL MEMORANDUM

APPENDIX E

ENGINEERING TECHNICAL MEMORANDUM

DRAFT TECHNICAL MEMORANDUM

San Luis Obispo County Hydrology and Hydraulics Study

OCEANO COMMUNITY

A. EXECUTIVE SUMMARY

This technical memorandum looks at the existing drainage conditions of the Oceano community and in a broad overview sets forth a preliminary set of potential alternative projects to the identified problems. There are three main problem areas identified through the community survey and consultant site inspection; 1) positive drainage to Arroyo Grande Creek during high flow periods, 2) flooding along Highway 1 at the base of the community, and 3) localized flood problems within the residential areas of the Community. Local drainage patterns are mapped. County policies are briefly identified and discussed with regard to their impact and current effectiveness. The study area is divided into drainage zones. The drainage infrastructure in each zone is discussed. Special attention is paid to the amount of existing and needed curb and gutter in the community to provide full coverage on all streets. Seven potential drainage projects within the community are identified. These projects range in cost from $390,000 to 5.5 million dollars. A complete community wide drainage system will cost between 10 and 12.5 million dollars.

B. INTRODUCTION

The purpose of the drainage and flood control study is to examine the existing drainage conditions of the Oceano Community, identify problematic areas and issues, and prioritize and categorize the problems. This study also discusses and addresses typical problems, and develops conceptual solutions to the identified drainage and flood control issues. This memorandum includes a description of existing drainage conditions, a discussion of the methodology used to evaluate drainage problems, and the identification of a series of alternative projects to mitigate the drainage problems. Projects can be combined to develop an overall solution for improved drainage in the community. This report does not address the flooding of the agricultural lands to south of Arroyo Grande Creek and it does not address some flooding issues around the lagoon and State Park areas. Issues specific to Arroyo Grande Creek and its flood conveyance capacity are not specifically addressed in this document. Flood control issues directly due to the Arroyo Grande Creek channel capacity and flow are subject of a separate study anticipated to be conducted by the SLO County Flood Control and Water Conservation District.

C. OVERVIEW OF OCEANO DRAINAGE ISSUES

Oceano is a community based on a subdivision of land (1920's) that created hundreds of buildable lots without the benefits of infrastructure improvements. In the early stages of urbanization, storm water conveyance and flood control infrastructure was not incorporated into the community because the high infiltration rate of the underlying Oceano sands was sufficient to naturally dispose of runoff. During this early period curb, gutter, and drainage improvements were not required for development thus no upfront drainage infrastructure cost was born by the property owners at this time. With an increase in urbanization came an increase in impervious surfaces and a decrease in the capability of the underlying soil to adequately absorb urban runoff.

The combination of the area's geology, flat streets, shallow topography, and inadequate drainage facilities has resulted in localized poor drainage and/or flooding around some residences, buildings, and roadways. Drainage and flooding problems have constricted roadways and caused damage to personal property during large storm events. Reported areas of localized flooding and/or drainage problems based on community questionnaires in 2002 are shown in **Figure 1**. The most serious flooding in the community takes place along Highway 1. Extensive ponding can occur for several days after significant rainfall, causing damage to nearby businesses and comprising roadway safety. This problem is generally caused by very low drainage system gradient and lack of adequate drainage facilities to move runoff south towards Arroyo Grande Creek. The two main locations of the flooding occur at the intersection of 17th and 19th streets with Cienaga Street (Highway 1) and 13th Street and Paso Robles Street. These two areas are located downhill of the community and rest in an extremely flat area without the proper slope to drain.

Another problem complicating the drainage in Oceano is that fact that Arroyo Grande Creek has levees along the southern boundary of the developed area of the Oceano Community. All runoff in the Oceano Community generally flows south-southwest to the northern Arroyo Grande Creek levee, this is shown on **Figure 2**. Throughout the community there are localized depressions and swales that run through private property. Generally, storm drainage outfalls to Arroyo Grande Creek through several private culverts with flap gates and pumps. These facilities tend to be isolated and difficult to access for maintenance. If flow in Arroyo Grande Creek is high the flaps gates remain closed and water back ups through the system until flow recedes in the creek channel. These gates are necessary to keep high channel flows from back flooding through the pipes and causing flooding.

D. HYDROLOGIC SETTING

1. Topography and Climate

Oceano is located in southwestern San Luis Obispo County. The Oceano Community is bordered by the Pacific Ocean to the west, and is surrounded by farm fields and sand dunes to the east and south. The topography of the area is essentially flat, sloping gently southwest towards Arroyo Grande Creek(north levee elevation 20 ft) and the Pacific Ocean. The center of the community is at roughly 25 feet above mean sea level (MSL). The railroad tracks at the crossing are at approximate elevation 18 ft.

The marine environment heavily influences the coastal climate of Oceano. Temperatures in this area are mild year-round, with minimum average temperatures of 42 degrees Fahrenheit in January and maximum average temperatures of 72 degrees Fahrenheit in September and October. Average annual rainfall, occurring primarily between December and March, is approximately 17 inches. The warmest months are August through October and are typically characterized by dense morning fog followed by afternoon sunshine.

2. Surface Geology and Soils

Geology and soil characteristics can have a significant influence on local drainage patterns. The surface geology in the Oceano Community is comprised of Quaternary and Holocene sediments of alluvium, dune deposits, and Paso Robles Formation. The weathering of these geologic units has produced the underlying sandy soils found throughout most of the Oceano Community. The

Soil Survey for San Luis Obispo County has classified these soils as Oceano sands. Oceano sands consist of deep, excessively drained soils that formed in material weathered from sandy Aeolian deposits. These soils are characterized as having high infiltration rates, low to moderate runoff potential, and rapid permeability in an undeveloped state.

3. Regional Hydrology

The Oceano Community is located within the Cienega Valley subbasin of the greater Arroyo Grande Creek watershed. The Arroyo Grande Creek watershed drains an area of approximately 130 square miles between the coastal hills of Central California and the Pacific Ocean.

The Cienaga Valley subbasin, draining an area of approximately 12 square miles, comprises the lowermost portion of the Arroyo Grande Creek watershed. Arroyo Grande Creek, flowing west along the southern edge of the Oceano Community, forms the primary drainage corridor in the subbasin. This segment of the creek receives runoff from developed areas of the Oceano Community and conveys it west to the Pacific Ocean. Additional waterways in the Cienaga Valley subbasin include Meadow Creek, Los Berros Creek, and Oceano Lagoon. Meadow Creek runs south along the western edge of the community and drains to Oceano Lagoon. Oceano Lagoon is a confined dune lake that drains areas west of the railroad tracks. Flood gates at the southwestern end of Oceano Lagoon control flows from the lagoon into Arroyo Grande Creek. The flood gates also prevent high flows in Arroyo Grande Creek from entering the lagoon area. Local residents have complained that the floodgates do not function properly. At present the State of California owns and is responsible for the maintenance of most of the Meadow creek and/Oceano lagoon areas.

Arroyo Grande Creek was constructed for flood control in 1959. Flood control improvements included the construction of levees on either side of the creek channel to move watershed drainage through the lower valley in a controlled state. During the drought periods in the 1980's and 1990's sedimentation removal was not required due to low flow or no-flow conditions in the lower creek reach. Subsequent heavy rain events resulted in the siltation and sedimentation of the creek channel, reducing the channel capacity by an estimated 80 percent[1]. The changes in the designation of wetland characteristics and listing of two endangered species within the creek channel has prevented the dredging of the channel to restore its design capacity. This has led to higher water surface elevations during minor storms that further compound flood problems on the Oceano side of the levee. The Oceano Community Services District (OCSD) has drainage maintenance authority over the communities streets and drainages as per LAFCO Resolution 80-6.

4. Local Drainage Patterns

Drainage in the Oceano Community was divided into seven different drainage zones (Zones A through G) based on drainage patterns within the community. Drainage zones and existing drainage infrastructure are shown in **Figure 3**. Generally, "The Pike" is the drainage divide to the north of the community. In Zones A and C, a network of curbs and gutters is used to convey most runoff to infiltration basins located within each zone. The infiltration basins allow storm water generated within these zones to percolate into the underlying sandy soils. The system of curbs, gutters, and infiltration basins is effective in Zone C, and as a result, the zone experiences minimal nuisance drainage and flooding problems. However, drainage problems have been noted in several areas of Zone A. Zone B is an upland zone that contributes some flow to the drainage

[1] SLO County. (2001). *Oceano Specific Plan and Environmental Impact Reports*.

network along "The Pike" but generally has some low spots that accumulate runoff, notably on 16th Street. Like Zones A and C, runoff in Zone E either flows to infiltration basins located within the zone or flows in an easterly direction away from the lowland problems areas around Highway 1. Few drainage problems have been reported in Zone E.

Zones B, D, F, and G lack a consistent organized network of curbs and gutters. The lack of an organized network of curbs and gutters within Zones B, D, F, and G has resulted in many nuisance drainage and flooding problems within these zones. The inconsistent placement of curbs and gutters in the area has lead to the concentration of the street runoff in areas that usually do not have curbs or gutters and generally represent local low spots. Runoff from Zone B flows north to drainage infrastructure along "The Pike" in Grover City. Runoff from Zone D flows south to Zone G. Stormwater runoff from Zone F is conveyed south and west to a drainage ditch at Paso Robles Road and Highway 1. An infiltration basin located roughly at 13th Street and Warner Street allows for the infiltration of some of Zone F's storm water. Finally, Zone G, the largest drainage zone in the Oceano Community, has the highest concentration of urbanization. Zone G was further divided into four separate areas (Area G-0, G-1, G-2, and G-3). Generally, runoff within Zone G flows south to an open channel along Highway 1 and then into a series of ditches that convey the runoff to Arroyo Grande Creek. Several areas of nuisance flooding have been noted in Zone G during large storm events.

Areas south of south and east Nipomo Street and Cienega Street were not included in the study because their drainage system is separated from the rest of the community and no problems have been reported in that area.

5. Flood Hazard Zones

In addition to localized flooding and drainage problems, portions of the Oceano Community have been classified by the Federal Emergency Management Agency (FEMA) as being located within 100-year flood hazard zones of Arroyo Grande and Meadow Creeks. As previously mentioned, the area of the community located north of the airport and near Oceano Lagoon experiences drainage and flooding problems during large storm events. The FEMA floodplain delineations are shown in **Figure 4.** It should be noted that it is not the purpose of this study to evaluate or recommend solutions to the significant flooding problems in the FEMA designated zones. They are presented here to show the relative context of the local drainage issue with the global flood issues concerning Arroyo Grande Creek.

6. County Policies

Unless waived, San Luis Obispo County requires the installation of concrete curb, gutters, and sidewalks along the entire street frontage of any project in the following areas: (1) all new residential subdivisions, pursuant to Title 21 of the SLO County Code; (2) all new residential multifamily categories within an urban reserve line; (2) substantial remodel projects; (4) all commercial and office and professional categories within an urban reserve line; and, (5) all industrial categories within an urban reserve line (6) all single family residential construction within the Urban Reserve Area. The OCSD strongly supports the County's enforcement of this code. **Table 1** below indicates the amount of potential future curb and gutter length needed to provide complete coverage to the community in Zones A through G.

Table 1: Curb and Gutter Data

Drainage Zone	Length of Needed Curb (ft)
Zone A	1,240
Zone B	1,760
Zone C	2,420
Zone D	5,800
Zone E	4,190
Zone F	13,330
Zone G	37,125
Total	**65,865**

* these numbers were based on the Ocean General Plan and field inspection.

7. Drainage and Flooding Issues

There are three basic drainage issues that need to be addressed.

- Shallow flooding in residential areas;
- Significant frequent flooding at Highway 1; and
- Managing local storm water runoff when Arroyo Grande Creek is flowing high.

All of these issues are dependent on each other and therefore merit a brief discussion.

a. Flooding in Residential Areas. Flooding in the residential areas of the community is a great concern. **Figure 1** shows the location of some the complaints of flooding within the Oceano area. For the most part the problems in these areas are extended ponding and/or shallow flooding during significant or repetitive storms. There is not a consistent curb and gutter system in the community and runoff leaves the roadway and collects in low spots that are adjacent to the road and usually on private property. Many of these low spots hold water for several days until the water either evaporates or infiltrates into the underlying soil. Exacerbating many of the drainage problems is the inconsistent lengths of curb and gutter within the community. The existing isolated curb and gutter system tends to channel and concentrate the runoff into residential areas and/or private property. In some cases where ground floors are low and runoff concentration is high, flooding can occur within the residence, causing some damage to structures and belongings. This impact in some cases is in direct response to the enforcement of the County code requiring construction of curbs and gutters for new development.

It is our understanding, based on information received from Oceano Community Services District (OCSD), that the community must continue, without exception, the construction of curbs, gutters and pedestrian sidewalks with all new development. Current County policy encourages this but these facilities alone cause isolated problems. The installation of curbs and gutters will reduce the opportunity for storm water to infiltrate. However, a continuous complete curb and gutter system will collect and convey runoff in an efficient manner. Downstream facilities receiving storm water must be able to handle this runoff or flooding may be increased in certain locations. The County policy of requiring curb and gutter installation on new buildings and larger remodels (improvements that are valued at 25% or greater than the current property home value) in the long term provides improved local location drainage, but in the short term may be causing or increasing flood problems within other parts of the Community. One option may be for the

County to collect fees for building projects then apply these fees to whole areas thereby potentially reducing the impacts of segmented curb and gutter systems. Along with the installation of curbs and gutters, a typical storm drain system will be needed to convey the runoff through the community.

b. Highway 1 Flooding. The portions of Highway 1 that flood are located in the lowest portions of the community where most if not all of the runoff from Zones D, F, and G end up. The railroad tracks immediately to the west exacerbate the problem of positive drainage. The tracks are higher than the adjacent roadway. Thus, instead of overflow moving to the south they can back up and pond on the highway. The flooding at Paso Robles Street and Highway 1 may be reduced if the existing culvert is replaced or if storm water can be diverted to another location. The existing culvert also passes beneath an agricultural packaging plant. Thus installing a new culvert would be difficult and costly.

A low gradient channel that is filled with sediment and runs under the elevated railroad to the west causes the flooding at the base of 17th and 19th streets. This runoff then flows through small culverts and channels through agricultural fields and industrial parcels, eventually discharging into the Arroyo Grande channel. These channels do not have adequate flow carrying capacity and compound the problem by creating backwater conditions that exacerbate drainage problems along Highway 1 and the lower portions of the Oceano Community. The flooding is caused by lack of the drainage system capacity and low topographic gradients. The flooding at the intersection of 13th street and Paso Robles is caused by under sized culverts under the railroad tracks. This system causes water to back up and then flood the intersection at Highway 1. It is important to note that the majority of the severe flooding problems occur within or adjacent to the Highway 1 right-of-way. It is likely that if mitigation of flooding in the Highway 1 right-of-way is to be accomplished then improvements to drainage infrastructure that is outside of the right-of-way is necessary. Caltrans has been approached concerning these drainage problems and has acknowledged that it would be willing to cost share in solutions to drainage problems adjacent Highway 1. There position is set forth in the a September 26, 2002 letter attached as appendix to this memorandum.

D. DRAINAGE AND FLOOD CONTROL ANALYSIS

1. Methodology

Drainage problems within the community were identified by: (1) distribution of a community drainage and flood control questionnaire to Oceano residents; (2) conduction of community outreach discussions with local residents and government officials; (3) field mapping of curbs, gutters, and infiltration basins; and (4) review of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the Oceano Community. The community was then divided into seven drainage zones (Zones A through G). The delineation of the drainage zones made it possible to better understand the drainage patterns and associated drainage problems within the community, and to develop conceptual solutions for these problems. The zones are generally laid out to correspond with the upland and low land areas of the community so that contributory watersheds are grouped to show which watersheds drain to localized infiltration basin and which drain towards Arroyo Grande Creek. The Rational Method was employed to calculate the peak discharge for Zones D, F, and G, which drain towards Arroyo Grande Creek.

2. Rational Method

The Rational Method was used to estimate peak discharge at drainage zones that discharge to Arroyo Grande Creek (Zones F and G) and Zone D, which is conveyed through Zone G prior to discharge to Arroyo Grande Creek. The calculated peak discharge was used to develop conceptual alternatives that are feasible for Oceano. The peak discharge, as computed by the Rational Method, is a function of precipitation, topography, soil characteristics, and land use within the drainage zone. Rational Method calculations are presented in **Appendix A**. The results of the Rational Method are presented in **Table 2**.

Table 2: Rational Method Results

	Area (acres)	Peak Discharge by Storm Event (cfs)		
		10-year	50-year	100-year
Zone D	33.1	24	37	43
Zone F	35.9	26	40	47
Zone G				
Area G-0	30	21	34	39
Area G-1	60.7	43	68	79
Area G-2	24	17	27	31
Area G-3	46.1	33	52	60

* County standards mandate that minor drainage facilities be designed for the 10-year design level. 50- and 100-year flows are shown for comparison purposes only

E. POTENTIAL PROJECT ALTERNATIVES AND COMBINATIONS

With the above issues in mind several sample potential projects have been developed to address the different flooding areas and issues. Due to the fact that the area north of the airport and near Oceano Lagoon is located within the 100-year flood hazard zone, solutions were not developed to address flooding problems in this area. Sample drainage projects for the area northeast of Highway 1 in Oceano are presented below. The alternatives have been organized by specific problem: 1) getting flow into Arroyo Grande Creek; 2) Highway 1 flooding; and, 3) residential flooding issues. A combination of the projects will be required to eliminate all of the drainage problems for the community. No one project can address all of the issues. The following alternatives are organized from downstream to upstream

1. Conveying Flow into Arroyo Grande Creek

No matter how much drainage infrastructure is installed in the community the underlying problem of how to get flow into Arroyo Grande Creek or to a terminal disposal facility during storms must be addressed. There are three basic solutions to this problem;

a) Dedicate significant tracks of land adjacent to the Creek as flood easements for a detention/retention basin. This land would flood and allow the runoff to slowly infiltrate into the soil or eventually be discharged in the Arroyo Grande Creek. This solution would likely mean that in wet years no agricultural production on the designated areas could occur during the winter months.

b) Build a pump station(s) near the levee of Arroyo Grande Creek and pump the ponded storm water flow in Arroyo Grande Creek (**Figure 6**). A detention basin /sump would need to be created adjacent to the pump(s). The size of these facilities would depend on the pump size and land area available.

c) The third solution would be to build a pressure storm drainage system. This system would consist of an open storm drainage system to a certain elevation, then it would become a pressurized system at a certain elevation. The probable area that could be drainage by a pressurized system is shown in **Figure 7.**

It should be noted that solutions 1 and 2 assume that that upstream runoff will be delivered to these facilities in an efficient manner. Upstream projects are discussed later in this memorandum.

Project 1A- Purchase Flood Easements on Farmland Adjacent to Arroyo Grande Creek. One of the basic problems with drainage in lower areas of Oceano is that when Arroyo Grande Creek is flowing high there is no way to get water into the levied channel. This project would involve purchasing flood easements on parcels adjacent to the Creek that would be designated flood areas. These areas would accept runoff from upstream areas and temporarily hold it until Arroyo Grande Creek flows subsided, then runoff would either flow by gravity into the creek or be pumped. The latter options are described in more detail below. The amount of land that would be needed would depend on the location of the land. Minor amounts of grading could be completed to increase the capacity of limited land area.

Project 1A Pluses and Minuses: The project would not necessarily involve the construction of new facilities, thus reducing costs. To a certain extent, these areas are already flooding, however any upstream storm drainage improvement would likely increase the depth and duration of flooding in these areas. The minuses would be that agricultural areas would be taken out of commission for a limited amount of time during the winter, growing crops would be damaged or destroyed, and easements would have to be acquired from private property owners who may or may not be receptive to the easement idea.

Project Cost: It is difficult to anticipate the cost of a negotiated flood easement but for the sake of this analysis it was assumed that a total of 5 acres would be needed and the easement would cost approximately $100,000 per acre for a total of $500,000.

Project 1B- Pump Station at Arroyo Grande Creek**:** During larger storm events, storm water pools behind the levee on the north bank of Arroyo Grande Creek. The installation of a single large sump pump near the intersection of River Ave and Creek Road would pump water pooled behind the levee into the creek channel. This component would also require the purchase of the parcel needed for the pump station

Project 1B Pluses and Minuses**:** There are no technical drawbacks to building a pump station at the levee other than the high initial cost of the project and annual maintenance. It is logical to construct adequate downstream drainage facilities first. A storm drainage infrastructure can then be built upstream to feed runoff to the downstream components. A pump station could be combined with numerous other projects to form an effective base on which to build the community drainage infrastructure. A pump station is a mechanical system and therefore would require annual periodic maintenance. Pumps would have to be tested and serviced, and sumps

de-silted periodically. The long-term cost of the pump station would have to be considered to determine the size of the pumping facilities as compared to the benefit of minimizing flooding.

Project Costs:

Table 3: Pump Station Costs

Pump Station	Install sump pump at River Ave and Creek Rd.	$750,000
Culvert diversion from Zone F to G	1,500 L.F.	$300,000
Land Acquisition	2.5 acres@$100,000/ac	$250,000
	Subtotal	**$1,300,000**
	Engineering/Design (20%)	$260,000
	Administrative/Environmental (60%)	$780,000
	Contingency (20%)	$260,000
	Total	**$2,600,000**

***Project 1C – Pressurized Storm Drainage Line*:** A pressurized storm drain line would require long runs with no inlets in order to achieve the hydraulic head necessary for pressurized flow and discharge in Arroyo Grande during high flow events. The pressurized drainage line would not be capable of draining the entire area, only the northeast portion of Zone G. The area that would be drained by the system is shown in **Figure 7.**

***Project 1C Pluses and Minuses*;** This system would only drain a portion of the community. The pipe run from the last inlet to Arroyo Grande Creek would be expensive, greatly reducing the cost benefit ratio of the project. Due to these considerations a pressure storm drain line does not seem to merit further consideration.

Project Costs:

Table 4: Pressure Storm Drain Cost

Item	Quantity	Cost	Total
Pressure Storm line	2600 LF	$225/LF	$585,000
Pressure Storm line- Laterals	4100	$165/LF	$676,500
Inlets	10	1,500/each.	$15,000
Outfall	1	Lump Sum	$75,000
		Subtotal	**$1,351,000**
		Engineering/Design (20%)	$270,200
		Administrative/Environmental (60%)	$810,600
		Contingency (20%)	$270,200
		Total	**$2,702,000**

2.

Highway 1 Drainage Problems

***Project 2a - Highway 1 Drainage Improvements at Paso Robles Drive*:** Runoff from upstream areas of Zones F is concentrated downstream, above Highway 1. Minimal relief and inadequate sizing and/or lack of drainage infrastructure in these downstream areas cause storm water to back up into the intersection of Paso Robles and Highway 1. The outlet for Zone F, is currently a subterranean drainage pipe beneath the railroad tracks and packaging plant. There are two options to improve drainage at this outlet; 1) replace the existing culvert and 2) divert storm water to the other outlet at 19th and Cienaga Street. The first option is straightforward and has been discussed previously. The second option would involve installing a drop inlet and storm drainpipe to move storm water southeast to the open channel at the other outlet. This option is cheaper and easier to construct then Option 1.Option 2 was addressed as part of the pump station alternative.

Highway 1 Drainage Improvements at 19th Street. In Zone G, pipes and drop inlets would be constructed in areas upstream of Highway 1. The construction of an overflow pipe from Zone F to Zone G is also proposed. Additionally, this component involves the construction of a subterranean drainage pipe to convey flows from Zone D to Zone G. The Rational Method was used to estimate the appropriate sizing for the subterranean drainage pipes and drop inlets in Zones D, F, and G (**See Appendix B**).

***Project 2a Pluses and Minuses*:** The pluses to improving the drainage in and around the Highway 1 are that the worst flooding areas in the community will be eliminated and traffic safety will be improved. However, by improving the drainage in this area it may cause a slight increase in flooding of the downstream area. Caltrans may participate in funding this alternative because it would benefit flooding conditions on a State right-of-way

3. Project Costs:

Table 5: Highway 1 Drainage Improvement Costs

Project Description	Est. Quantity	Unit	Unit Price	Total
Zone F Culverts Bore and Jack	650	L.F.	$ 850.00	$ 552,500.00
Zone G Channel Improvements	2,200	L.F.	$ 250.00	$ 550,000.00
			Subtotal	**$ 1,102,500**
			25% Contingency	$ 275,625
			Engineering Design (20%)	$ 220,500
			Administrative/environmental (60%)	$ 661,500
			Total	**$ 2,260,125**

4. Residential Flooding Problems

Project 3a- Storm Drains Curbs and Gutters
This project is made up of two components: (1) curbs and gutters, and (2) a subterranean storm drain system.

***Curbs and Gutters*:** Currently, many roadway shoulders in the Oceano Community are bare, allowing runoff from impervious surfaces to flow freely onto residential lots. Low spots on residential lots collect storm runoff and cause localized flooding in many areas of the community. The construction of a network of curbs and gutters in the Oceano Community would function to restrict most runoff to the streets and away from residential lots. Approximately 65,865 feet of new curb and gutter are needed to construct a network of curbs and gutters in the seven drainage zones.

Subterranean Storm Drainage Lines: In order to install curbs and gutters some type of collection and conveyance system will be needed. A typical subterranean storm system is proposed. This system would consist of a mainline and several trunk lines joining to it. The general concept is laid out in **Figure 8**. This system would collect runoff in Zones D, F, and G and deliver it to one of the two outlet locations near Highway 1. This project does not consider the capacity of the open channel under or downstream of Highway 1, it does however assume the upgrade of an existing 30 inch line along 22nd street.

Street Reconstruction: In order to get positive flow along the new gutters leading to the new drop inlets, portions of the existing roadway may need to be reconstructed. This would entail raising or lowering the flowline at the edge of pavement. This may necessitate that the roadway crown and other portions of roadway section be reconstructed.

Project 3a Pluses and Minuses: This project is a plus in many ways. First, it greatly increases the usability of the community streets by providing sidewalk and formal street infrastructure. Secondly, it provides an organized way to collect and convey runoff throughout the whole community. This project will likely eliminate the flooding that has been reported in residential structures along Ocean and Air Park Drive. However, this project by itself would likely increase flooding in the Highway 1 area as well as in the agricultural

fields downstream. Additionally, the overall cost is a negative aspect of this project. Currently, only minor damage occurs during flood events. The cost of these damages does not likely exceed the cost of the overall project.

5. Project Cost Estimates;

Table 6: Zone G Curb/Gutter and Storm Drain Cost

Item Description	Est. Quantity	Unit	Unit Price	Total
Curbs/gutters Straight, 6" high	37,125	L.F.	$ 12.00	$ 445,500
Main Drainage Lines	3,100	L.F.	$ 250.00	$ 775,000
Branch Drainage Pipes	4,100	L.F.	$ 200.00	$ 820,000
Feeder Pipes	640	L.F.	$ 180.00	$ 115,200
Roadway Reconstruction	Estimate			$ 650,000
			Subtotal	**$ 2,805,700**
			25% Contingency	$ 701,425
			Engineering Design (20%)	$ 561,140
			Administrative/environmental (50%)	$ 1,402,850
			Total	**$ 5,471,115**

Table 7: Zone F Curb/Gutter and Storm Drain Cost

Item Description	Est. Quantity	Unit	Unit Price	Total
Curbs/gutters Straight, 6" high	13,330	L.F.	$ 12.00	$ 159,960
Main Drainage Lines	600	L.F.	$ 250.00	$ 150,000
Branch Drainage Pipes	1,500	L.F.	$ 200.00	$ 300,000
Feeder Pipes	200	L.F.	$ 180.00	$ 36,000
Roadway Reconstruction	Estimate			$ 250,000
			Subtotal	**$ 895,960**
			Contingency (25%)	$ 223,990
			Engineering Design (20%)	$ 179,192
			Administrative/environmental (50%)	$ 447,980
			Total	**$ 1,747,122**

Note: higher unit costs were used pipe systems because of need for installation of manholes and the uncertainty of roadway work associated with the installation of the local storm drainage network. Also additional pipe length may be needed in some areas. These are planning level cost estimates and could be refined as more detailed engineering design is accomplished.

***Project Alternative 3b- Subsurface Infiltration Chambers*:** Localized infiltration basins would allow runoff to be detained and infiltrate into the underlying sandy soils as well as reducing runoff into downstream drainage system. Parcel investigations determined that there are no County or community owned parcels in the areas that need storm water

management. In order to create new regional or local infiltration basins, it is likely that private property would have be purchased. This would mean removing buildings and other improvements on the site. If these properties were purchased some type of duel use as parks or play areas could be possibly be created. This potential solution will not be investigated seriously until the local community shows potential support for it.

Another potential option is to use subsurface infiltration chambers. These chambers can be installed under the existing roadway alignment. Some additional information on these systems is presented in Appendix C of this technical memorandum. These systems could be installed in smaller isolated areas within the community. Preferably, these infiltration chambers would be constructed on land owned by SLO County and/or the Community Services District (CSD). This would likely mean that the system would be constructed in County road right-of-way. Figure 9 shows several locations where these systems could potentially be used. These systems can be used on an individual property basis however implementing these systems on a property by property basis will address the community drainage problems as a whole.

***Project 3b Pluses and Minuses*:** One of the main advantages of the subsurface infiltrator system is that it can be built in stages. When areas get curbs and gutters this system can be installed without greatly impacting receiving areas downstream. The systems can also be tailored in size depending on the area of land contributing runoff to the infiltration system. The draw back is that these systems need periodic maintenance and are most likely cost prohibitive for handling storm events larger than the 25-year event. Additionally, concentrating groundwater infiltration in certain areas could potentially impact adjacent properties by locally elevating ground water levels. This issue would have to be investigated a project specific basis.

Project Costs: The systems runabout $150 per per lineal-foot, plus any roadway repair or reconstruction costs. Generally, about 50 to100 lineal feet of infiltrating systems are needed per acre of drainage area. Length depends on protection levels and underlying soil properties. The Holden Road area receives runoff from about 10 to 13 acres. Thus, fixes in this area would range between $30,000 and $60,000 plus roadway repairs, curbs and gutters, and catch basins. For planning purposes, assume that the cost of the system would be $10,000 to $15,000 per acre of drainage area plus the cost of the collection system (curbs, gutters etc.)

Table 8: Subsurface Infiltration Costs

Project Description	Unit Price	Total
Holden Avenue	Lump Sum	$ 45,000
La Verne Street	Lump Sum	$ 45,000
16th Street	Lump Sum	$ 25,000
Roadway Repairs	Lump Sum	$ 80,000
	Subtotal	**$ 195,000**
	20% Contingency	$ 39,000
	Engineering Design (20%)	$ 39,000
	Administrative/environmental (60%)	$ 117,000
	Total	**$ 390,000**

A cost summary table of each of the proposed projects is shown below.

Table 9. Summary Cost Table

Proposed Project	Estimated Cost
Project 1A- Flood Easements	$500,000
Project 1B - Pump Station	$2,600,000
Project 1C - Pressure Storm Drain	$2,702,000
Project 2A - Highway 1 Improvements	$2,260,125
Project 3A - Zone G	$5,471,115
Project 3A - Zone F	$1,747,122
Project 3B – Infiltration Systems	$390,000

G. THE COMPLETE DRAINAGE SOLUTION

Each of the proposed projects will not completely solve the drainage problems within the Oceano Community. The recommended plan of action is to improve drainage in downstream areas adjacent to Arroyo Grande Creek then work upstream on each problem. Generally, a complete solution will entail managing ponded water adjacent to the Arroyo Grande Channel, improving the conveyance of the drainage system around Highway 1 and installing a drainage system in the residential areas. There maybe other potential combinations of solutions however, these combinations give a general idea of the overall cost to the community. The cost of putting these solutions together is summarized below.

Table 10: Complete Solution Costs

Scenario 1 - Project 1A, 2A, 3A, 3B	$9,978,362
Scenario 2 - Projects 1B, 2A, 3A, 3B	$12,468,362

H. CONCLUSIONS

Nuisance drainage and flooding problems were encountered at several locations within the Oceano Community. These problems can generally be attributed to the lack of an organized curb and gutter system throughout much of the community and the minimal relief throughout most of the community. This technical memorandum is intended to define the problems and discuss potential alternatives to reduce and repair the identified problems. Many of the alternatives need further investigation and discussion with the community and the County.

I. Recommendations

The following recommendations are made as follow up:

1). Consider forming a special assessment district to fund a comprehensive curb and gutter drainage system and/or any community wide drainage solution.

2). Continue implementing County curb and gutter policy, however, waivers should be should be considered if the installation leads to a concentration of flooding onto lower lying properties.

3). The lead agency should coordinate with Caltrans and the Union Pacific Rail Road regarding improvements to the drainage in and around State Highway 1.

2) Appendix A- Rational Method Calculations

SLO County Drainage Study and Flood Control Project
Rational Method Calculations for Oceano

Zone G

Area G-0

Freq.	Duration	C	I		Ca	A	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**30**	21
50	30	0.55	43	1.69	1.2	**30**	34
100	30	0.55	48	1.89	1.25	**30**	39

Area G-1

Freq.	Duration	C	I		Ca	A	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**41.3**	30
50	30	0.55	43	1.69	1.2	**41.3**	46
100	30	0.55	48	1.89	1.25	**41.3**	54

Area G-2

Freq.	Duration	C	I		Ca	A	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**43.4**	31
50	30	0.55	43	1.69	1.2	**43.4**	48
100	30	0.55	48	1.89	1.25	**43.4**	56

Area G-3

Freq.	Duration	C	I		Ca	A	Q	Total Q
yr	min		mm/hr	in/hr		**ac**	cfs	cfs
10	30	0.55	33	1.30	1	**46.1**	33	115
50	30	0.55	43	1.69	1.2	**46.1**	52	146
100	30	0.55	48	1.89	1.25	**46.1**	60	170

Total Area of Zone G= **160.8**

Zone F

Freq.	Duration	C	I		Ca	A	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**35.9**	26
50	30	0.55	43	1.69	1.2	**35.9**	40
100	30	0.55	48	1.89	1.25	**35.9**	47

Zone D

Freq.	Duration	C	I		Ca	A	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**33.1**	24
50	30	0.55	43	1.69	1.2	**33.1**	37
100	30	0.55	48	1.89	1.25	**33.1**	43

Appendix B - Hydraulic Calculations

SLO County Drainage Study and Flood Control Project

Rational Method Calculations for Oceano

Zone G

Area G-0

Freq.	Duration	C	I		Ca	**A**	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**30**	21
50	30	0.55	43	1.69	1.2	**30**	34
100	30	0.55	48	1.89	1.25	**30**	39

Area G-1

Freq.	Duration	C	I		Ca	**A**	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**60.7**	43
50	30	0.55	43	1.69	1.2	**60.7**	68
100	30	0.55	48	1.89	1.25	**60.7**	79

Area G-2

Freq.	Duration	C	I		Ca	**A**	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**24**	17
50	30	0.55	43	1.69	1.2	**24**	27
100	30	0.55	48	1.89	1.25	**24**	31

Area G-3

Freq.	Duration	C	I		Ca	**A**	Q	Total Q
yr	min		mm/hr	in/hr		**ac**	cfs	cfs
10	30	0.55	33	1.30	1	**46.1**	33	115
50	30	0.55	43	1.69	1.2	**46.1**	52	146
100	30	0.55	48	1.89	1.25	**46.1**	60	170

Total Area of Zone G= **160.8**

Zone F

Freq.	Duration	C	I		Ca	**A**	Q
yr	min		mm/hr	in/hr		**ac**	cfs

10	30	0.55	33	1.30	1	**35.9**	26
50	30	0.55	43	1.69	1.2	**35.9**	40
100	30	0.55	48	1.89	1.25	**35.9**	47

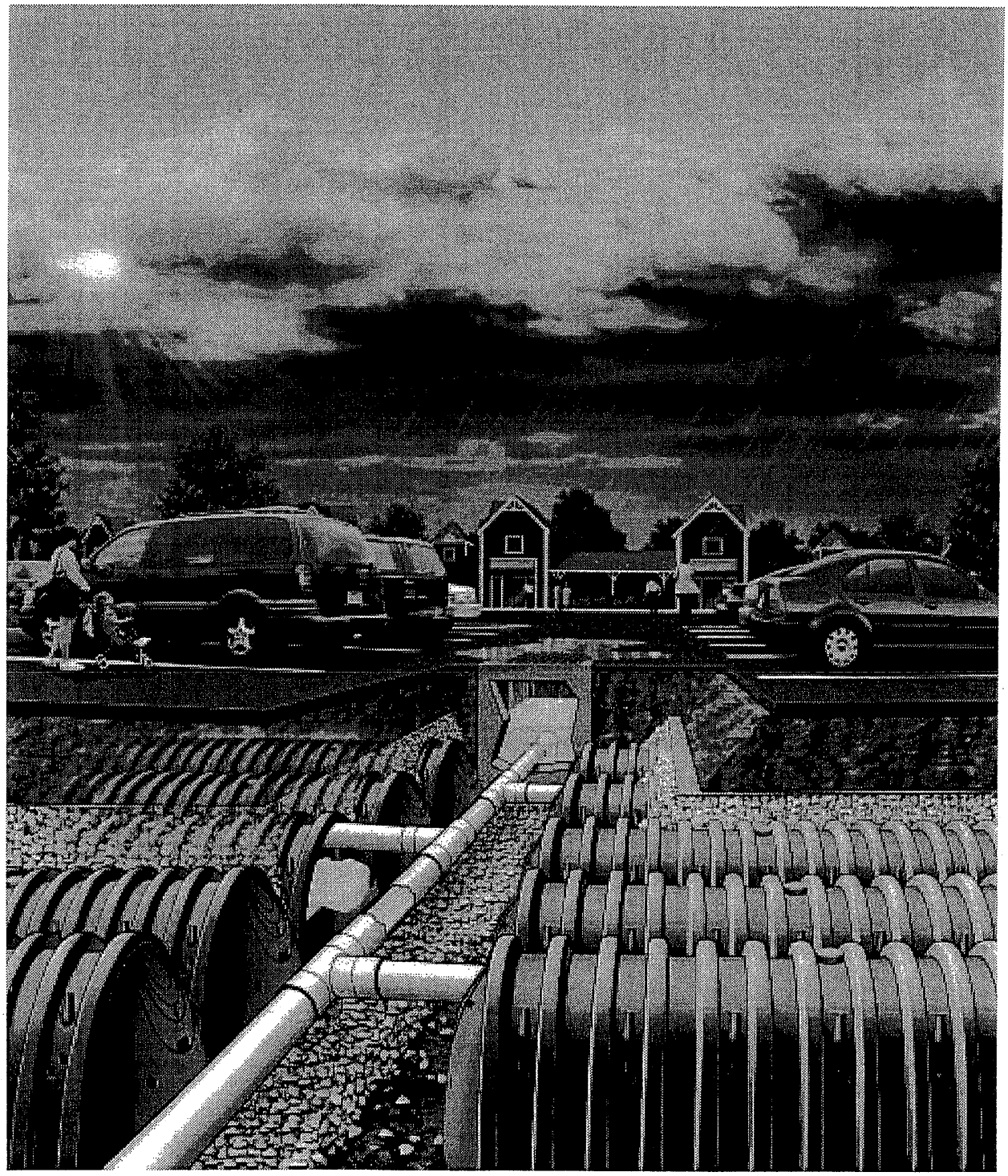
Zone D

Freq.	Duration	C	I		Ca	**A**	Q
yr	min		mm/hr	in/hr		**ac**	cfs
10	30	0.55	33	1.30	1	**33.1**	24
50	30	0.55	43	1.69	1.2	**33.1**	37
100	30	0.55	48	1.89	1.25	**33.1**	43

StormTech™

A Subsidiary of Infiltrator Systems Inc.

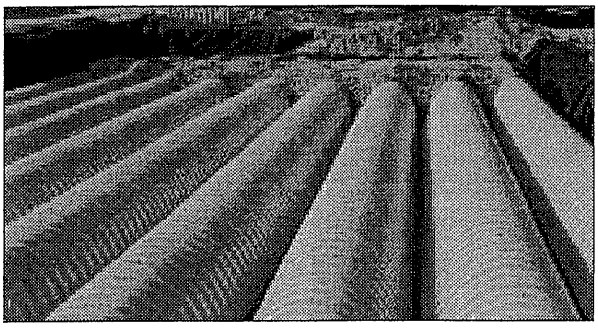
Environmental Solutions for Stormwater Management℠



Design Manual

StormTech™ Chamber System for Stormwater Management

1.0 Introduction



1.1 INTRODUCTION

StormTech's stormwater management systems allow stormwater professionals to create more profitable, environmentally sound developments. Compared with other subsurface systems, StormTech systems offer lower overall installed cost, superior design flexibility and enhanced long-term performance.

StormTech is a wholly owned subsidiary of Infiltrator Systems Inc., the world leader in subsurface chamber technology. StormTech was founded in 1998 to provide environmental solutions for stormwater management. StormTech utilized Infiltrator Systems' 16 years of experience in the design and manufacture of subsurface chambers, and invested over $7.5 million and four years to develop the SC Series of stormwater chambers. These innovative products exceed the rigorous requirements of the stormwater industry.

1.2 THE NEW STANDARD IN STORMWATER MANAGEMENT

The advanced design of StormTech's SC Chamber Series was created by implementing an aggressive research, development, design and manufacturing protocol. StormTech chamber products establish a new standard in stormwater management through:

- Collaborations with experts in the field of buried plastic structures and polyolefin materials
- The development and utilization of new testing methods and proprietary text fixtures
- The use of thermoformed prototypes to verify engineering models, perform in-ground testing and install observation sites
- The investment in custom designed injection molding equipment
- The utilization of polypropylene as a manufacturing material
- The design of molded-in features not possible with traditional thermoformed chambers

Section 3.0 of this design manual, *Structural Capabilities*, provides a detailed description of the research, development and design process.

Many of StormTech's unique chamber features can benefit a site developer, stormwater system designer, and installer. Where applicable, StormTech's Product Specifications are referenced throughout this design manual. If StormTech's unique product benefits are important to a stormwater system's design, then consider including the applicable StormTech product specifications on the site plans. This can prevent substitutions with inferior products. Refer to Section 13.0, *StormTech Product Specifications.*

1.3 TECHNICAL SUPPORT FOR PLAN REVIEWS

StormTech's in-house technical support staff is available to review proposed plans that incorporate StormTech chamber systems. They are also available to assist with plan conversions from existing products to a StormTech system. Not all plan sheets are necessary for StormTech's review. Required sheets include plan view sheet(s) with final elevations, any detail sheets with cross sections of the stormwater system including catch basins and any landscape details.

It is recommended that the following items are included in project plans: StormTech chamber system General Notes, applicable StormTech chamber illustrations and StormTech chamber system Product Specifications. These items are available in various formats and can be obtained by contacting StormTech at **1-888-892-2694** or may be downloaded at **www.stormtech.com.**

StormTech's plan review is limited to the sole purpose of determining whether plans meet StormTech chamber systems' minimum requirements. **It is the ultimate responsibility of the design engineer to assure that the stormwater system's design is in full compliance with all applicable laws and regulations.** StormTech products must be designed and installed in accordance with StormTech's minimum requirements. Failure to do so will void the limited warranty.

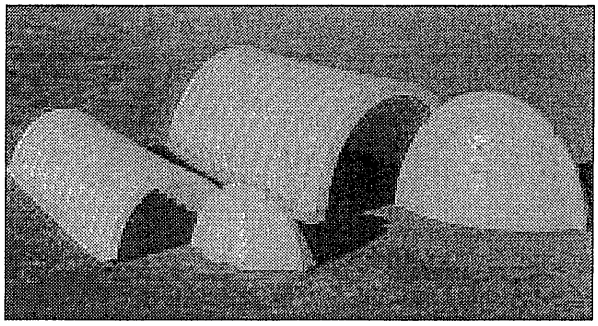
SEND PLANS TO:

StormTech Inc., Plan Review, 6 Business Park Road, P.O. Box 619, Old Saybrook, CT 06475 E-mail: techinfo@stormtech.com. File size should not exceed 2MB. Plan reviews are typically completed within three business days upon receipt. The engineer can expect a written response of the review to follow.

2.1 PRODUCT APPLICATIONS

StormTech chamber systems may function as stormwater detention, retention, first-flush storage, or some combination of these. The StormTech chambers can be used for commercial, municipal, industrial, recreational, and residential applications.

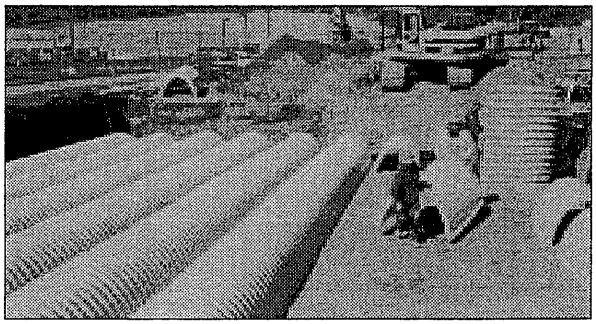
One of the key advantages of the StormTech chamber system is its design flexibility. Chambers may be configured into beds or trenches of various sizes or shapes. They can be centralized or decentralized, and fit on nearly all sites. Chamber lengths enhance the ability to develop on both existing and pre-developed projects. The systems can be designed around utilities, natural or manmade structures and any other limiting boundaries easily and efficiently.



2.2 CHAMBER SELECTION

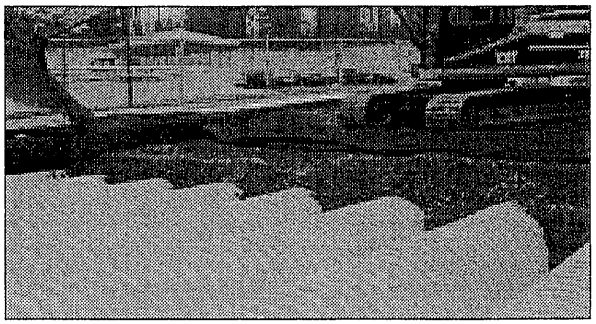
StormTech currently offers two chamber sizes for stormwater management. These chambers have been designed to optimize and balance storage volumes with respect to depth and area constraints.

Primary considerations when selecting between the SC-740™ and SC-310™ chambers are the depth to groundwater, available area for subsurface storage and outfall restrictions.



The StormTech SC-740 chamber shown in **Figure 1** on page 4 optimizes storage volumes in relatively small footprints. By providing 2.2 ft^3 / ft^2 (minimum) of storage, the SC-740 chambers can minimize excavation, backfill and associated costs.

The StormTech SC-310 chamber shown in **Figure 2** on page 4 is an ideal solution for stormwater systems requiring low rise and wide span solutions. This low profile chamber allows the storage of large volumes, 1.3 ft^3/ft^2 (minimum), at minimum depths.
Product Specifications: 2.2 and 2.5

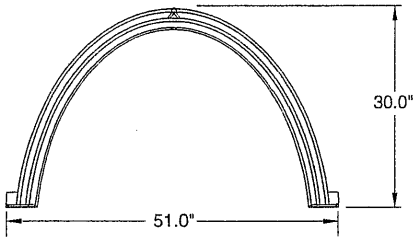


2.0 Product Information

Figure 1
StormTech SC-740 Chamber (not to scale)

Nominal Chamber Specifications

Size (W x H x Installed L)	51.0" x 30.0" x 85.4"
Chamber Storage	45.9 Cubic Feet
Minimum Installed Storage*	74.9 Cubic Feet
Weight	75 Lbs.



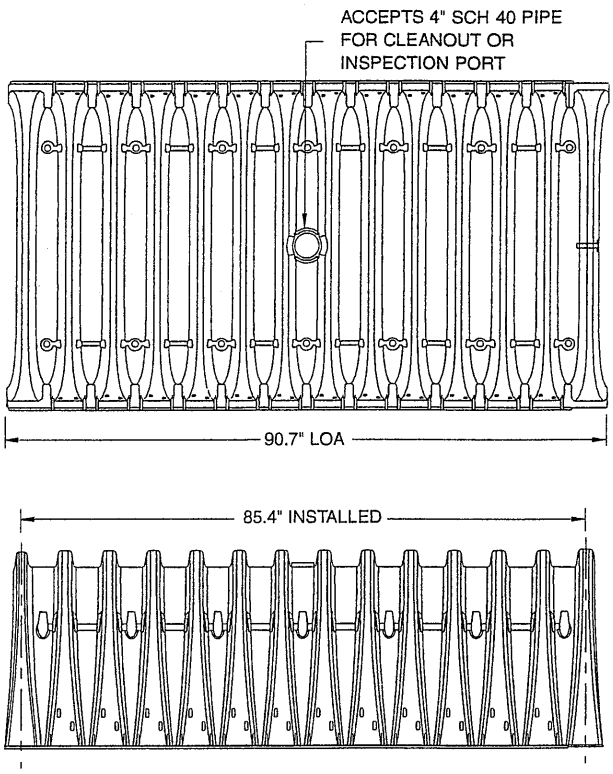
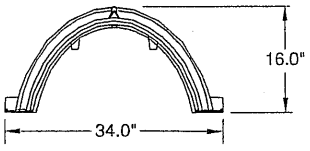
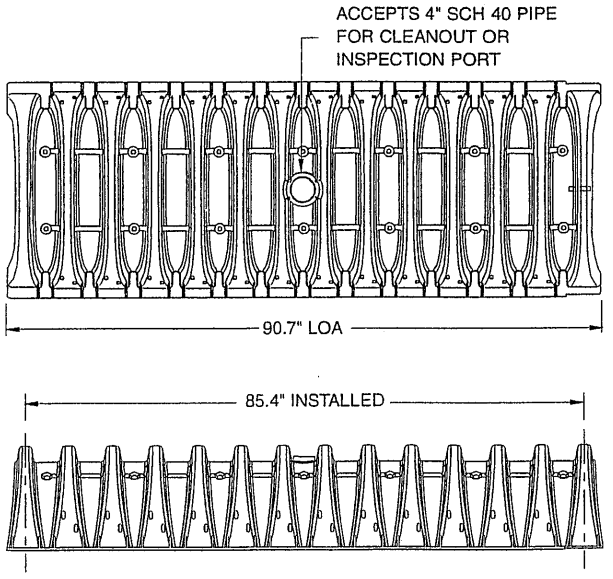


Figure 2
StormTech SC-310 Chamber (not to scale)

Nominal Chamber Specifications

Size (W x H x Installed L)	34.0" x 16.0" x 85.4"
Chamber Storage	14.7 Cubic Feet
Minimum Installed Storage*	31.0 Cubic Feet
Weight	35 Lbs.





*This assumes a minimum of 6-inches of stone below, above and between chamber rows.

2.1 STORMTECH CHAMBERS

StormTech's chamber systems have unique features to improve site optimization and reduce product waste. The SC-740 and SC-310 chambers can be cut at the job site in approximately 6.5-inch increments to shorten a row's length. Designing and constructing chamber rows around site obstacles is easily accomplished by including specific cutting instructions or a well placed "cut to fit" note on the design plans. The last chamber of a row can be cut in any of its corrugation's valleys. An end cap placed into the trimmed corrugation's crest completes the row. If of practical length, the trimmed off piece of a StormTech chamber may then be used to start the next row. See **Figure 3**.

To assist the contractor, StormTech's chambers are molded with simple assembly instructions and arrows that indicate the direction to build rows. Rows are formed by overlapping the next chamber's "Start End" corrugation with the previously laid chamber's end corrugation. Two people can safely and efficiently form rows of chambers without complicated connectors, special tools or heavy equipment.

Product Specifications: 2.2, 2.4, 2.9 and 3.2

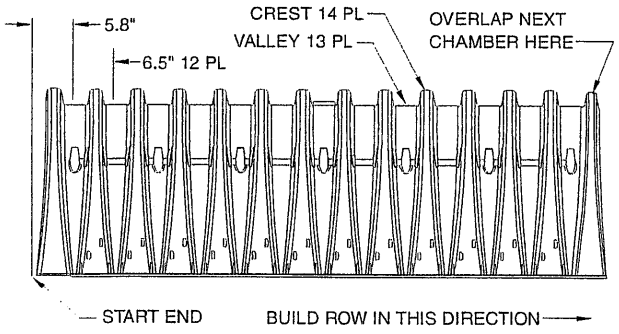
2.2 STORMTECH END CAPS

The StormTech end cap has features which make the chamber system simple to design, easy to build and more versatile than other products. StormTech end caps can be easily secured within any corrugation's crest. A molded-in handle makes attaching an end cap a one-man operation. Tools or fasteners are not required.

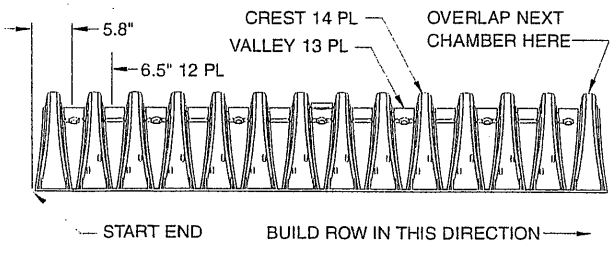
StormTech end caps are required at each end of a chamber row to prevent stone intrusion (two per row). The SC-740 end cap will accept up to a 24-inch inlet pipe. The SC-310 end cap will accept up to a 12-inch inlet pipe. To aid contractors, inlet pipe cutting guides and a blade-starting slot are molded into the end caps at the highest possible inverts. Inlet pipe penetrations may also be cut below the guides to suit the design. See **Figure 4**.

Product Specifications: 3.1, 3.2, 3.3 and 3.4

Figure 3
Distance Between Corrugations (not to scale)

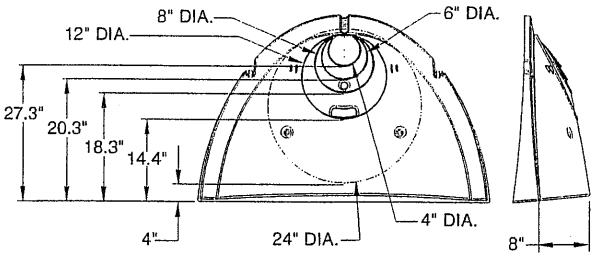


SC-740 chamber

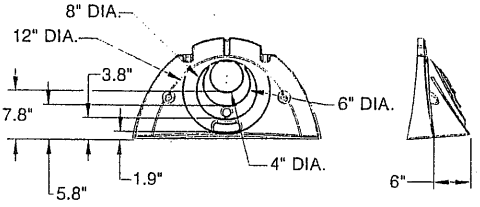


SC-310 chamber

Figure 4
Chamber End Caps (not to scale)

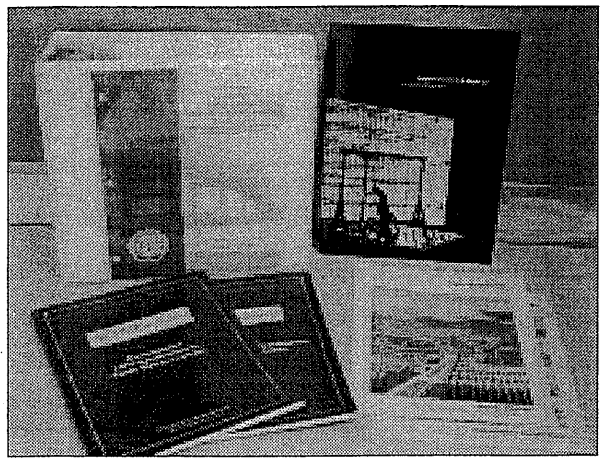


SC-740 end cap



SC-310 end cap

3.0 Structural Capabilities

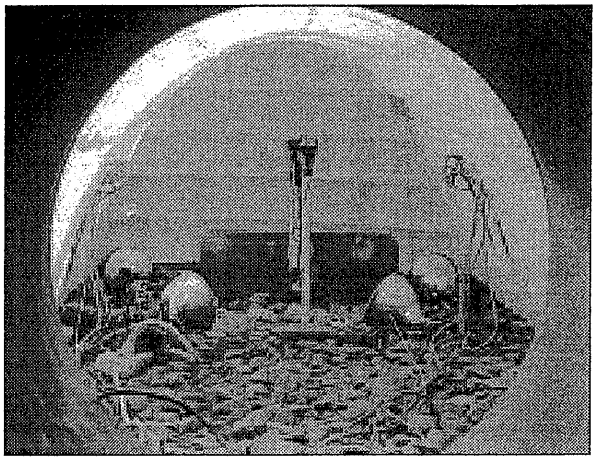


3.1 STRUCTURAL SC SERIES DESIGN APPROACH

StormTech's chambers are designed to exceed AASHTO's recommended design factors for Earth Loads and HS-20 live loads, with consideration for impact and multiple presences, when installed per StormTech's minimum requirements. Structural performance of StormTech's chambers were assessed utilizing current AASHTO procedures for the design of profile wall thermoplastic culverts (AASHTO LRFD Bridge Design Specifications with Interim Specifications through 2001).

Computer models of the chambers under shallow and deep conditions were developed. Utilizing design forces from the computer models, chamber sections were evaluated using AASHTO procedures that consider thrust and moment, and check for local buckling capacity. The procedures also considered the time-dependent strength and stiffness properties of polypropylene.

These procedures were developed in a research program conducted by the National Cooperative Highway Research Program (NCHRP) for AASHTO, and published as NCHRP Report 438 Recommended LRFD Specifications for Plastic Pipe and Culverts.
Product Specifications: 2.12

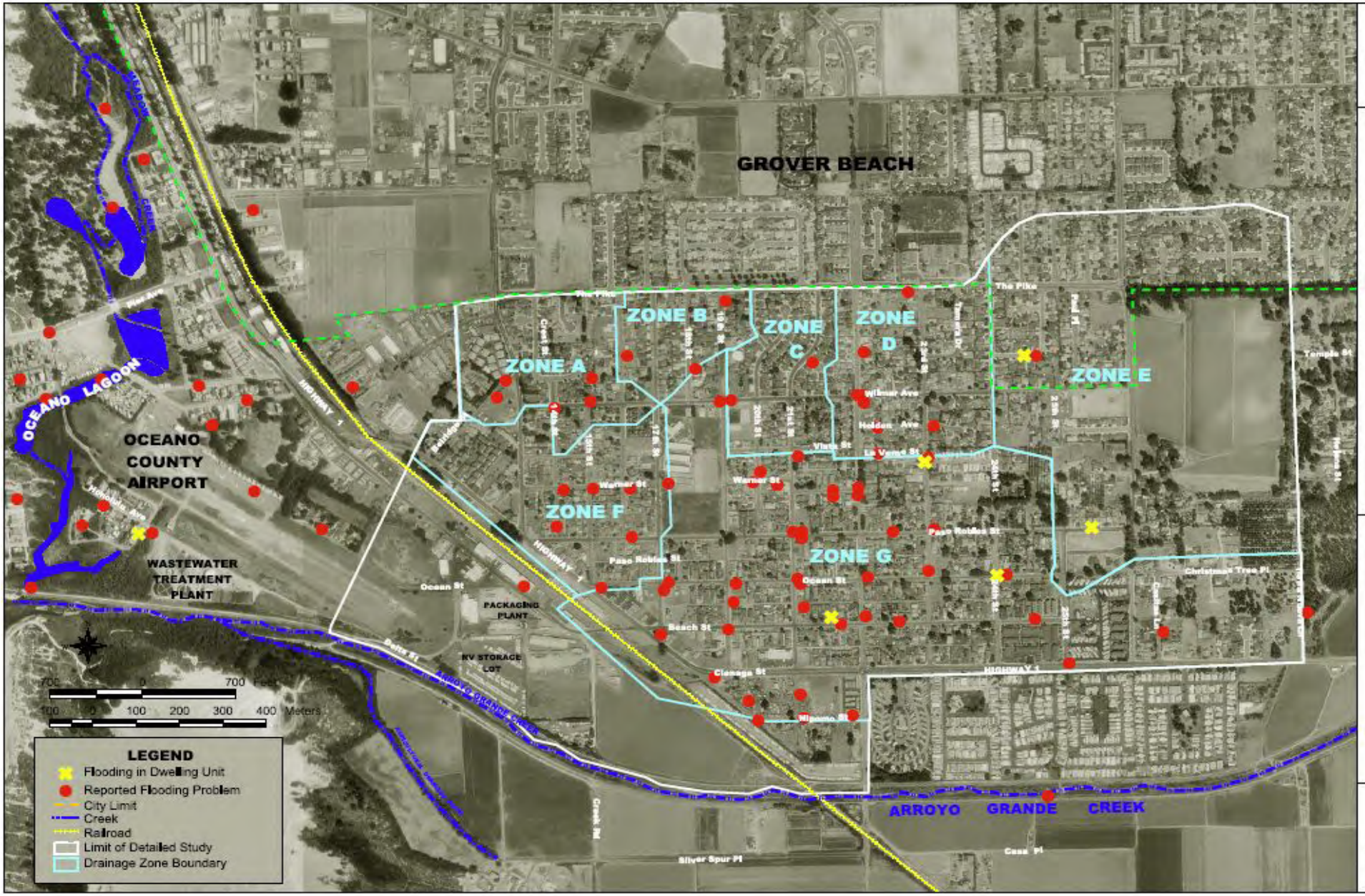


3.2 FULL SCALE TESTING

After developing the StormTech chamber designs, the chambers were subjected to rigorous full-scale tests. The test programs verified the safety of the designs by subjecting the chambers to more severe load conditions than anticipated during service life. Capacity under live loads and deep fill was investigated by conducting tests with a range of cover depths.

3.3 INDEPENDENT EXPERT ANALYSIS

StormTech worked closely with the consulting firm Simpson Gumpertz & Heger Inc. (SGH) to develop and evaluate the SC-740 and SC-310 chamber designs. SGH has world-renowned expertise in the design of buried drainage structures. The firm was the principal investigator for the NCHRP research program that developed the structural analysis and design methods recently adopted by AASHTO for thermoplastic culverts. SGH conducted design calculations and computer simulations of chamber performance under various installation and live load conditions. They worked with StormTech to design the full-scale test programs to verify the structural capacity of the chambers. SGH also observed all full-scale tests and inspected the chambers after completion of the tests.



COUNTY OF SAN LUIS OBISPO

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

RESIDENT COMPLAINTS

Based on 2001 Community Survey

FIGURE 1

QUESTA ENGINEERING CORP

Project No: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
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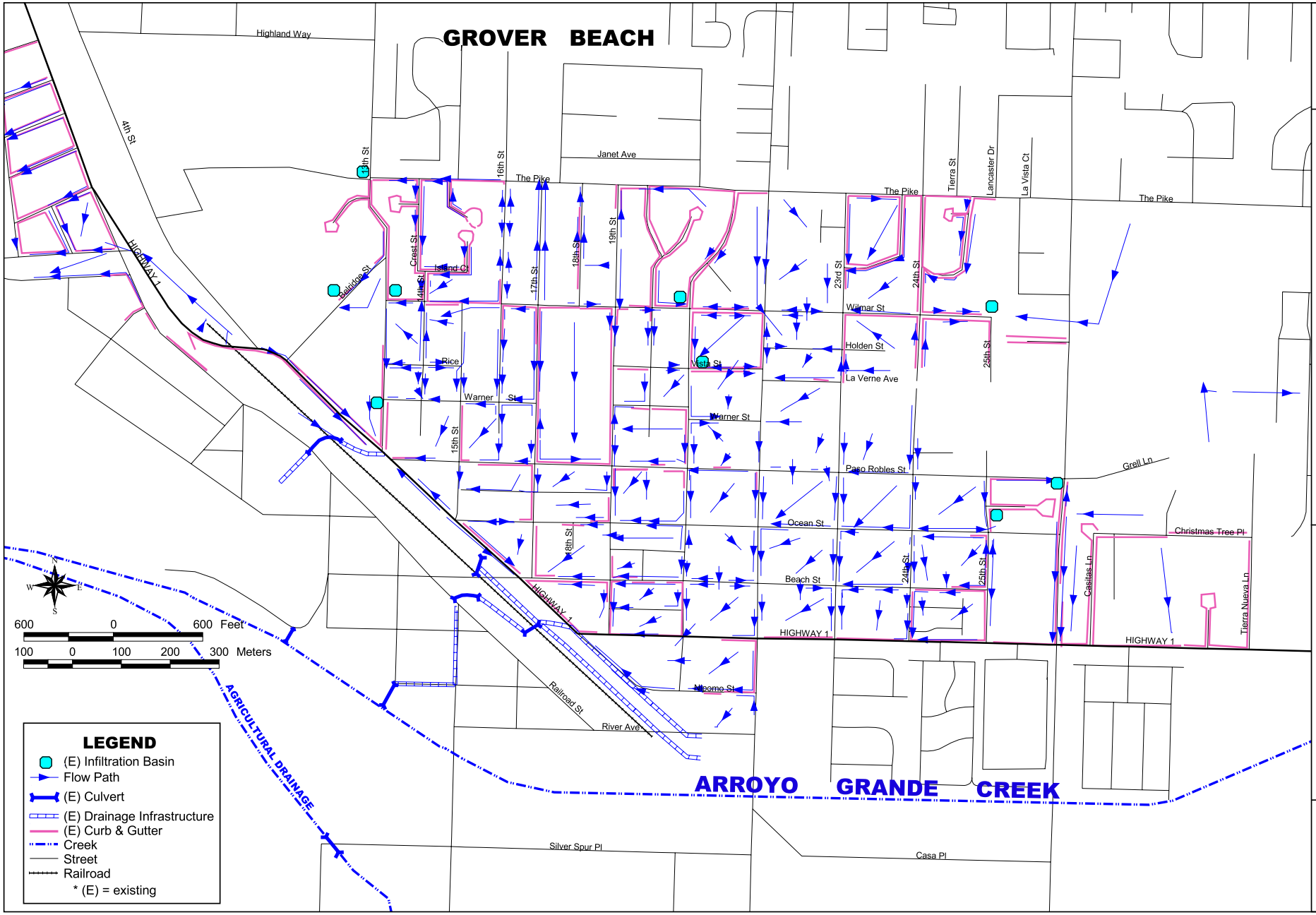

FIGURE 2

COUNTY OF SAN LUIS OBISPO
COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

FLOW DIRECTION AND
EXISTING DRAINAGE INFRASTRUCTURE

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
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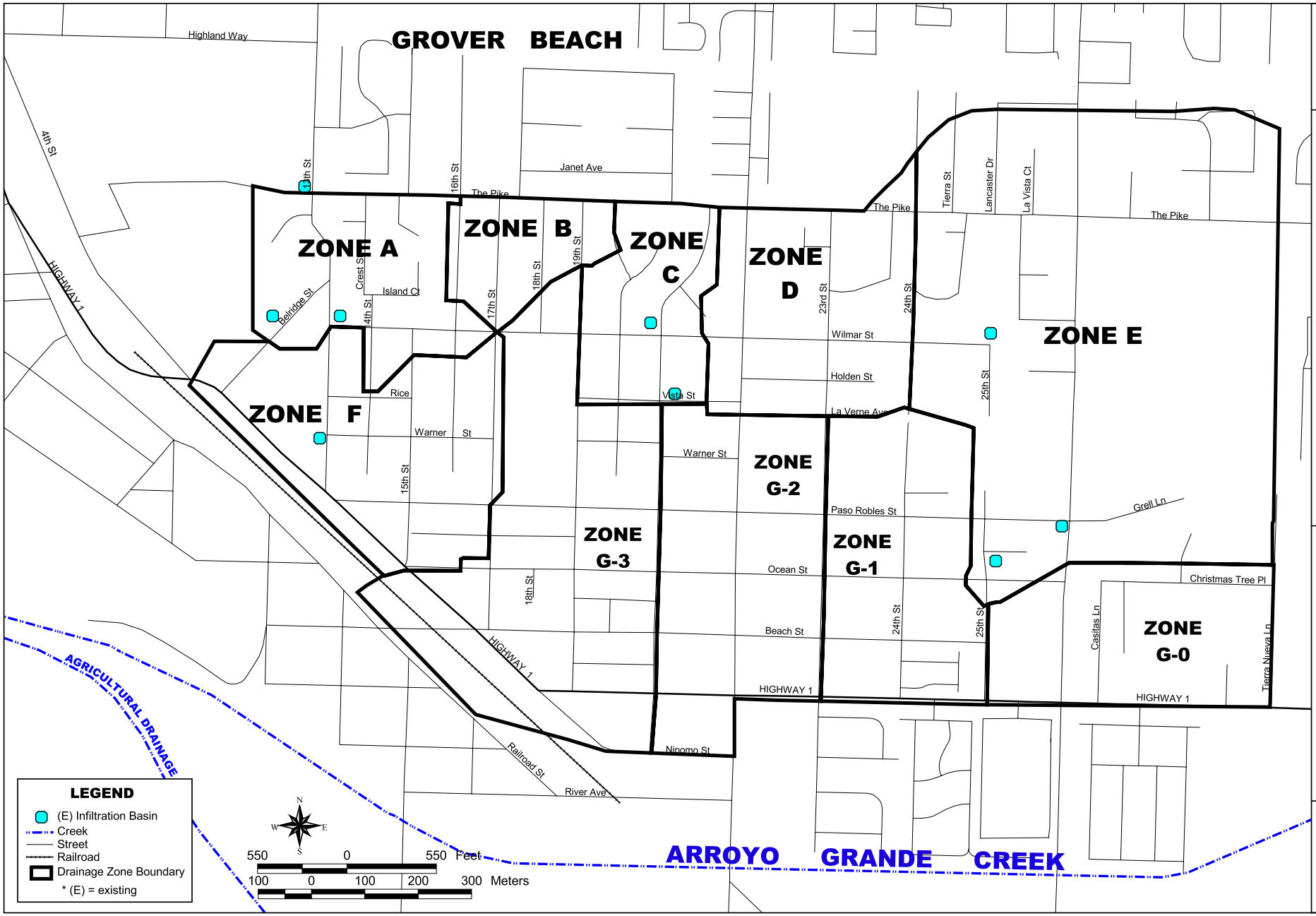

FIGURE 3

COUNTY OF SAN LUIS OBISPO

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

DRAINAGE ZONES

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 6 Aug. 2003
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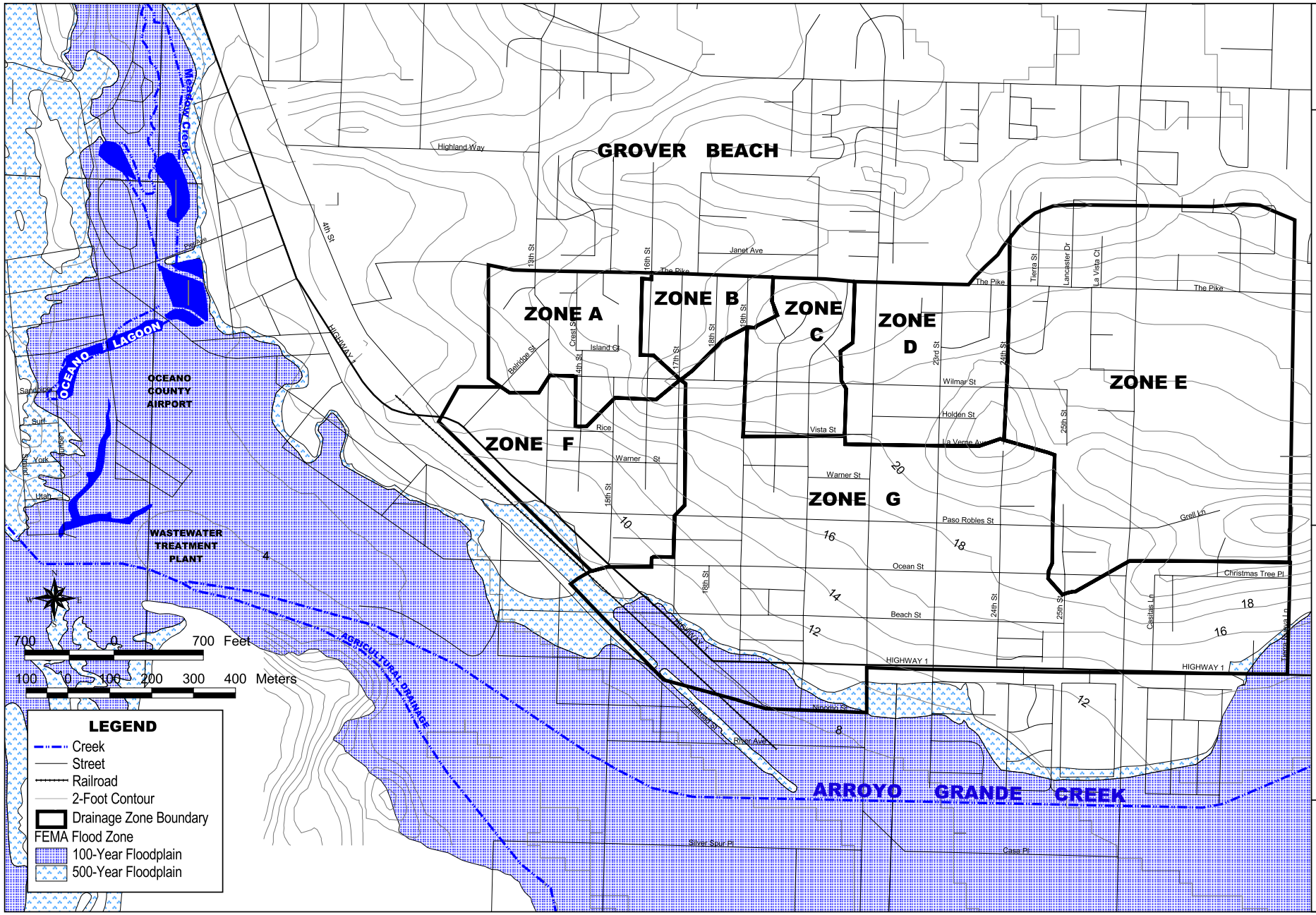


FIGURE 4

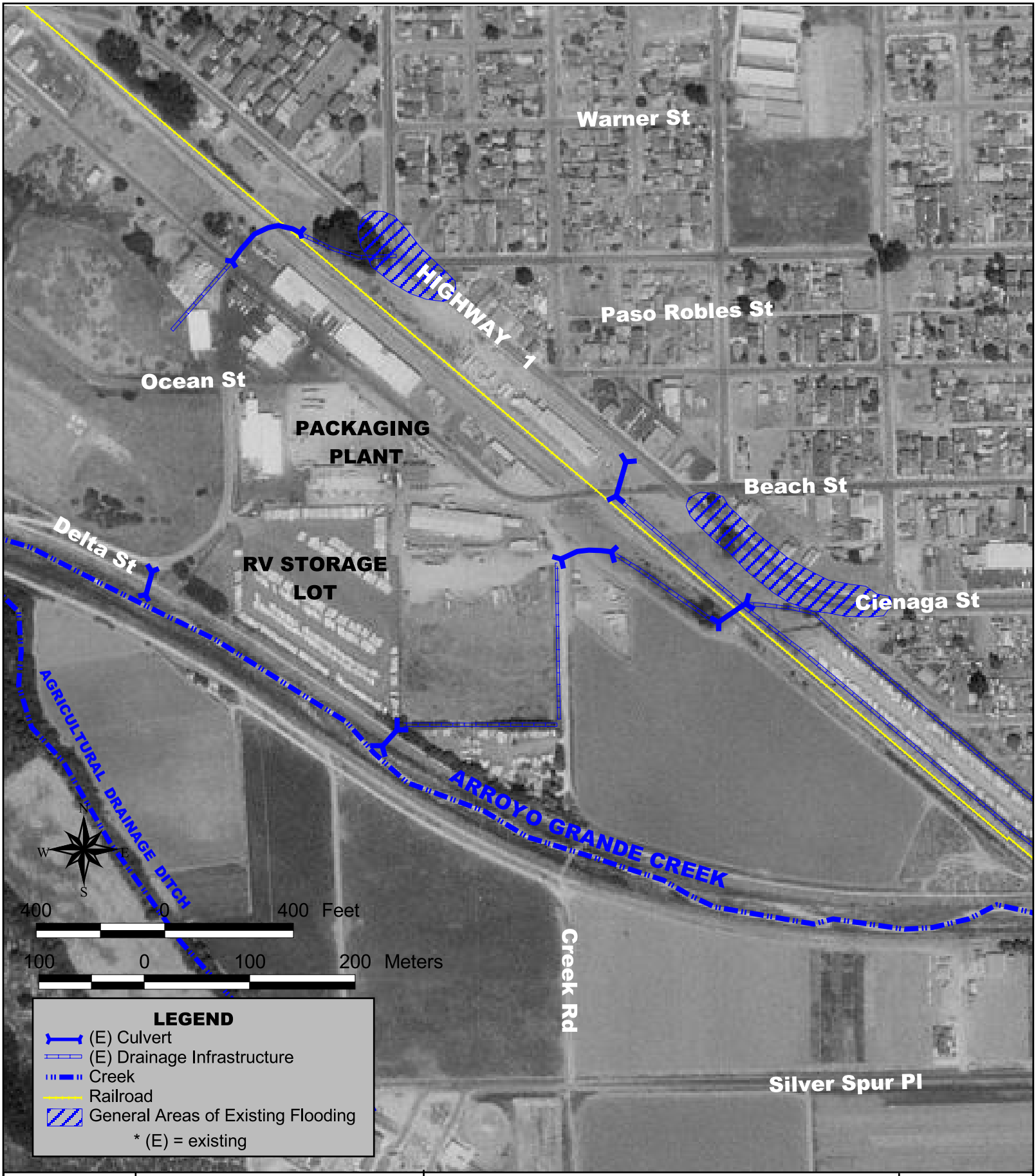
COUNTY OF SAN LUIS OBISPO

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

FEMA FLOOD ZONES

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176



Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP
Civil Environmental & Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

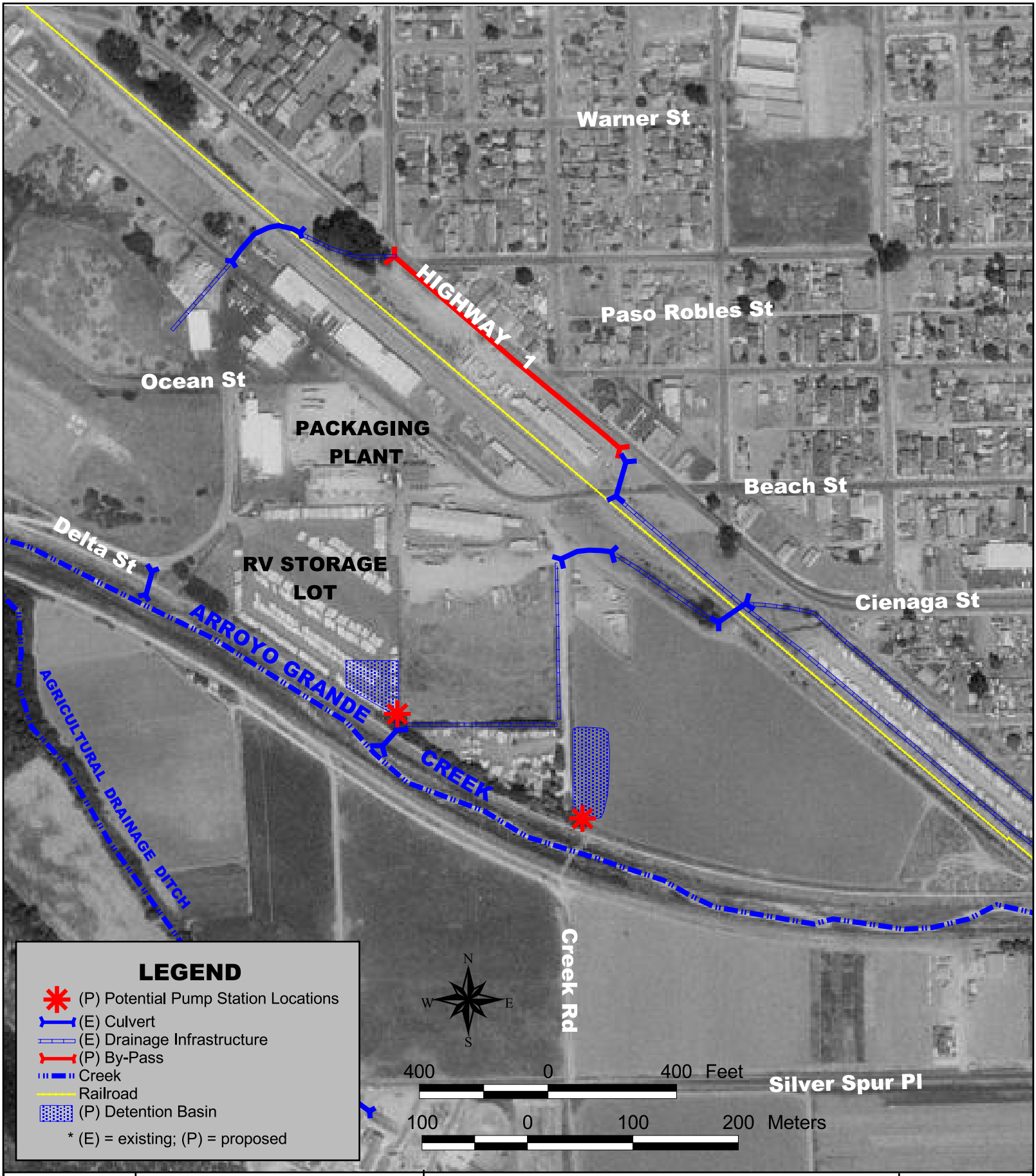
COUNTY OF SAN LUIS OBISPO

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

EXISTING INFRASTRUCTURE AND AREAS OF FLOODING

FIGURE

5



Project No.: 220176
Project Name: SLO County H&H
Date: 23 Feb. 2003
Path: Z:\2001\210176

QUESTA ENGINEERING CORP
Civil Environmental & Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

COUNTY OF SAN LUIS OBISPO

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

PROPOSED INFRASTRUCTURE
PROJECT 1B

FIGURE

6

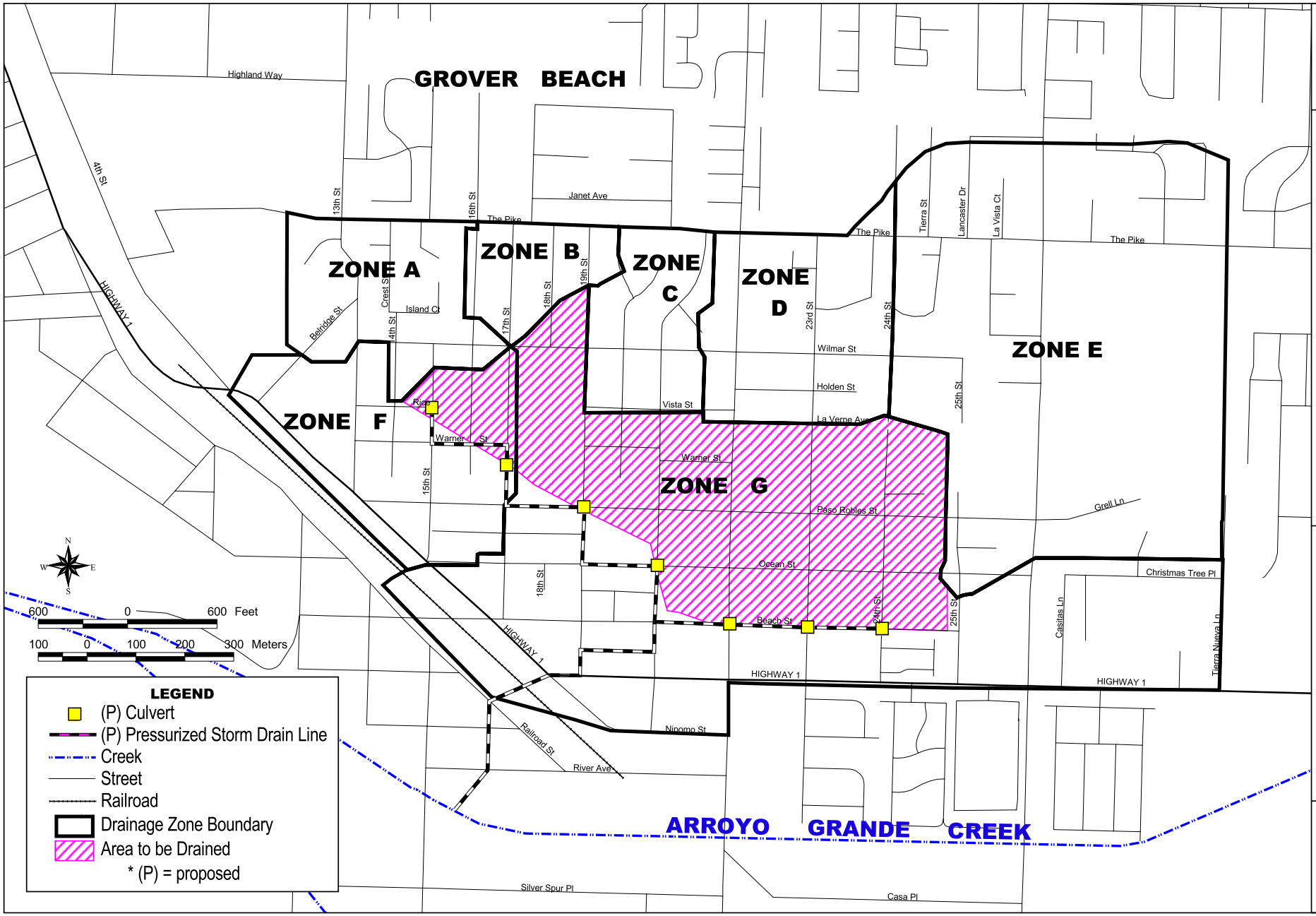


FIGURE 7

COUNTY OF SAN LUIS OBISPO

COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

AREA DRAINED BY PRESSURE LINE
PROJECT 1C

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 3 Jan. 2003
Path: Z:\2001\210176

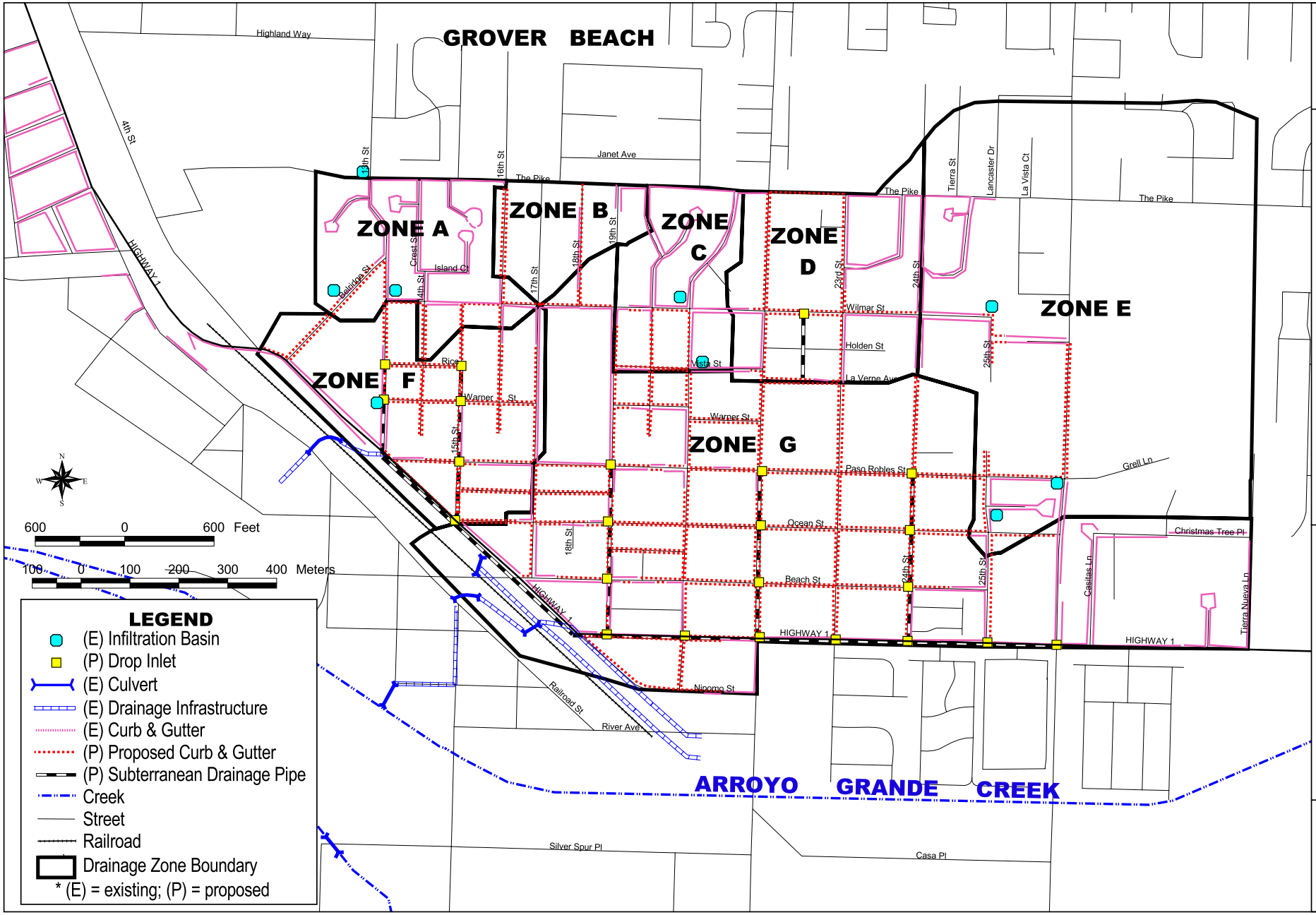


FIGURE 8

COUNTY OF SAN LUIS OBISPO
COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

PROPOSED DRAINAGE INFRASTRUCTURE
PROJECT 3A

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 26 Feb. 2003
Path: Z:\2001\210176

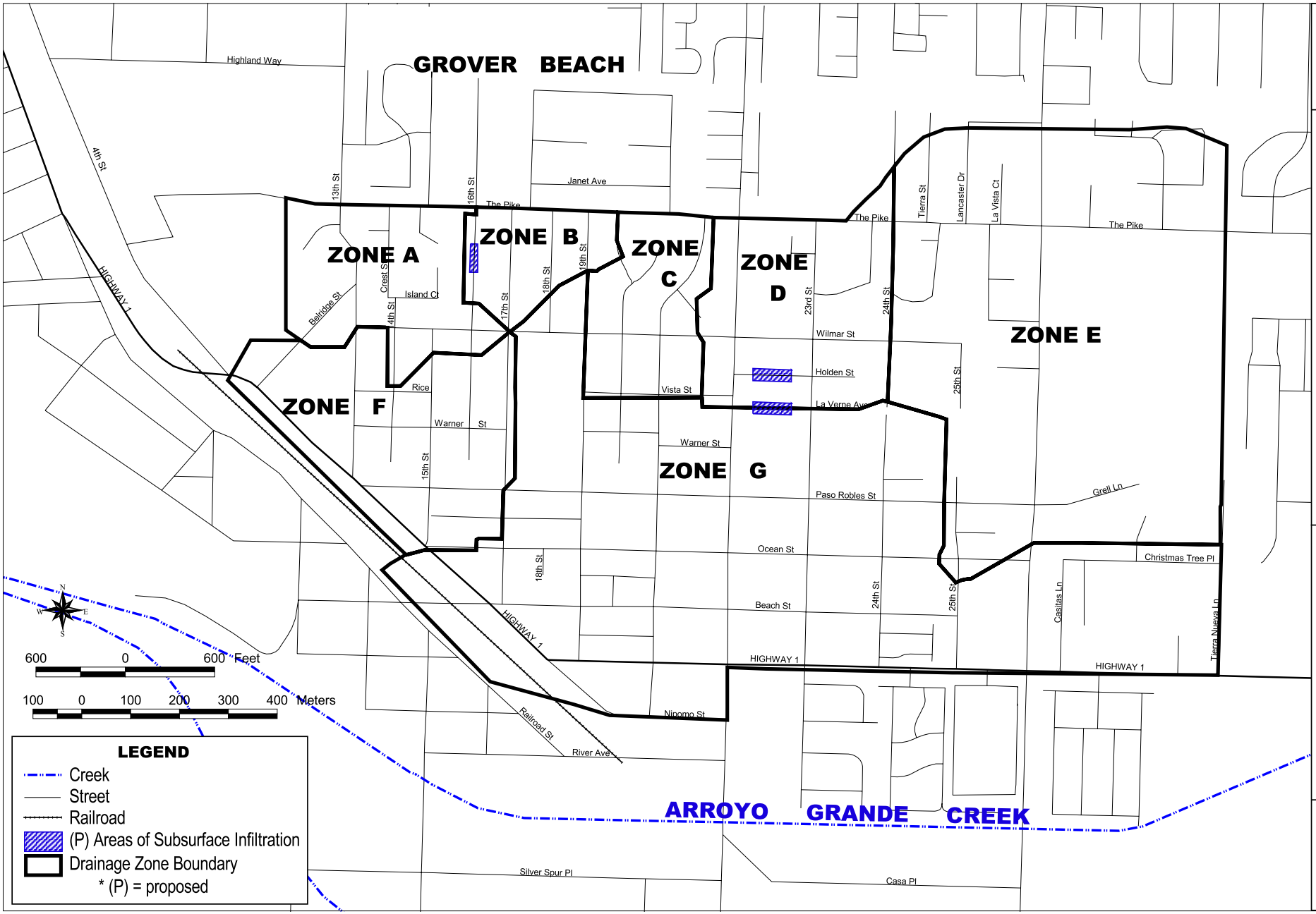


FIGURE 9

COUNTY OF SAN LUIS OBISPO
COMMUNITY DRAINAGE AND FLOOD CONTROL STUDIES

LOCALIZED INFILTRATION BASINS
PROJECT 3B

QUESTA ENGINEERING CORP

Project No.: 220176
Project Name: SLO County H&H
Date: 26 Feb. 2003
Path: Z:\2001\210176

DEPARTMENT OF TRANSPORTATION
50 HIGUERA STREET
SAN LUIS OBISPO, CA 93401-5415
TELEPHONE (805) 549-3111
TDD (805) 549-3259
http://www.dot.ca.gov/dist05

September 26, 2002

Mr. Katcho Achadjian
Supervisor, District 4
San Luis Obispo County
County Government Center, Room 370
San Luis Obispo, CA 93408-2040

SLO- 1 -12.38
Flooding Adjacent to Front Street (Rte. 1)
at the Intersection of 13th Street in Oceano.

Dear Supervisor Achadjian:

Thank you for your letter regarding the above-cited intersection along State Route 1 in Oceano. The issue regarding the ponding of water at 13th Street and State Route 1 due to the recent maintenance repair has been brought to our attention and a project has been started to address the minor ponding problem. The problem of water flooding and standing across the entire intersection during moderate to heavy rainfall events is not as easily solved.

Your assertion that, "the grades in this area are extremely flat", is correct. The concept that a culvert could successfully operate at this location if the California Department of Transportation (Department) dedicated additional attention to maintenance is more problematic. Water can barely drain to the entrance of the Union Pacific Railroad (UPRR) culvert from the westerly edge of the highway because there is no slope between the two. Even a small culvert, under the roadway, would exit into a basin with no downhill slope in any direction. The culvert under UPRR's tracks is set on grade at its entrance and outlet. At out-fall from that culvert the water then has nowhere to flow due to the existence of the Arroyo Grande Creek levees and the airport runway fill. These levees, the airport, and various agricultural operations have cut off the historical drainage paths to Arroyo Grande Creek from the hill on which Oceano sits. Farming interests, between UPRR's westerly right of way and the levee have built up or bermed up their land to prevent inundation of surface water runoff during storm season. The result is that the State highway and Railroad right-of-way are the lowest points along the blocked drainage courses and are therefore flooded when there is significant rainfall.

You may recall that this location was brought up and discussed at the 3/12/99 Oceano Community Services District meeting along with the flooding problem that exists at the angle point of Route 1 in Oceano where Cienega Street becomes Front Street. The problems, while at differing locations, have all of the same components. The relatively minor amount of Route 1 runoff and all of the Oceano community runoff from Wilmar Street, south and from 23rd Street, west flows to these two points along the highway.

Surface water runoff then stands on the highway and idles across the almost flat UPRR right of way for approximately 100 feet through ditches to the railroad embankment where it enters UPRR culverts. In both cases, the flow then stagnates in sumps at those culvert outlets. When the sumps fill, the water begins to back up. The Cienega/Front Street area flows into an abandoned condensation discharge basin in UPRR right-of-way for a refrigeration warehouse once leased and maintained by Phelan & Taylor. The 13th Street/State Route 1 intersection drains to a smaller basin that Phelan & Taylor presently use, just north of the warehouse. In both cases, this is the terminus point of flow because there is no downhill path anymore for flow to get to Arroyo Grande Creek.

The Department is very interested in participating in finding a solution to these problem areas that occasionally are flooded and temporarily close the highway. The Department has researched property ownership, contacted UPRR real estate staff in Omaha, Nebraska, spoken with the local track maintenance supervisor, (Javier Sanchez), and met in the field with John Taylor of Phelan & Taylor. Former District Director Jay Walters and Lance Gorman of Hydraulics have met with the Oceano Community Services District, County of San Luis Obispo (SLO) Flood Control and Engineering Staff and with you or your staff on one or more occasions regarding this and the Cienega/Front Street locations.

While the Department is interested in contributing both financial and engineering resources to a solution, we are not able to solve this problem alone or to be the lead agency. The responsibility for overall flood control falls under the jurisdiction of SLO County Flood Control and SLO County Public Works and/or the Oceano Community Services District.

The Department will correct the minor nuisance problem created by the recent maintenance repair of Route 1 at its intersection with 13th Street and Paso Robles Street. The greater localized ponding and flooding problem that previously existed will remain, however, and cannot be addressed until all the interested parties are brought together under the lead of the County and the Oceano Community Services District. It has always been the Department's contention that an assessment district be set up to address this situation because the State highway is only one component in an area-wide problem.

Public Works Director Noel King sent the Department a letter on August 27, 2002 (a copy was sent to your office) regarding an engineering planning study to evaluate drainage and flood control problems in Cambria, Cayucos, Nipomo, Oceano, Santa Margarita, & San Miguel. Along with the letter he attached responses to questionnaires that made reference to State highway facilities in those communities. He has requested a contact person within the Department to work with the County on responding to drainage issues. Perhaps this could be the avenue for the Department to participate with the SLO County Department of Public Works as lead agency in projects to resolve these drainage problems that include and/or affect the transportation corridors within these various communities.

The Department welcomes any proposals by the County and/or the Oceano Community Services District that will both aid in keeping the transportation corridor open and benefit the community of Oceano. We look forward to participating with the County to resolve this and other flooding problems that are of mutual concern. Please contact Steve Price, Deputy District Director of Maintenance and Operations at (805) 549-3281 if we can be of any further assistance.

Sincerely,

R. GREGG ALBRIGHT
District Director

Appendix F

ENVIRONMENTAL TECHNICAL MEMORANDUM

APPENDIX F

ENVIRONMENTAL TECHNICAL MEMORANDUM

Oceano
Community Drainage and Flood Control Project
Environmental Constraints Analysis

July 2003

Prepared for:
Raines, Melton, & Carella, Inc.
2001 North Main Street
Suite #400
Walnut Creek, California 94596

Prepared by:
Essex Environmental
637 Main Street
Half Moon Bay, California 94019

Essex Environmental
975 Osos Street
San Luis Obispo, California 93401

INTRODUCTION

In March 2003, a drainage and flood control study examined the existing drainage conditions of the Oceano community, identified problematic areas and issues, and developed conceptual alternatives to the identified drainage and flood control issues. This environmental constraints analysis assesses the environmental impacts and constraints associated with the proposed solutions to the drainage problems in the community of Oceano. Each proposed solution was examined for the biological resources, cultural resources, geology and soils, hydrology and water quality, and land use constraints likely to be present in each given area.

PROJECT DESCRIPTION

To address the different flooding issues in the community of Oceano, several site-specific solutions have been proposed. The project alternatives have been organized by specific problem:

1) Flow conveyance into Arroyo Grande Creek Channel
2) Highway 1 flooding
3) Residential flooding issues

The existing drainage problems in Oceano and proposed alternatives for mitigating the problems are described in Chapter 3 of the report and also in the engineering technical memorandum. The proposed alternatives for the three categories are discussed below.

Alternative 1. Convey Flow Into Arroyo Grande Creek Channel

- 1A: Dedicate up to 5 acres of land adjacent to the creek as flood easements for a detention/retention basin. The detention/retention site would either be at a RV storage lot or on agricultural land. This land would flood and allow the runoff to slowly infiltrate into the soil or be discharged into Arroyo Grande Creek.

- 1B: Build a pump station near the levee of Arroyo Grande Creek and pump water pooled behind the levee into Arroyo Grande Creek. A detention basin/sump would need to be constructed adjacent to the pump.

- 1C: Build an underground pressurized storm drainage system collecting runoff from the higher elevations of Zone G and discharging into Arroyo Grande Creek.

Alternative 2. Alleviate Highway 1 Drainage Problems

- Install drop inlets and a 1,500-foot storm drain pipeline and improve or replace existing drainage infrastructure in and around Highway 1. The pipeline would convey storm water from Paso Robles and 13th street southeast along Highway 1 to an existing open drainage channel that runs parallel to the railroad. To improve existing drainage infrastructure, vegetation and sediment would be removed from low gradient drainage channels and the undersized culvert at the intersection of Creek Road and Sand Dollar Road would be replaced.

Alternative 3. Resolve Residential Flooding Problems

- Construct a network of curbs and gutters and install a subterranean storm drain system. Approximately 65,000 feet of new curb and gutter throughout city streets would be installed. A storm drain line would be built to collect and convey water away from residential neighborhoods. In order to get positive flow along the new gutters leading to drop inlets, portions of the existing roadway may need to be reconstructed. To drain low points with no outlets, subsurface infiltration chambers would be installed under existing roadway or other public right-of-way.

METHODS

Project alternatives were analyzed for environmental constraints that would prevent agency approval, increase costs (particularly for mitigation), or delay the project schedule. Existing documentation relative to each resource topic (e.g., biological resources, cultural resources, geology and soils, hydrology and water quality, and land use) was examined to help determine the likelihood of constraints. Minor impacts (e.g. traffic noise, disturbance to residents and businesses during construction) discovered during the analysis are not included in this report because they can be avoided or minimized by using best management practices or by following engineering or design standards.

Biological Resources

Essex performed a site assessment with Raines, Melton, & Carella, Inc. (RMC) on July 1, 2002, to conduct a reconnaissance level review of biological resources in the project area. The assessment area included the proposed project sites and bordering areas. Each site was generally assessed for its potential to support sensitive biological and botanical resources. Information from the California Natural Diversity Database was combined with recent experience on other projects in the area to determine the potential for sensitive species and their habitat in the project areas.

Cultural Resources

Data on file in the San Luis Obispo County Department of Planning and Building was used to determine if cultural resources have been identified in each project area. No standard record searches or site visits were conducted.

Geology and Soils

The below public data was obtained and analyzed in comparison to all the proposed project locations using a Geographic Information System (GIS) to determine whether the projects were located on or in close proximity to active faults or on soils highly susceptible to liquefaction or landslides:

- GIS Data for the Geologic Map of California
- GIS Files of Official Alquist-Priolo Earthquake Fault Zones, Central Coast Region

- Soil Survey Geographic Data Base
- Designated Geologic Sensitive Area-Landslide Potential GIS file

Hydrology and Water Quality

The *Ocean Drainage and Flood Control Study-Draft* prepared by RMC was used to assess hydrological conditions in the project area and to determine if any of the project alternatives would result in flooding elsewhere. In addition, the Federal Emergency Management Agency digital Q3 flood GIS data was used to determine if the project alternatives are located in known flood zones.

Land Use

The San *Luis Obispo General Plan* and *Oceano Specific Plan* were reviewed to determine whether the project was consistent with local policies. A GIS was used to examine the presence of prime farmland and farmland of local or state importance in the project area. In addition, the *Airport Land Use Plan, Oceano County Airport* and Federal Aviation Administration (FAA) policies were also analyzed for those areas near the Oceano Airport.

RESULTS

Environmental Constraints

Table 1 summarizes the environmental constraints that may be encountered for each project alternative. Based on this preliminary analysis, major environmental constraints include potential modification of jurisdictional waters (Alternative 2), the potential presence of cultural resources (Alternatives 1C and 3), and potential impacts to endangered/threatened species habitat (Alternatives 1A, 1B, 1C, and 2).

Permit Assessment

An assessment of the state and federal environmental permits that may be necessary for each project alternative is provided in Table 2. An estimate of the timeframe typically required to obtain each type of permit is summarized in Table 3. Based on the level of research performed for this analysis, most project alternatives would be possible to permit if mitigation measures are implemented to avoid significant environmental impacts. The U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service may not approve Alternative 2 due to potential impacts to jurisdictional waters and sensitive species habitat.

Potential Mitigation

Potential impacts to environmental resources may result from the proposed project alternatives. Those impacts may require implementation of mitigation measures to protect sensitive, threatened or endangered species, water quality (including erosion control), land use, and cultural resources. Mitigation measures could include:

- Conducting preconstruction surveys for sensitive species for project alternatives 1A, 1B, 1C, and 2

    - Monitoring during construction in locations where presence of sensitive species habitat has been confirmed

- Implementing erosion and sediment control measures during construction for project alternatives 1A, 1B, 1C, and 2

- Performing a record search for cultural resources on all project alternatives

    - Surface surveys, monitoring by qualified archeologist during ground disturbance, and identifying exclusion zones for cultural resources may be necessary depending on results of record search. Recovery and treatment could be required depending on findings

- Implement the following FAA general recommendations for detention facilities near airports

    - Placing riprap or quarry fragments on the side and bottom of the ponds
    - Increasing the depth of the facility and making it more linear
    - Removing vegetation that could provide food or cover in or around the basins

Additional Studies/Surveys

The following studies/surveys will need to be performed in order to begin the permitting phase of the project:

- Habitat assessments
- Sensitive species surveys
- Cultural resource record searches

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Table 1: Oceano Environmental Constraints

Alternatives	Biological	Cultural Resources[1]	Geology and Soils	Hydrology and Water Quality	Land Use
Alternative 1. Convey Flow Into Arroyo Grande Creek					
1A: Dedicate land adjacent to Arroyo Grande Creek as flood easements for a detention or retention basin. Site will be a RV storage lot or on agricultural land.	Construction of a new outfall in the creek bank may affect endangered/ threatened species habitat, including steelhead, tidewater goby, and California red-legged frog (CRLF). Other sensitive species that may also be affected include: southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	None	None	None	Standing water in detention basins may attract waterfowl that may affect operations at Oceano Airport. Related FAA recommendations may increase project costs. Permanent loss of prime farmland may be likely if the detention basin is built in the agricultural land and if FAA recommendations are incorporated into the design of the detention basin. Permanent loss of prime farmland may require an Environmental Impact Report (EIR) if the loss cannot be mitigated, causing schedule delays and increased project costs.
1B: Build a pump station near the levee of the Arroyo Grande Creek Channel and pump the retained storm water into the channel.	Improving the existing outfall to the creek may affect endangered/threatened species habitat, including steelhead, tidewater goby, and CRLF. Other sensitive species that may also be affected include: southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	None	The proposed pump station is on land with moderate potential for liquefaction. Project design for the liquefaction zone may result in higher project costs.	None	Standing water in detention basins may attract waterfowl that may affect operations at Oceano Airport. Related FAA recommendations may increase project costs. Permanent loss of prime farmland may be likely if the detention basin is built in the agricultural field and if FAA recommendations are incorporated into the design of the detention basin. Permanent loss of prime farmland may require an EIR if the loss cannot be mitigated, causing schedule delays and increased project costs.
1C: Build a pressurized storm drainage system.	Construction of the drainage pipe outfall within the creek bed may affect endangered/threatened species habitat, including steelhead, tidewater goby, and CRLF. Other sensitive species that may also be affected include: southwestern pond turtle, two-striped garter snake, and nesting birds in riparian zones. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	Numerous archaeological sites have been identified in the eastern portion of Zone G. Cultural resources include weathered shell, stone flakes, and stone tools. Surveys, monitoring, and mitigation may be required. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None	None	None

[1] Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building. No standard record searches or site visits were conducted.

Alternatives	Biological	Cultural Resources[1]	Geology and Soils	Hydrology and Water Quality	Land Use
Alternative 2. Alleviate Highway 1 Drainage Problems					
Install drop inlets and a 1,500-foot storm drain pipeline and improve or replace existing drainage infrastructure in and around Highway 1.	Removal of vegetation and sediment from low gradient drainage channels may affect threatened CRLF's habitat. If CRLF habitat is determined to be present, approval from the U.S. Fish and Wildlife Service (USFWS) may be difficult. Higher project costs and schedule delays may result from required surveys, monitoring, and mitigation for sensitive species.	None	None	Sediment and vegetation removal from drainage channel may temporarily increase the sediment load of Arroyo Grande Creek. Implementation of Storm Water Pollution Prevention Plan and Best Management Practices during construction will minimize this impact. U.S. Army Corps of Engineers (Corps) approval for sediment removal may be difficult to obtain, thereby delaying the project schedule or preventing the project altogether.	None
Alternative 3. Resolve Residential Flooding Problems					
Construct a network of curbs and gutters and install a subterranean storm drain system to collect and convey runoff. Install subsurface infiltration chambers under existing roadway or other public right-of-way.	None	Numerous archaeological sites have been identified in the eastern portion of Zone G. Cultural resources include weathered shell, stone flakes, and stone tools. Higher project costs may result from required surveys, and monitoring for cultural resources. The project schedule may be delayed and project costs increased if cultural resources are found on site.	None	None	None

Table 2: Oceano Permit Assessment

Alternative	Project Description	CEQA[1] Document	SHPO 106[2]	CDFG 1601[3]	Corps 404 Permit[4]	USFWS Section 7[5]	NMFS Section 7[6]	RWQCB 401[7]	SWRCB General Permit[8]	SWRCB Phase II SWMP[9]	CCC CDP[10]	APCD ATC/PTO[11]	FAA[12]	Notes
Alternative 1. Convey Flow Into Arroyo Grande Creek														
1A: Dedicate land adjacent to Arroyo Grande Creek as flood easements for a detention/ retention basin.	Detention basin on 5-plus acres at a RV storage lot or on agricultural land; grading required to increase capacity of field; new outfall constructed in creek bank to drain water by gravity into creek.	ND[13] (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	No	Yes	Because project involves new facilities and has the potential to affect sensitive species or their habitat, a ND will be required. If permanent loss of prime farmland cannot be mitigated, an Environmental Impact Report (EIR) may be required (Williamson Act). A Corps permit will be required if the new outfall or improvements to the existing outfall are constructed below ordinary high water (OHW). The Corps will consult with the NMFS and USFWS if threatened/endangered species will be affected by improvements to the existing outfall, new outfall construction and/or operation. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.

[1] California Environmental Quality Act: Required if a state agency has to take action on a project; If the project does not qualify for an exemption, the compliance document is either a Negative Declaration or Mitigated Negative Declaration (ND) or an Environmental Impact Report (EIR)

[2] State Historic Preservation Office – Section 106 (Cultural resource information was obtained solely from the San Luis Obispo County Department of Planning and Building): Required if a project has the potential to impact cultural resources

[3] California Department of Fish and Game – 1601 Streambed Alteration Agreement: Required if a project has the potential to impact sensitive species or their habitat

[4] U.S. Army Corps of Engineers – 404 Permit: Required if a project involves work below the ordinary high water mark

[5] U.S. Fish and Wildlife Service – Section 7 Consultation: Required if a project has the potential to impact sensitive species or their habitat

[6] National Marine Fisheries Service – Section 7 Consultation: Required if a project has the potential to impact sensitive marine and anadromous fish species or their habitat

[7] Regional Water Quality Control Board – 401 Certification: Required if a project has the potential to discharge to surface water, ground water, or other water systems

[8] State Water Resources Control Board – National Pollutant Discharge Elimination System (NPDES) General Construction Permit: Required if a project involves ground disturbance of more than 1 acre

[9] State Water Resources Control Board – Phase II Storm Water Management Plan Revision: Required for potential discharges to surface water, ground water, or other water systems by small municipal separate storm sewer systems not covered by the Phase I program

[10] California Coastal Commission – Coastal Development Permit: Required if a project is located in the Coastal Zone or in streams that feed into the Coastal Zone

[11] San Luis Obispo County Air Pollution Control District – Authority to Construct and Permit to Operate: Required for projects with the potential to emit pollutants

[12] Federal Aviation Administration – Notice of Proposed Construction or Alteration and Notice of Actual Construction or Alteration: Required for construction of detention basins near airports

[13] Negative Declaration or Mitigated Negative Declaration: Required if projects with impacts that are less than significant or less than significant with mitigation

Alternative	Project Description	CEQA[1] Document	SHPO 106[2]	CDFG 1601[3]	Corps 404 Permit[4]	USFWS Section 7[5]	NMFS Section 7[6]	RWQCB 401[7]	SWRCB General Permit[8]	SWRCB Phase II SWMP[9]	CCC CDP[10]	APCD ATC/PTO[11]	FAA[12]	Notes
1B: Build a pump station near the levee of the Arroyo Grande Creek Channel and pump the retained storm water into the channel.	New pump station and sump basin on 2.5 acres at a RV storage lot or on agricultural land; newly excavated and graded sump basin at either site; water would be discharged by pump into creek, requiring some improvements to existing outfall or construction of a new outfall.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	Yes	Yes	Because project involves construction of new facilities, a ND will be required. If permanent loss of prime farmland cannot be mitigated, an EIR may be required (Williamson Act). A Corps permit will be required if the new outfall or improvements to the existing outfall are constructed below OHW. The Corps will consult with the NMFS and USFWS if threatened/ endangered species will be affected by improvements to the existing outfall, new outfall construction and/or discharges through the outfall. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.
1C: Build a pressurized storm drainage system.	Drain southwest corner of Zone G; discharge into Arroyo Grande Creek; long runs with no inlets needed to achieve pressurized flow.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Possibly (see notes)	Yes	Yes	Yes	No	No	Because there is potential of less than significant impacts to threatened/ endangered species and/or cultural resources, a ND will be required. A Corps permit will be required if the new outfall is constructed below OHW. The Corps will consult with the NMFS and USFWS if threatened/endangered species will be affected by outfall construction and/or operation. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. Depending on the result of a cultural records search, Section 106 consultation may be required.

Alternative	Project Description	CEQA[1] Document	SHPO 106[2]	CDFG 1601[3]	Corps 404 Permit[4]	USFWS Section 7[5]	NMFS Section 7[6]	RWQCB 401[7]	SWRCB General Permit[8]	SWRCB Phase II SWMP[9]	CCC CDP[10]	APCD ATC/PTO[11]	FAA[12]	Notes
Alternative 2. Alleviate Highway 1 Drainage Problems														
Install drop inlets and a 1,500-foot storm drain pipeline and improve or replace existing drainage infrastructure in and around Highway 1.	Storm drain would convey storm water from Paso Robles and 13th street southeast along Highway 1 to an existing open drainage channel that runs parallel to the railroad. Improvements to the existing drainage infrastructure would include removing vegetation and sediment from low gradient drainage channels and replacing undersized culvert at Creek Road and Sand Dollar Road.	ND (see notes)	Possibly (see notes)	Yes	Possibly (see notes)	Possibly (see notes)	No	Possibly (see notes)	Yes	Yes	Yes	No	No	Because there is potential to impact threatened/endangered species, a ND would be required. A Corps permit will be required for sediment removal unless the "scoop and lift" technique is used. The Corps will consult with USFWS if threatened/endangered species will be affected by vegetation and/or sediment removal. If a Corps permit is required, a 401 Certification from the RWQCB and a Federal Consistency Determination from the Coastal Commission Consistency Office will also be required. A Coastal Development Permit will be needed for activities west of the railroad tracks. Depending on the result of a cultural records search and Corps involvement, Section 106 consultation may be required.
Alternative 3. Resolve Residential Flooding Problems														
Construct a network of curbs and gutters and install a subterranean storm drain system to collect and convey runoff to existing drainage.	Install 65,000 feet of new curb and gutter throughout city streets; install storm drain line to collect and convey water; reconstruct portion of roadway. Install subsurface infiltration chambers in smaller isolated areas within the community where there are swales or low points with no outlets.	ND (see notes)	No (see notes)	No	No	No	No	No	Yes	Yes	No	No	No	Because there is potential to affect cultural resources while installing the curbs, gutters, and storm drains, a ND will be required. However, since there are no federal permits required for the project, Section 106 Consultation is not triggered.

Table 3: Oceano Permitting Timeframes

Permit	Typical Timeframe* (months)	Notes
California Environmental Quality Act (CEQA)		
Exemption	< 1	
Negative Declaration (ND)	6 - 12	
Environmental Impact Report (EIR)	12 - 24	
California Department of Fish and Game (CDFG) 1601 Streambed Alteration Agreement	3 - 6	CEQA must be completed before the 1601 Agreement can be issued.
U.S. Army Corps of Engineers (Corps) Section 404		
Nationwide Permit	1 - 3	Section 7 and Section 106 consultations are required to be complete.
Individual Permit	12 - 18	National Environmental Policy Act (NEPA) compliance is required, which can take one year or more.
U. S. Fish and Wildlife Service (USFWS)/ National Marine Fisheries Service (NMFS) Section 7 Consultation		
Informal	1 - 3	
Formal	6 - 12	

Permit	Typical Timeframe* (months)	Notes
State Historic Preservation Office (SHPO) Section 106 Consultation	6 - 12	
Regional Water Quality Control Board (RWQCB) 401 Certification	1 - 3	CEQA must be completed before the 401 Certification can be issued.
State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Construction Permit	< 1	A Storm Water Pollution Prevention Plan (SWPPP) must be prepared prior to construction and implemented during construction.
SWRCB NPDES Phase II Storm Water Management Plan (SWMP) Modification	3 - 6	A SWMP must be modified and submitted with Notice of Intent (NOI) prior to construction. Because this program has just begun, processing times may vary.
Coastal Commission Coastal Development Permit	6 - 12	Public controversy could delay this approval. Projects within original Coastal Commission jurisdiction require review at the state level. A federal consistency determination, which might further delay approval, is required for projects with federal agency involvement.
Federal Aviation Administration (FAA) Notice of Proposed Construction or Alteration	1 - 2	
Air Pollution Control District (APCD) Permit to Construct/Permit to Operate	1 - 3	

* Timeframes do not include time required to perform pre-applications studies, to prepare required applications, and to complete prerequisite approvals.

Appendix G

FUNDING TECHNICAL MEMORANDUM

APPENDIX G

FUNDING TECHNICAL MEMORANDUM

Technical Memorandum

Raines, Melton & Carella, Inc.
Consulting Engineers/Project Managers

San Luis Obispo County
Community Drainage and Flood Control Studies

Task: **Task 8 – Funding Assistance Review**

To: Mr. Dean Benedix, Project Manager, San Luis Obispo County

Prepared by: Jeffrey Tarantino, P.E.

Reviewed by: Lou Carella, P.E., Mary Grace Pawson, P.E.

Date: July 30, 2003

File: 34-9.B.8

1 Introduction

The San Luis Obispo County Flood Control and Water Conservation District ("District") has contracted with Raines, Melton, & Carella, Inc. ("RMC") to prepare six community drainage and flood control studies (the "Study"). The communities involved in the Study are Cambria, Cayucos, Nipomo, Oceano, San Miguel, and Santa Margarita. The problems in these communities include inadequate local drainage systems, unmaintained creeks, and inadequate conveyance capacity in creeks. Technical Memoranda detailing the problems for each of the communities and possible solutions are being completed as a separate task of this scope of work. This memorandum outlines funding source options and requirements for possible solutions to the six community drainage and flood problems.

The District is the designated County agency responsible for managing, planning, and maintaining drainage and flood control facilities in unincorporated public areas where no other agency has assumed an active role in such activities. The District is not responsible for funding the design and construction of private property benefiting from drainage and flood control improvements. Exceptions to this exist in established Community Services Districts (CSD's) where the CSD's may be specifically designated as authorized agencies responsible for or authorized to perform these as well as other services. Design and construction of drainage and flood control improvements is the responsibility of the local lead agency or sponsoring entity which implements the improvements on behalf of the property owners who benefit from the improvements. This policy is consistent with State subdivision development law, which requires the benefiting properties to finance property improvements.

Funding of management, planning, design, construction and maintaining drainage and flood control facilities in unincorporated areas comes from four primary sources:

- Local Community Funding: The property owners benefiting from the improvements are responsible for funding or obtaining funding for the implementation of the improvements. They are also responsible for funding annual maintenance of the system if the facilities primarily serve private property. The District Board's policy does not provide for the use of general flood control revenue, collected from all County properties, to be used to construct improvements that mainly benefit individual property owners.

- Supplemental Grant Program: Numerous Federal, State & Private grant programs exist which provide partial funding for drainage improvements, flood control and related watershed, stream and shore protection. It is the goal of these grant programs to provide supplemental funding for a community or agency for flood protection, flood mitigation and resource conservation and enhancement programs. Grant funding, if available, or establishment of loans through bonds sold through the formation of assessment districts, are examples of potential supplemental funding for implementation of drainage and flood control improvements. These programs are uniquely focused, have stringent qualifying regulations, specific procedural processing and monitoring requirements. These programs usually require a significant community funding or matching contribution.

- General Flood Control Fund Revenue: It is the District Board's adopted policy that general flood control revenue funding be used only for management, planning and non-roadway related maintenance services for drainage and flood control facilities. General flood control revenue is generated from County property taxes collected from all property in the County. This policy does not provide for the use of these funds for construction of new drainage or flood control improvements since this revenue is limited and is to be spent to benefit County areas at large.

- Road Fund Revenue: The use of Road fund revenue is restricted to roadway servicing maintenance and improvements, including drainage and flood control maintenance and roadway related improvements necessary to maintain the integrity and safety of the County road system. County Road funds are severely limited and inadequate relative to the needs of the expansive County maintained road system.

The realities of the overwhelming need for multi-million dollar funding for drainage and flood control facilities throughout the County and limited revenue sources pose a challenge to Communities to locally determine the desire and importance of the implementation of drainage infrastructure. For this reason, it is the policy of the District to encourage a local entity to serve as the lead agency (e.g. a CSD) to provide an implementation strategy and financing mechanism that is supported by the Community or area of benefit. If there is no local agency available or agreeable to assist in project implementation, the District is available to provide planning and management services for supporting community groups. However, if a community is unwilling to pay for the benefiting infrastructure, the project will not advance until funding is secured.

1.1 Technical Memorandum Objectives

The purpose of this technical memorandum (the "TM") is to provide a summary of various funding options for the projects developed as part of the Study. The selection of funding alternatives presented in this TM is based on the general types of drainage and flood mitigation projects proposed for the six communities, and is not project specific. The basic problems experienced and potential solutions for the six communities are summarized in Table 1 and fall into two categories; 1) local drainage, and 2) creek conveyance capacity.

Table 1 - Summary of Problems and Solutions

Problem	Alternative Solution
Inadequate Local Drainage	• Curb and Gutter • Percolation Basins • Storm Drain System
Overtopping of Creek Banks	• Larger Culverts • Improve Channels • Levees • Floodwalls • Vegetation Management • Increase Maintenance • Retention Basins

1.2 Recommended Funding Strategy

A community or area consensus must be established as an advocate for the installation of new drainage and flood control facilities. A local lead agency (e.g. CSD) or other sponsoring agency should be utilized to promote and sponsor the project on behalf of the supporting community. The County Flood Control District staff is available to assist if the local community supports the implementation but no local agency or sponsor is available or supportive of a project. Included in the community consensus must be the commitment to fund a significant portion of the initial costs of implementing and constructing the project. It should be recognized that the strongest applicants for leveraged grant or other supplemental funding have an established and effective local funding program. It is recognized that nearly all of the recommended project may need to seek and obtain leveraged supplemental funding from outside the local community. Additionally, the community or area must be committed to fund annual maintenance of the facilities to the extent they provide a benefit to private property. A commitment to maintenance is one way a local community can demonstrate a supportive and effective program to a potential grant program source.

After establishment of a supportive community and lead agency, the lead agency should apply for supplemental grant, loan and/or cost sharing funds through available programs outlined herein. The implementation of a project will depend on the success and continued support of the community and the success of the grant application process.

This TM is organized to outline first, the local funding options that the lead agency can establish, and second the outside Federal and State funding options that may be accessed to "match" local funding sources and help implement projects. Because the local match is critical to accessing outside funding, it is highly recommended that the lead agency begin to establish local funding mechanisms (even if these do not fully fund the recommended projects) in order to be more competitive for outside funds. The recommended local funding mechanisms include 1) grants, 2) taxes, 3) assessments, and 4) fees (property based and development impact). The creation of a local funding source, plus the potential procurement of Federal and State grants, establishes the framework for a comprehensive community funding program. This approach

also acknowledges the realistic nature of public projects that no capital improvement can rely solely on grants.

2 Local Funding

It must be recognized by communities needing and desiring drainage and flood control improvements that the area property owners obtain a significant benefit from the installation of these improvements. This benefit is partially demonstrated in the increased overall property value where drainage improvements have been installed. Likewise, in areas of flooding or areas where drainage infrastructure does not exist, the lack of this benefit is observed in reduced property value. Therefore, significant or majority funding from the property owners benefiting from the improvements is the primary funding source of such projects.

As previously discussed, the lead agency or sponsoring entity is the responsible agency for programming new drainage and flood control improvements where there is community support and potential funding resources. Existing CSD's could be responsible for drainage and flood control project implementation. However, the original LAFCo designated services of the CSD must include these powers. If these powers are not currently included within the CSD's current charter service designations, they can only be included by holding an election. It is assumed that the lead agency is the applicant and/or responsible agency for administering the funding options discussed in this section.

The lead agency has several options for acquiring funds for the community or area involved in the study. The primary avenues for collection of property owner revenue are taxes, assessments, and fees. Each of these is detailed in the following subsections.

2.1 Special Taxes

Taxes are the most common means for a government to raise revenue. An existing tax can be raised, or a new tax can be levied on residents in an area to fund flood control projects. By definition, this is a special tax requiring approval from two thirds of the electorate (residents). If approved, the revenue generated would be allocated specifically for drainage and flood control projects anywhere in the proposed improvement boundary. It would be the responsibility of the lead agency to determine where those funds would be spent.

This form of revenue requires all residents to pay the tax regardless of benefits received and the special tax formula does not need to be related to benefits received from the proposed projects. In order to establish the special tax, the lead agency would need to develop and adopt a formula; the Board of Supervisors approves placing the tax on the ballot. A special tax is approved by resident registered voters (except in the case of Mello-Roos CFD tax which can be approved by property owners in uninhabited areas). Figure 1 illustrates the special tax adoption process.

2.2 Benefit Assessments

A benefit assessment is a charge levied on a property to pay for public improvements or services that benefit the property. The difference between an assessment and a tax is that benefit assessment formula must quantify the relationship between the assessment charged and the benefit received by the property (if a property does not benefit, it cannot be assessed).

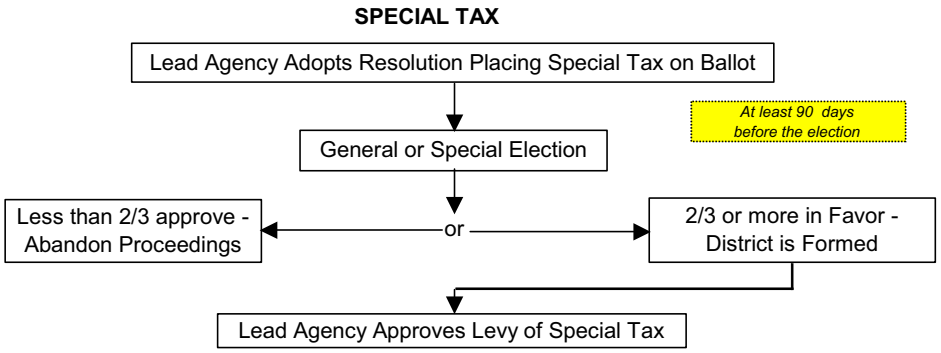

Figure 1 – Special Tax Adoption Process

All new assessments must conform to the requirements of Proposition 218, which was passed in November 1996. Proposition 218 specifically requires that property owners (not registered voters) be allowed to vote on new benefit assessments. New assessments may be approved by a simple majority approval of the property owners, with votes weighted in proportion to the assessment proposed.

In order to implement a new assessment, the lead agency must define those parcels that receive benefit and define the method of assessment in an Engineer's Report. Figure 2 illustrates the benefit assessment adoption process.

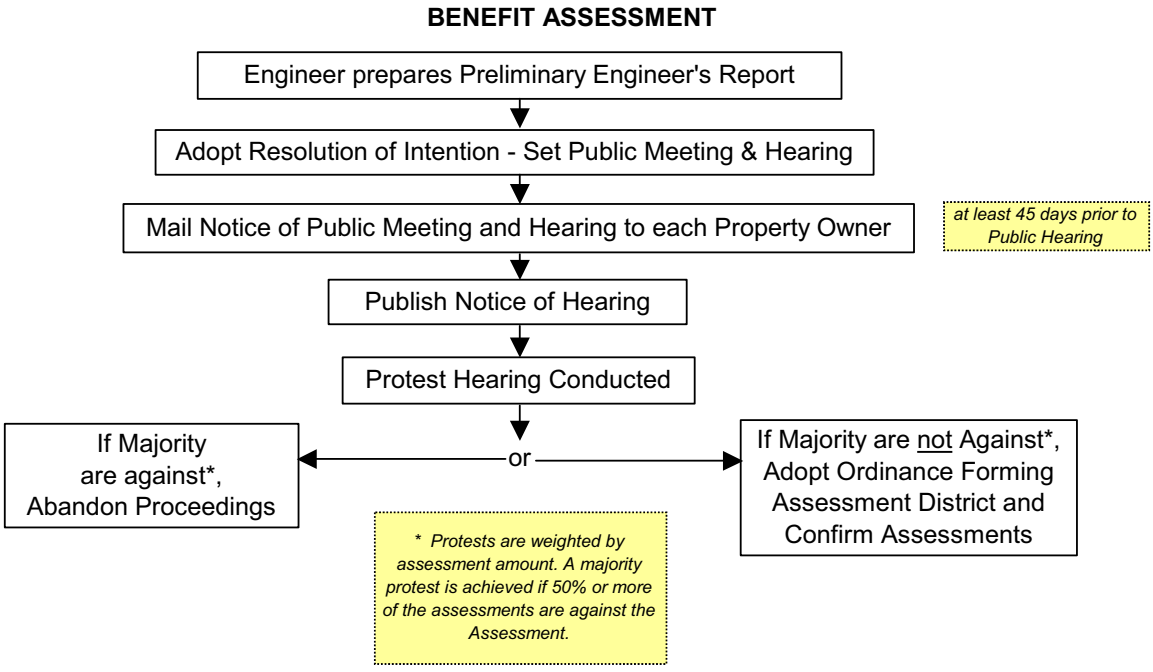

Figure 2 – Benefit Assessment Adoption Process

2.3 Property-Based Fee

A property-based user fee is a charge levied on a property to pay for public improvements or services that are used by that property. The difference between an assessment and a user fee is that assessments rely on a demonstration of special benefit (which can be hard to prove) while user's fees require demonstration of use. In the case of drainage facilities, a user fee allows a lead agency to collect revenue from properties that contribute runoff into the system but may not flood because of their location.

A user fee can be structured proportionally to the amount each parcel uses the flood control facilities rather than how much each property benefits from the services or improvements provided. This allows program costs to be spread over a larger customer base. For flood control work, user fees are typically related to impervious area on the property, which can be equated to runoff. Like the benefit assessment, a user fee may also be implemented by a 50% vote; however, before the vote may be initiated, a noticed protest hearing must take place and less than 50% written protest must be received.

In order to implement a new user fee, the lead agency must define those parcels that use the various drainage facilities and define its method of calculating a fee proportional to use. Figure 3 illustrates the user fee adoption process.

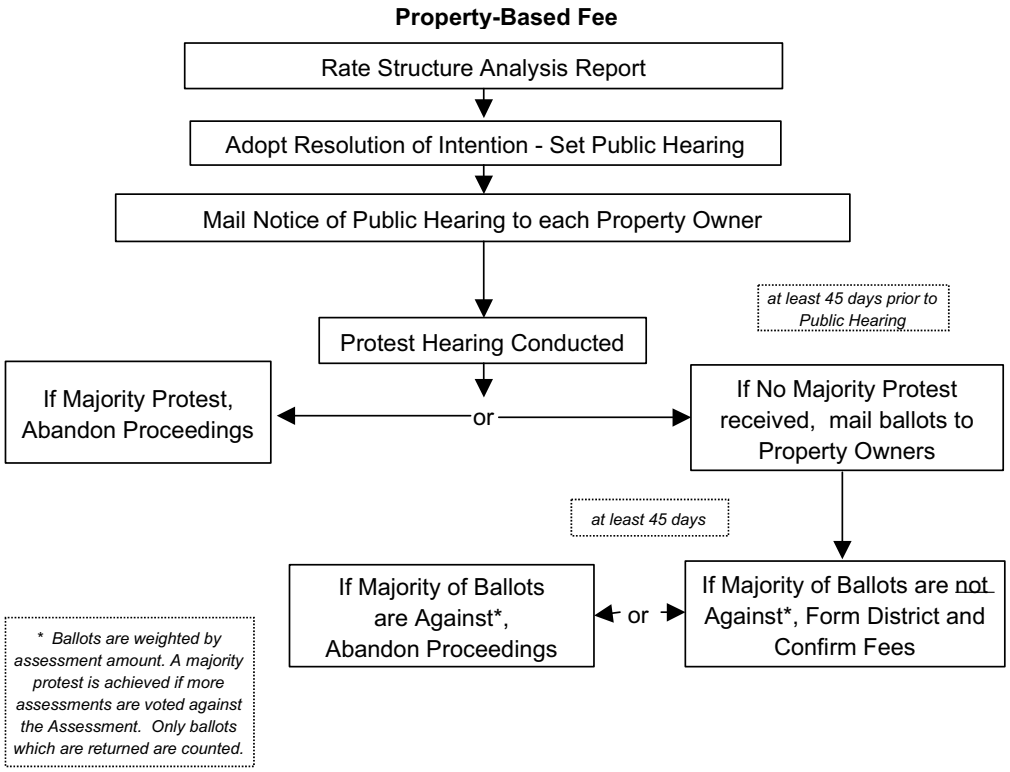

Figure 3 – Property Based Fee Adoption Process

2.4 Development Impact Fee

Government Code Section 66000 et.seq., allows the County or District to collect development fees to fund the installation of storm drain infrastructure necessary to offset the impacts of development. Development Impact Fees are tied to either General Plans or Capital Improvement Programs approved by the County or District. As regular updates of the General Plan and/or Capital Improvement Programs are prepared, additional storm drain infrastructure is identified to support the new developments and projects. The fees cannot be used to correct existing problems; although they can be used to fund a "fair share" of new projects.

Development Impact Fees are not subject to vote. They can be approved by a majority of the County Board of Supervisors or the Flood Control and Water Conservation District Board of Directors after a protest hearing. Figure 4 illustrates the adoption process.

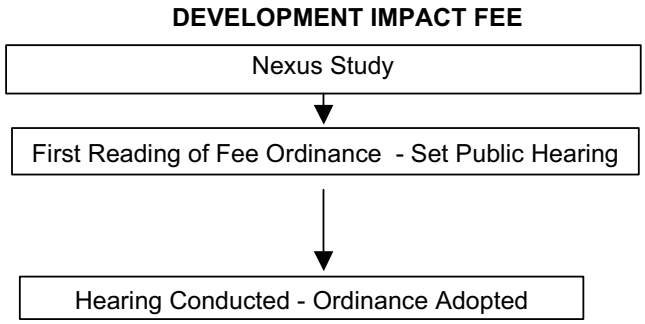

Figure 4 – Development Impact Fee Adoption Process

The County/District should implement Development Impact Fees in all the communities. The communities of Nipomo, San Miguel, and Santa Margarita would benefit from the collection of impact fees as their general plans indicate continued growth of residential and commercial properties. Cambria, Cayucos and Oceano appear built out, however, redevelopment and larger remodels (improvements that exceed a certain percentage of the current property home value) could provide the nexus for collecting impact fees.

3 Outside (Leveraged) Funding Sources from the Federal Analysis

The US Army Corps of Engineers (Corps) developed the Final Funding Program Analysis Report (FPAR) for the San Luis Obispo Creek Watershed (Report) in October 2001. The purpose of the FPAR was to inform the District of monies that might be available to fund a variety of watershed protection projects. The funding sources identified in the FPAR are included in the funding review as part of this TM. In order to not duplicate efforts, the funding sources identified in the FPAR are incorporated as part of this TM and select sections from the FPAR are included in Appendix B.

3.1 Applicable Funding Sources

Although all the funding sources identified in the FPAR relate to watershed protection, only a small number of those sources apply to the types of projects proposed by this Study. Table 2 identifies applicable funding sources described in the FPAR.

Table 2 – Applicable Funding Sources from Funding Program Analysis Report

Agency	Funding Source	Description
US Army Corps of Engineers	Flood Hazard Mitigation and Riverine Ecosystem Restoration Program	Watershed-based program focusing on providing flood protection through non-structural measures when possible
US Army Corps of Engineers	Emergency Streambank and Shoreline Erosion Protection	Allows emergency streambank and shoreline protection to prevent damage to public facilities
US Army Corps of Engineers	Section 205 Flood Control Project	Local protection from flooding by the construction of flood control works such as levees, channels, and dams.
US Army Corps of Engineers	Section 206 Aquatic Ecosystem Restoration	Carries out aquatic ecosystem restoration projects that will improve the quality of the environments.
US Army Corps of Engineers	Section 208 Snagging and Clearing	Local protection from flooding by channel clearing and excavation.
California Department of Water Resources	Urban Streams Restoration Program	Reduce damages from streambank and watershed instability and floods while restoring the environmental and aesthetic values of streams.
State Water Resources Control Board	Nonpoint Source Implementation Grant Program	Reduce erosion in channels to improve water quality through nonpoint source questions
State Water Resources Control Board	Proposition 13 Watershed Protection Program	Develop local watershed management plans and/or implement projects consistent with watershed plans

Notes:

Projects authorized under the US Army Corps of Engineers Continuing Authorities Program (CAP). The CAP provides the Corps with authority to implement small water resources projects without specific congressional authorization

3.2 Additional Requirements for Corps Funding

The Corps requires that the local sponsor[1] assist in the preparation of the planning, environmental, and design documents to ensure that the communities are involved in the project development and selection process. This requires the local sponsor to have an active role throughout the entire Corps civil works process, which can last up to seven years or more. The local sponsor is also expected to share in the cost of the project planning, design and construction (cost sharing depends on the program, but can be as high as 50 percent of the project). The local sponsor financial contribution can be in the form of in-kind service (e.g. staff time), which would offset the cash contribution requirements, but some of these costs would be in addition to the requirements defined by the Corps process. The local sponsor will incur

[1] A local sponsor is typically the local flood control agency or district responsible for programming drainage and flood control services. Local sponsors share in the cost for planning, designing and constructing a project with the Corps.

project costs that are deemed ineligible and cannot be used as part of the local sponsor financial contribution. These costs are typically project management costs incurred for administrative tasks such as management of staff, preparation of invoices, etc.

3.3 Grants

The County's planning department administers Community Development Block Grants (CDBG) on a yearly basis. This program is funded by the US Department of Housing and Urban Development (HUD) and targets low to moderate-income communities. The funding for CDBG is guaranteed each year but the level of funding varies. A detailed description of the program is included in Appendix A.

4 Additional Outside Funding Sources available through the State

In addition to the sources of funding identified in the FPAR, the State of California (State) provides funding for flood protection and erosion control projects. The California Department of Water Resources (DWR), through the Flood Protection Corridor Program (FPCP), funds watershed protection projects that have agriculture and/or wildlife benefits. For those projects that impact the California Department of Transportation (Caltrans) facilities, a standard cooperative agreement exists that can be used to share drainage project costs. The Governor's Office of Emergency Services (OES) administers grants that fund flood protection projects through the Federal Emergency Management Agency's (FEMA) Flood Mitigation Assistance (FMA) program. The State Water Resources Control Board (SWRCB) provides low interest loans for projects that address non-point source pollution through the State Revolving Fund (SRF) loans. Specifically, communities that must meet National Pollutant Discharge Elimination System (NPDES) Phase II requirements are eligible for the SRF loans. The state funding sources are summarized in Table 3 and detailed in Appendix A.

Table 3 – Additional Funding Sources

Agency	Funding Source
California Department of Water Resources	Flood Protection Corridor Program
California Department of Transportation	Cooperative Drainage Projects
Governor's Office of Emergency Services	Flood Mitigation Assistance Program
State Water Resources Control Board	State Revolving Fund Loan

The District is currently applying for assistance from FEMA through the FMA program. The District has submitted a Floodplain Management Plan (FMP) to the State of California Office of Emergency Services for approval. The FMP identifies several repetitive loss structures throughout the County to be removed from identified floodplains. As described in Appendix A, an approved FMP is required prior to applying for funds from the FMA for implementation of the proposed project. The District should continue its efforts to have the FMP approved and apply for FMA project funds to implement the proposed projects.

4.1 Typical Grant Requirements

Grants provide an opportunity for communities to reduce the total project cost that will be funded through taxes, assessments, and fees. Grant applications often require detailed information

regarding the project, the impact on the community and the environment, and project costs. Additionally, grant distributors prefer projects that provide multiple benefits including environmental restoration. Projects compete for existing funds and a majority of applications are not accepted because of this.

Once a grant is appropriated to a project, the recipient is required to complete additional paperwork including invoices, status reports, and project closeout reports. All these costs are not included as part of the grant and are the responsibility of the recipient. The costs are considered ineligible costs, not included as matching funding for project costs. These costs and application costs can be significant and need to be accounted for when preparing project budgets.

5 Additional Outside Funding Sources available through Private Sources

The FPAR identified several funding sources available through private sources. However, these programs provide funds for projects whose scope of work include environmental restoration, creation of open space, and wildlife habitat improvement projects. Projects that will be identified in the Study may not provide enough of these benefits and therefore private funding sources were removed from further consideration. In addition, the focus of these private sources is to provide funds for non-profit and tax exempt groups.

Additional private sources other than those identified in the FPAR are available for similar projects. A listing of these sources can be found on the California Watershed Database website. The website address is http://watershed.ecst.csuchico.edu/new_spin/spinmain.asp. This website provides a search engine for users to locate funding sources based on the project scope of work.

6 Funding Strategy

There are several funding opportunities available for the projects identified in the Study but the likelihood of receiving enough grant funding for all project costs is unlikely. As stated previously, the lead agency will need to fund the planning of the projects, but it is the responsibility of the community to provide permitting, environmental compliance, design and construction funding. The following case studies present example projects using a combination of funding for a sample project.

6.1 Case Study #1 – Isolated Drainage Project

For an isolated drainage project that eliminates localized ponding or street flooding through the construction of curbs and gutter, drop inlets and culverts, the benefit assessment is a logical choice. A typical funding strategy using a benefit assessment would be as follows:

- The Engineer's Report for the project would be completed by the lead agency within 3 months of start. Programming costs would be funded through the lead agency.
- Concurrently with completing the Engineer's Report, the lead agency would conduct a benefit assessment proceeding for the properties that benefit from the improvements. The benefit assessment would be in place prior to moving forward with permitting, environmental compliance, and design. The lead agency can use the assessment to secure bonds to fund construction.

- Appropriate environmental documentation is completed concurrently with the design within 9 months of start.
- Lead agency advertises project and oversees construction. Duration of the construction would be based on the magnitude of the scope, but most likely would be less than one year.
- The lead agency would continue collecting assessments on the properties until the bonds are paid off.

The total time required to complete a project under this scenario is a minimum of two years.

6.2 Case Study #2 – Comprehensive Drainage Project

For a project that includes the construction of storm drain infrastructure such as curbs and gutters, drop inlets, and storm sewer pipelines, a typical funding strategy using a benefit assessment, and if appropriate, CDBG funds would be as follows:

- An Engineer's Report for the project completed by the lead agency within 6 months of start. Programming costs would be funded through the lead agency.
- Concurrently with completing the Engineer's Report, the lead agency would conduct a benefit assessment proceeding for the properties that benefit from the improvements. The benefit assessment would be in place prior to moving forward with permitting, environmental compliance, and design. The lead agency can use the assessment to secure bonds to fund construction.
- Appropriate environmental documentation is completed concurrently with design within 12 months of start.
- Community can apply for CDBG funds, for low-income communities only, following the establishment of the user fees. Funds are distributed in August of each year and applications are typically due October of the previous year.
- Lead agency advertises project and oversees construction. Duration of the construction would be based on the magnitude of the scope and could vary between one and three years.
- The lead agency would continue collecting property based fees until the bonds are paid off.

The total time required to complete a project under this scenario is a minimum of three years.

6.3 Case Study #3 – Channel Improvements

For a project that includes work within an existing channel, a typical funding strategy using a Corps CAP agreement would be as follows:

- The lead agency, on behalf of a majority of its constituents, sends a letter to the Corps to request a CAP project.
- Corps completes a reconnaissance report to identify the problem and determine Federal interest in a project within 1 year of authorization. The benefiting constituents are not required to cost share in the preparation of the study but will be required to participate in the development through public meetings, coordination meetings with Corps staff, and review of the reconnaissance report.

- Corps completes a feasibility report and environmental document within 3 years of approval of the reconnaissance report. The benefiting constituents are required to pay for 50 percent of the total project costs as well as participate in the completion of both documents.
- Corps completes final design within 3 years of approval of the feasibility report and environmental document. The benefiting constituents are responsible for 25 percent of the project costs.
- The lead agency creates a benefit assessment district concurrently with the completion of final design. The lead agency can use the assessment to secure bonds to fund the benefiting constituents portion of the cost.
- Corps advertises and administers construction contract with construction completed between one and three years after start depending on the magnitude of the projects. The benefiting constituents are responsible for 35 percent of the construction costs.

The total time required to complete a project under this scenario is a minimum of seven years.

6.4 Case Study #4 – Drainage Facility Across Public Highway

For a project that includes construction of drainage facilities across a public highway such as Highway 1, a typical funding strategy using a property-based fee and cost sharing with Caltrans would be as follows:

- An Engineer's Report for the project would be completed by the lead agency within 6 months of start. Caltrans will require a review period for the design, which will impact the duration of the design schedule. Programming costs would be funded through the lead agency.
- Concurrently with completing the planning, the lead agency implements a property-based fee. The fee would be in place prior to proceeding with environmental documentation and design. The lead agency can use the property-based fee to secure bonds to fund construction.
- Lead agency submits a cost share agreement to Caltrans concurrently with completing design. Approval of the cost share agreement can take up to 12 months depending on the project.
- Lead agency advertises project and oversee construction. Duration of the construction would be based on the magnitude of the scope and could vary between one and three years.

The total time required to complete a project under this scenario is a minimum of three years.

7 Community Funding

Each community participating in the Study likely qualifies for one or more funding sources identified. The various funding sources identified for projects are presented in Table 4. A matrix identifying each community's problems and likely funding sources is included in

Table 5. A more detailed analysis of potential funding for each of the communities will be included with the individual community implementation strategy report that will be prepared under separate task of the agreement.

8 Conclusion/Recommendation

The study being prepared under separate task of the agreement with RMC will provide the lead agency, sponsoring agency, benefiting constituents, and/or the District with a summary of existing problems in the six communities as well as recommended solutions. This TM summarizes the various funding sources available to these entities, and the communities to implement those projects. Although several grant and cost sharing opportunities exist with various federal and state agencies, significant work is required by the lead agency and/or local sponsor to complete applications and participate in the process. In other words, these funding sources are not "free money."

Because of the effort required to apply for monies that are not guaranteed, it is recommended that the following two local funding mechanisms for projects be implemented:

- The County implement a development impact fee structure that will help assure that all new development pays fairly for its impacts.
- Subject to demonstrated community support, the lead agency should move forward with a property based fee program that assures that all users of existing drainage systems will contribute to upgrade and maintenance. Because the property based fee requires voter approval, it is recommended that the lead agency does not move forward with an election until a petition signed by more than 50% of property owners is brought to the lead agency.

Detailed recommendations for each of the communities will be included with the Study. This TM only summarizes the various sources of funding unless the funding mechanism can be implemented without a specific project scope.

The District and lead agency should continue to aggressively pursue the funding sources listed in this TM and new funding sources that may become available where communities commit themselves to support of a project. Monies received through grants and cost share can be used to offset costs born by the communities.

Table 4 – Summary of Funding Sources

Number	Agency	Funding Source
1	Community Services Districts, San Luis Obispo County Flood Control and Water Conservation District, other lead agency	Special Property Tax
2	Community Services Districts, San Luis Obispo County Flood Control and Water Conservation District, other lead agency	Benefit Assessment
3	Community Services Districts, San Luis Obispo County Flood Control and Water Conservation District, other lead agency	Property Fee
4	County of San Luis Obispo and/or San Luis Obispo County Flood Control and Water Conservation District	Development Fee
5	County of San Luis Obispo	Community Development Block Grants
6	US Army Corps of Engineers	Flood Hazard Mitigation and Riverine Ecosystem Restoration Program
7	US Army Corps of Engineers	Emergency Streambank and Shoreline Erosion Protection
8	US Army Corps of Engineers	Section 205 Flood Control Project
9	US Army Corps of Engineers	Section 206 Aquatic Ecosystem Restoration
10	US Army Corps of Engineers	Section 208 Snagging and Clearing
11	California Department of Water Resources	Urban Streams Restoration Program
12	California Department of Water Resources	Flood Protection Corridor Program
13	California Department of Transportation	Cooperative Agreement
14	State Water Resources Control Board	Nonpoint Source Implementation Grant Program
15	State Water Resources Control Board	Proposition 13 Watershed Protection Program
16	State Water Resources Control Board	State Revolving Fund Loan
17	Governor's Office of Emergency Services	FEMA Flood Mitigation Assistance Program

Community	Problems	Funding Sources from Table 4																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Cambria	1. Local Drainage	L	H	M	H												H	M
Cayucos	1. Overtopping of Cayucos Creek	L	H	M	H		L	L	L	L	L	L			L	L		M
	2. Local Drainage	L	H	M	H													M
Nipomo	1. Old Town Nipomo in Floodplain	L	H	M	H	M	L	L	L	L	L	L	L		L	L		M
	Local Drainage	L	H	M	H												H	M
Oceano	1. Local Drainage	L	H	M	H	M	L							M			H	M
San Miguel	1. Local Drainage	L	H	M	H	M	L											M
Santa Margarita	1. Overtopping of Santa Margarita and Yerba Buena Creek	L	H	M	H		L	L	L	L	L	L	L	L	L	L		M
	2. Local Drainage	L	H	M	H													M

Legend

H - High opportunity for success
M - Moderate opportunity for success
L - Low opportunity for success

Notes

1. Where no opportunity for success designation is listed, it is not considered likely that the listed funding option would be applicable

Table 5 – Summary of Funding Options

Appendix A
Potential Grant and Loan Programs

(1) Community Development Block Grants

Overview

The County's planning department administers Community Development Block Grants (CDBG) on a yearly basis. This program is funded by the US Department of Housing and Urban Development (HUD) and targets low to moderate income communities. The funding for CDBG is guaranteed each year but the level of funding varies.

CDBG funds can be used for any community development activity such as acquisition of real property, affordable housing activities, construction or rehabilitation of public facilities and improvements, clearance and demolition of buildings, provision of certain types of public services, relocation payments and assistance, removal of architectural barriers, housing rehabilitation, special economic development activities, planning studies and grant administration. A community must meet one of the three national objectives to be eligible for the funding:

- 51% or more of the community households must have incomes below 80% of the County median; or
- The project must aid in the prevention or elimination of slums or blight; or
- The project must address urgent needs that pose a serious, immediate threat to the public health or welfare.

Application Deadline(s)

October of each year

Assistance Provided

The CDBG funds can be used for planning, design, or construction of a project, however, the County planning department's preference is that a project have plans and specifications completed prior to paying out funds. The County is required to report on spending of CDBG funds on an annual basis and therefore most projects that receive CDBG funds are construction projects because funds are more likely to be expended within a year of appropriation. Applications are ranked based on the following criteria:

- Consistency with federal regulations and laws
- Community support
- Seriousness of community development need proposed to be addressed by project
- Degree to which project benefits low-income and very low-income families or persons
- Feasibility of the project to be completed as budgeted within 18 months of appropriation
- Cost effectiveness of funds requested and leveraging of other funds
- Organization's experience or knowledge regarding CDBG requirements

Funding Level	There is no cap on grant application but the County is allocated approximately $500,000 on an average year from HUD for projects similar to those identified in the study. While matching funds are not required; the County and HUD looks most favorably on projects with a matching fund component.	
Legislative Authority	Title I of the Housing and Community Development Act of 1974, Public Law 93-383, as amended	
Contacts	Address:	County of San Luis Obispo Department of Planning and Building County Government Center San Luis Obispo, CA 93408
	Telephone:	(805) 781-5787
	Internet:	http://www.co.slo.ca.us

(2) Flood Protection Corridor Program

Overview

The Flood Protection Corridor Program (FPCP) was established when California voters passed Proposition 13, the "Safe Drinking Water, Watershed Protection and Flood Protection Act" in March of 2000. The FPCP authorized bond sales of $70 million for primarily nonstructural flood management projects that include wildlife habitat enhancement and/or agricultural land preservation. Of the $70 million, approximately $5 million will go to educational programs and administrative costs. Another $5 million was earmarked by the Legislation for the City of Santee, leaving approximately $60 million for flood corridor protection projects throughout the state.

Application Deadline(s)

February of each year

Assistance Provided

The Flood Protection Corridor Program grant can be used for projects that include:

- Non-structural flood damage reduction projects within flood corridors,
- Acquisition of real property or easements in a floodplain,
- Setting back existing flood control levees or strengthening or modifying existing levees in conjunction with levee setbacks,
- Preserving or enhancing flood-compatible agricultural use of the real property,
- Preserving or enhancing wildlife values of the real property through restoration of habitat compatible with seasonal flooding,
- Repairing breaches in the flood control systems, water diversion facilities, or flood control facilities damaged by a project developed pursuant to Chapter 5, Article 2.5 of the Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act of 2000,
- Establishing a trust fund for up to 20 percent of the money paid for acquisition for the purpose of generating interest to maintain the acquired lands,
- Paying the costs associated with the administration of the projects.

The project location must also be located at least partially in:

- A FEMA Special Flood Hazard Area (SFHA), or
- An area that would be inundated if the project were completed and an adjacent FEMA SFHA were inundated, or
- A FEMA SFHA, which is determined by using the detailed methods identified in FEMA Publication 37, published in January 1995, titled “Flood Insurance Study Guidelines and Specifications for Study Contractors”, or

- A floodplain designated by The Reclamation Board under Water Code Section 8402(f) *[Title 23, California Code of Regulations, Division 2, Section 497.5(a)],* or a
- Locally designated Flood Hazard Area, with credible hydrologic data to support designation of at least one in 100 annual probability of flood risk. This is applicable to locations without levees, or where existing levees can be set back, breached, or removed. In the latter case, levee setbacks, removal, or breaching to allow inundation of the floodplain should be part of the project.

Funding Level

A grant cap of $5 million per project has been established, however, exceptional projects requesting funding greater than the established cap will be considered on a case-by-case basis.

Legislative Authority

Division 26, Section 79000 Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act

Contacts

Address: Flood Protection Corridor Program
Department of Water Resources, Division of Flood Management
1416 Ninth Street, Room 1641
Sacramento, CA 95814
Telephone: (916) 654-3620
Internet: http://www.dfm.water.ca.gov/fpcp/

(3) Cooperative Agreement

Overview

The California Department of Transportation (Caltrans) has established a process for cost sharing of drainage projects being implemented by a local agency that will benefit Caltrans facilities.

Application Deadline(s)

None

Assistance Provided

Caltrans has established a process for cost sharing of planning, design, and construction of drainage projects. The process for applying for a Cooperative Agreement is detailed in the Cooperative Agreement Manual.

Funding Level

The cost to Caltrans is based on the benefit received from the project.

Legislative Authority

Streets and Highways Code Sections 114 and 130

Contacts

Address: California Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, CA 93401-5415
Telephone: (805) 549-3111
Internet: http://www.dot.ca.gov/hq/oppd/coop/cooptoc.html

(4) Flood Mitigation Assistance

Overview

FEMA provides funds on a yearly basis for each of the states to administer FMA grants. In California, the Governor's Office of Emergency Services administers these grants. The purpose of these grants is to provide local communities with funds to alleviate reoccurring flooding problems and to reduce claims on the National Flood Insurance Fund (NFIF). There are three types of grants available:

- FMA Planning Grants
- FMA Project Grants
- FMA Technical Assistance Grants

All projects that address flooding issues for areas within a Special Flood Hazard Area (SFHA)[2] are eligible for both FMA Planning and Project grants. In order to receive a FMA Project grant to implement a project to reduce flood losses, a Flood Mitigation Plan (FMP) must be completed by the lead agency and approved by FEMA. The FMA Planning Grant can be used to fund the completion of the FMP.

Application Deadline(s)

None

Assistance Provided

Prior to proceeding with a FMA Project Grant application, the grant applicant must document the flooding problem with the FMP. In addition to describing the flooding problem, the following information is included in the FMP:

- Public involvement
- Coordination with other agencies or organizations
- Flood hazard area inventory
- Review of possible mitigation actions
- State or local adoption following a public hearing
- Actions necessary to implement plan

Following the approval of the FMP, the grant applicant can apply for a FMA Project Grant. This grant is used to implement the specific project identified in the FMP including property acquisition, modification of existing culverts/bridges, elevation of National Flood Insurance Program (NFIP) insured structures, or relocation of NFIP insured structures.

The project must also meet five basic requirements to receive funding:

- Be cost effective – Project costs cannot exceed expected benefits
- Conform with applicable Federal, State, and Executive Orders
- Be technically feasible

[2] Any area within the 100-year flood plain as defined by FEMA is within a SFHA.

- Conform with the FMP
- Be located physically in a participating NFIP community that is not on probation, or benefit such a community directly by reducing future flood damages

Funding Level

- The applicant is responsible for 25% of the costs associated with each grant. The applicant can utilize in-kind services to fund half the applicant's fiscal responsibility. Examples of in-kind services include County staff time, volunteer work, donated supplies, and donated equipment.
- An applicant may receive only one FMA Planning Grant for a maximum of $50,000 in any given five year period.
- An applicant may receive multiple FMA Project Grants but the maximum total of all grants cannot exceed $3.3 million over a five-year period. The $3.3 million value includes monies received from a FMA Planning Grant.

Legislative Authority National Flood Insurance Reform Act of 1994 (NFIRA), Sections 1366 and 1367 (42 U.S.C. 4101)

Contacts

Address:	Governor's Office of Emergency Services P.O. Box 419047 Rancho Cordova, CA 95741-9047
Telephone:	(916) 845-8150
Internet:	http://www.oes.ca.gov http://www.fema.gov/fima/planfma.shtm (Copy of FEMA's Flood Mitigation Assistance Guidance)

(5) SWRCB Revolving Loan Program

Overview

Low interest loans to address water quality problems associated with discharges from wastewater and water reclamation facilities, as well as from nonpoint source discharges and for estuary enhancement.

Application Deadline(s)

Final adoption of State priority list for next State fiscal year in June

Assistance Provided

The purpose of the loan is to assist agencies and local communities meet water quality standards set forth by the Federal Clean Water Act. The loan is for projects associated with discharge from wastewater and water reclamation facilities, as well as from nonpoint sources to conform with NPDES requirements.

Funding Level

The interest rate on an SRF loan is 50% of the interest rate on the most recently sold general obligation bond. The maximum amortization period is 20 years. Loans may cover up to 100% of the cost of planning, design, and construction of NPS pollution control structures and 100% of NPS pollution control programs. The borrower will begin making annual repayments of principal and interest one year after the first disbursement of loan funds.

Legislative Authority

Federal Clean Water Act

Contacts

Address: State Water Resources Control Board
Division of Financial Assistance
1001 I Street, 16th Floor
Sacramento, CA 95814
Contact: Jeff Albrecht

Telephone: (916) 341-5717

Internet: http://www.swrcb.ca.gov/funding/

Appendix B

Excerpts from the San Luis Obispo Creek Watershed, San Luis Obispo County, California, Final Funding Program Analysis Report Prepared by the US Army Corps of Engineers, Los Angeles District October 2001

(1) Continuing Authorities Programs

Overview

Congress has provided the Corps with a number of standing authorities to study and build water resources projects for various purposes, and with specified limits on Federal money spent for a project.

Application Deadline(s)

Specific congressional authorization is not needed

Assistance Provided

- Flood Control Projects – Local protection from flooding by the construction or improvement of flood control works such as levees, channels, and dams. Non-structural alternatives are also considered
- Emergency Streambank and shoreline Erosion – Allows emergency streambank and shoreline protection to prevent damage to public facilities, e.g., roads, bridges, hospitals, schools, and water/sewage treatment plants
- Snagging and Clearing for Flood Control – Local protection from flooding by channel clearing and excavation, with limited embankment construction by use of materials from the clearing operations only.
- Aquatic Ecosystem Restoration – Carries out aquatic ecosystem restoration projects that will improve the quality of the environment, are in the public interest, and are cost effective

Funding Level

- Flood Control Projects - Federal share may not exceed $7 million for each project. Required non-Federal match: 50 percent of the cost of the project for structural measures and 35 percent of the cost of the project for nonstructural measures.
- Emergency Streambank and Shoreline Restoration - Federal share may not exceed $1 million for each project. Non-Federal share of total project costs is at least 25 percent.
- Snagging and Clearing for Flood Control – Federal share may not exceed $500,000 for each project. Required 50 percent non-Federal match including all costs in excess of the Federal cost limitation.
- Aquatic Ecosystem Restoration – Federal share is limited to $5 million. The non-Federal share is 35 percent (including studies, plans and specifications, and construction).

Legislative Authority

- Flood Control Projects – Section 205 of the 1948 Flood Control Act (FCA), as amended
- Emergency Streambank and Shoreline Restoration – Section 14, 1946 FCA, as amended
- Snagging and Clearing for Flood Control – Section 208, 1954 FCA, as amended
- Aquatic Ecosystem Restoration – Section 206, Water Resources Development Act (WRDA) of 1996

Contacts

Address:	US Army Engineer District, Los Angeles PO Box 2711 Los Angeles, CA 90053-2325
Telephone:	(213) 452-5300
Internet:	http://www.spl.usace.army.mil/

(2) Flood Hazard Mitigation and Riverine Restoration Program

Overview

Informally known as "Challenge 21," this watershed-based program focuses on identifying sustainable solution to flooding problems by examining nonstructural solutions in flood-prone areas, while retaining traditional measures where appropriate. Eligible projects will meet the dual purpose of flood hazard mitigation and riverine ecosystem restoration.

Application Deadline(s)

Undetermined

Assistance Provided

Projects include the relocation of threatened structures, conservation or restoration of wetlands and natural floodwater storage areas, and planning for responses to potential future floods.

Funding Level

The non-Federal sponsor is required to provide 50 percent for the studies and 35% for project implementation, up to a maximum Federal allocation of $300 million.

- FY2003 through FY2005 - $50 million for each FY

Legislative Authority

Section 212 WRDA 1999

Contacts

Address: US Army Engineer District, Los Angeles
PO Box 2711
Los Angeles, CA 90053-2325
Telephone: (213) 452-5300
Internet: http://www.spl.usace.army.mil/

(3) Urban Streams Restoration Program – Proposition 13

Overview

The objectives of this program is to assist communities in reducing damages from streambank and watershed instability and floods while restoring the environmental and aesthetic values of streams, and to encourage stewardship and maintenance of streams by the community. Objectives of the program are met by providing local governments and citizen's groups with small grants and technical assistance for restoration projects, to encourage all segments of local communities to value natural streams as an amenity, and to educate citizens about the value and processes taking place in natural streams.

Application Deadline(s)

To Be Determined

Assistance Provided

This program supports actions that:

- Prevent property damage caused by flooding and bank erosion
- Restore the natural value of streams; and
- Promote community stewardship

Funding Level

Grants can fund projects as simple as a volunteer workday to clean up neighborhood steams, or projects as complex as complete restoration of a streams to its original, natural state.

- The Department is in the process of amending the regulations for the program, including raising the grant cap from $200,000 to $1 million
- All potential projects must have two sponsors: a local agency and a community group.

Legislative Authority

- Stream Restoration and Flood Control Act of 1984
- Costa-Machado Water Bond Act of 2000

Contacts

Address: California Department of Water Resources
Urban Streams Restoration program
Attn: Earle Cummings
PO Box 942836
Sacramento, CA 94236-0001

Telephone: (916) 327-1656

Internet: http://wwwdpla.water.ca.gov/environment/habitat/stream/

(4) Proposition 13 Watershed Protection Program

Overview

This program provides grants to municipalities, local agencies, or nonprofit organizations to develop local watershed management plans and/or implement projects consistent with watershed plans.

Application Deadline(s)

To Be Determined

Assistance Provided

Grants may be awarded for projects that implement methods for attaining watershed improvements or for a monitoring program described in a local watershed management plan in an amount not to exceed five million dollars ($5,000,000) per project. At least 85 percent of the total amount in the sub account shall be used for capital outlay projects.

Eligible projects under this article may do any of the following:

- Reduce chronic flooding problems or control water velocity and volume using vegetation management or other nonstructural methods.
- Protect and enhance greenbelts and riparian and wetlands habitats.
- Restore or improve habitat for aquatic or terrestrial species.
- Monitor the water quality conditions and assess the environmental health of the watershed.
- Use geographic information systems to display and manage the environmental data describing the watershed.
- Prevent watershed soil erosion and sedimentation of surface waters.
- Support beneficial groundwater recharge capabilities.
- Otherwise reduce the discharge of pollutants to state waters from storm water or nonpoint sources.

Funding Level

Minimum request of $50,000 and maximum of $5 million

Legislative Authority

Costa-Machado Water Act of 2000

Contacts

Address: Proposition 13 Grant Program – Phase II
Attn: Bill Campbell, Chief
Watershed Project Support Section
Division of Water Quality
State Water Resources Control Board
1001 I Street, 15th Floor
Sacramento, CA 95814

Telephone: (916) 341-5250

Internet: http://www.swrcb.ca.gov/prop13/index.html

(5) Nonpoint Source Pollution Control Program

Overview

The purpose of the NPS Pollution Control Program is "to provide grant funding for projects that protect the beneficial uses of water throughout the State through the control of nonpoint source pollution."

Application Deadline(s)

To Be Determined

Assistance Provided

Grants shall only be awarded for any of the following projects:

- A project that is consistent with local watershed management plans that are developed under subdivision (d) of Section 79080 and with regional water quality control plans.
- A broad-based nonpoint source project, including a project identified in the board's "Initiatives in NPS Management," dated September 1995, and nonpoint source technical advisory committee reports.
- A project that is consistent with the "Integrated Plan for Implementation of the Watershed Management Initiative" prepared by the board and the regional boards.
- A project that implements management measures and practices or other needed projects identified by the board pursuant to its nonpoint source pollution control program's 15-year implementation strategy and five-year implementation plan that meets the requirements of Section 6217(g) of the federal Coastal Zone Act Reauthorization Amendments of 1990.
- The projects funded from the sub account shall demonstrate a capability of sustaining water quality benefits for a period of 20 years. Projects shall have defined water quality or beneficial use goals.

Funding Level

Minimum request of $50,000 and maximum of $5 million

Legislative Authority

Costa-Machado Water Act of 2000

Contacts

Address: Proposition 13 Grant Program – Phase II
Attn: Bill Campbell, Chief
Watershed Project Support Section
Division of Water Quality
State Water Resources Control Board
1001 I Street, 15th Floor
Sacramento, CA 95814

Telephone: (916) 341-5250

Internet: http://www.swrcb.ca.gov/prop13/index.html

Appendix H

RESPONSE TO COMMENTS

APPENDIX H

COUNTY GENERAL SERVICES REVIEW COMMENTS

SAN LUIS OBISPO COUNTY
DEPARTMENT OF PUBLIC WORKS

Noel King, Director

County Government Center, Room 207 • San Luis Obispo CA 93408 • (805) 781-5252

Fax (805) 781-1229 email address: pwd@co.slo.ca.us

OCEANO COMMUNITY DRAINAGE AND FLOOD CONTROL STUDY
April 30, 2003 Meeting Minutes
County General Services Department Review of First RMC Draft Report

Prepared by Dean Benedix

A draft report of the study was provided to Caryn Maddalena of the General Services Department for review and comment. General Services review was requested because the draft report included alternative recommendations to utilize "undeveloped" County property in the Oceano area adjacent to the airport for storm water detention/retention purposes. Possible areas considered include the "RV storage site" and the airport "clear zone" vacant area at the east end of the Oceano airport.

Caryn requested that a meeting be held to discuss issues associated with possible use of County property for drainage purposes.

Attending the meeting were:

George Rosenberger, Deputy Director of General Services
Caryn Maddalena, Real Property Manager
Dean Benedix, Public Works Department Project Engineer
Klaasje Mairne, Airport Manager
Martin Pehl, Assistant Airport Manager

Dean presented the concept of the consideration of use of vacant or underutilized County property in the vicinity of the airport for storm water detention or retention. Another potential use of the property is as a forebay basin for a pump station to pump water into the Arroyo Grande Creek channel. The purpose is to assist in resolving a portion of the Oceano Community area drainage problems. Dean advised that the downstream areas in the vicinity of the airport have historically flooded and acted as a large stormwater storage basin. This will continue to occur, and likely worsen as development continues without significant mitigations. As the area developed, storm water storage areas were filled without adequate replacement facilities. The draft report discusses using the RV storage site as a potential detention basin site.

Dean also noted that the draft Study discussion regarding OCSD as a lead agency with respect to drainage will be modified since OCSD has repeatedly advised that they are not interested in serving or performing any functions relative to this responsibility.

General Services staff provided the following information regarding the Oceano airport area County property:

1. Although the airport property is County owned, the property was acquired using Federal Aviation Administration (FAA)l funds. The development of the airport property and major maintenance is accomplished using FAA funds. The County must obtain FAA approval prior to any change in use of any airport property, including the RV storage property since this was purchased using FAA funds. Additionally FAA funding for Oceano Airport is connected to FAA funding for the San Luis Obispo County Airport. Any use changes, circumstances, approvals, or developments on any airport property may adversely affect continued funding for other County airport property, facilities or uses. Because of these reasons, new or different property uses are extremely sensitive and must be directly tied to improvements or optimization of airport property uses.

2. It is proposed that the Oceano Airport widen its existing approximately 2500-foot, paved runway by 10 feet on each side, and overlay the entire asphalt area as major maintenance. This work would be accomplished using FAA funds. This widening and overlay may be viewed as an opportunity to require the provision of some stormwater storage in conjunction with an Oceano community stormwater mitigation solution.

3. The General Services Department is in the process of beginning a Master Plan update for the Oceano Airport. County staff estimates it will take approximately one year to complete the update. General Services will subsequently prepare an EIR and a NEPA document since federal funding will be utilized to expand the width of the runways. The Oceano Community Drainage Study may be used as a vehicle to support the inclusion of drainage features into the Airport Maser Plan, subject to County and FAA approval. The key to a positive coordinated use, will be to show the benefit a drainage feature would have to the airport. This benefit could come from a perspective of reduction in flooding potential or reduced down time due to lack of access to or use of the airport property and associated facilities.

4. General Services has recently completed a Record of Survey of the airport property. The survey was accomplished under the engineering auspices of Tartaglia Engineering by Volbrecht Surveying. This Record of Survey is No. 01-048, located at Book 83 LS, Page 60-81. Additionally, Tartaglia is preparing an aerial topographic survey with digital photographic file to be used with the airport property boundary work. This work should be completed by the end of June 2003. Additionally, Tartaglia has prepared an

Airport Layout Plan (August 2002) consisting of three sheets showing airport and runway data on a single two hundred scale map. A copy of sheet 1 of this map is attached.

5. A significant issue which was discussed is a potential conflict between the attraction of waterfowl to new drainage features within the vicinity of the Oceano airport take off and runway zones. Klassje provided Dean with an FAA advisory circular dated May 1, 1997, which provides guidance on locating certain land uses having the potential to attract hazardous wildlife to and in the vicinity of public use airports. According to the documents, any new land use practices that attract or could sustain hazardous wildlife populations on or near airports could increase potential for wildlife aircraft collisions. According to the regulations, siting criteria for such wildlife attractants a minimum distance of 5,000 feet is recommended and a distance of five statue miles for departure or approach airspace is recommended. This siting criteria could have a significant effect on siting drainage basins south or north of the airport runway. Martin advised that the State Dept. of Agriculture had staff which reviews wildlife attractants, and could provide our consultant additional information, if necessary. A copy of the FAA Advisory Circular is attached.

6. The Oceano Community Services District requested and was given the authority to maintain and operate the Oceano Airport from 1980 to 1986. Subsequent to 1986, OCSD returned the responsibility to the County.

7. General Services staff indicated that there was a potential for use of airport property for drainage & flood control facilities providing the following could occur:

   - If the RV site property were to be used, the approximate collection of $30,000 per year revenue would need to be replaced since this annual revenue collection is utilized to operate the Oceano Airport.

   - There would have to be a benefit shown to the airport in order to convince FAA such a use is indeed beneficial. It will have to be supported by General Services.

   - A potential conflict between waterfowl and aircraft would have to be addressed without a restricting result.

It was agreed that Public Works would have their consultant revise the Community Drainage Study as follows:

- Potential use of County property for drainage and flood control purposes would be subject to provision of replacement of revenue should the RV site appear to be the best solution.

- Discussion of the wildlife attractant and conflict issue should be included in the report and considered when siting the facilities, or addressed briefly in the environmental evaluation as a potential impact.

- Use of the airport property would need to provide a significant benefit to the airport facilities or property.

- Any proposal for new airport property use for drainage facilities must obtain FAA's review and approval prior to any formalization of such as concept use.

- The anticipated Oceano Master Plan Update EIR/NEPA can include the evaluation of wildlife attractants in more detail than is required for the drainage study.

- A copy of the revised draft will be provided to Caryn for review of the above issues.

Attachments: FAA advisory circular dated May 1, 1997
Airport Layout Plan (August 2002)

c: All Attendees
Noel King, Director of Public Works
Glen Priddy, Deputy Director Public Works -Engineering Services
George Gibson, Design Engineer
Jose Guittierez, RMC (w/attachments)

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U.S. Department
of Transportation

Federal Aviation Administration

Advisory Circular

Subject: HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

Date: 5/1/97
Initiated by: AAS-310 and APP-600

AC No: 150/5200-33
Change:

1. **PURPOSE.** This advisory circular (AC) provides guidance on locating certain land uses having the potential to attract hazardous wildlife to or in the vicinity of public-use airports. It also provides guidance concerning the placement of new airport development projects (including airport construction, expansion, and renovation) pertaining to aircraft movement in the vicinity of hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2. **APPLICATION.** The standards, practices, and suggestions contained in this AC are recommended by the Federal Aviation Administration (FAA) for use by the operators and sponsors of all public-use airports. In addition, the standards, practices, and suggestions contained in this AC are recommended by the FAA as guidance for land use planners, operators, and developers of projects, facilities, and activities on or near airports.

3. **BACKGROUND.** Populations of many species of wildlife have increased markedly in the last few years. Some of these species are able to adapt to human-made environments, such as exist on and around airports. The increase in wildlife populations, the use of larger turbine engines, the increased use of twin-engine aircraft, and the increase in air-traffic, all combine to increase the risk, frequency, and potential severity of wildlife-aircraft collisions.

Most public-use airports have large tracts of open, unimproved land that are desirable for added margins of safety and noise mitigation. These areas can present potential hazards to aviation because they often attract hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives world-wide, as well as billions of dollars worth of aircraft damage. Hazardous wildlife attractants near airports could jeopardize future airport expansion because of safety considerations.

DAVID L. BENNETT
Director, Office of Airport Safety and Standards

SECTION 1. HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS.

1-1. TYPES OF HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS. Human-made or natural areas, such as poorly-drained areas, retention ponds, roosting habitats on buildings, landscaping, putrescible-waste disposal operations, wastewater treatment plants, agricultural or aquacultural activities, surface mining, or wetlands, may be used by wildlife for escape, feeding, loafing, or reproduction. Wildlife use of areas within an airport's approach or departure airspace, aircraft movement areas, loading ramps, or aircraft parking areas may cause conditions hazardous to aircraft safety.

All species of wildlife can pose a threat to aircraft safety. However, some species are more commonly involved in aircraft strikes than others. Table 1 lists the wildlife groups commonly reported as being involved in damaging strikes to U.S. aircraft from 1993 to 1995.

Table 1. Wildlife Groups Involved in Damaging Strikes to Civilian Aircraft, USA, 1993-1995.

Wildlife Groups	Percent involvement in reported damaging strikes
Gulls	28
Waterfowl	28
Raptors	11
Doves	6
Vultures	5
Blackbirds-Starlings	5
Corvids	3
Wading birds	3
Deer	11
Canids	1

1-2. LAND USE PRACTICES. Land use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife-aircraft collisions. FAA recommends against land use practices, within the siting criteria stated in 1-3, that attract or sustain populations of hazardous wildlife within the vicinity of airports or cause movement of hazardous wildlife onto, into, or across the approach or departure airspace, aircraft movement area, loading ramps, or aircraft parking area of airports.

Airport operators, sponsors, planners, and land use developers should consider whether proposed land uses, including new airport development projects, would increase the wildlife hazard. Caution should be exercised to ensure that land use practices on or near airports do not enhance the attractiveness of the area to hazardous wildlife.

1-3. SITING CRITERIA. FAA recommends separations when siting any of the wildlife attractants mentioned in Section 2 or when planning new airport development projects to accommodate aircraft movement. The distance between an airport's aircraft movement areas, loading ramps, or aircraft parking areas and the wildlife attractant should be as follows:

a. Airports serving piston-powered aircraft. A distance of 5,000 feet is recommended.

b. Airports serving turbine-powered aircraft. A distance of 10,000 feet is recommended.

c. Approach or Departure airspace. A distance of 5 statute miles is recommended, if the wildlife attractant may cause hazardous wildlife movement into or across the approach or departure airspace.

SECTION 2. LAND USES THAT ARE INCOMPATIBLE WITH SAFE AIRPORT OPERATIONS.

2-1. GENERAL. The wildlife species and the size of the populations attracted to the airport environment are highly variable and may depend on several factors, including land-use practices on or near the airport. It is important to identify those land use practices in the airport area that attract hazardous wildlife. This section discusses land use practices known to threaten aviation safety.

2-2. PUTRESCIBLE-WASTE DISPOSAL OPERATIONS. Putrescible-waste disposal operations are known to attract large numbers of wildlife that are hazardous to aircraft. Because of this, these operations, when located within the separations identified in the sitting criteria in 1-3 are considered incompatible with safe airport operations.

FAA recommends against locating putrescible-waste disposal operations inside the separations identified in the siting criteria mentioned above. FAA also recommends against new airport development projects that would increase the number of aircraft operations or that would accommodate larger or faster aircraft, near putrescible-waste disposal operations located within the separations identified in the siting criteria in 1-3.

2-3. WASTEWATER TREATMENT FACILITIES. Wastewater treatment facilities and associated settling ponds often attract large numbers of wildlife that can pose a threat to aircraft safety when they are located on or near an airport.

a. New wastewater treatment facilities. FAA recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in the siting criteria in 1-3. During the siting analysis for wastewater treatment facilities, the potential to attract hazardous wildlife should be considered if an airport is in the vicinity of a proposed site. Airport operators should voice their opposition to such sitings. In addition, they should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

b. Existing wastewater treatment facilities. FAA recommends correcting any wildlife hazards arising from existing wastewater treatment facilities located on or near airports without delay, using appropriate wildlife hazard mitigation techniques. Accordingly, measures to minimize hazardous wildlife attraction should be developed in consultation with a wildlife damage management biologist. FAA recommends that wastewater treatment facility operators incorporate appropriate wildlife hazard mitigation techniques into their operating practices. Airport operators also should encourage those operators to incorporate these mitigation techniques in their operating practices.

c. Artificial marshes. Waste-water treatment facilities may create artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. FAA recommends against establishing artificial marshes within the separations identified in the siting criteria stated in 1-3.

d. Wastewater discharge and sludge disposal. FAA recommends against the discharge of wastewater or sludge on airport property. Regular spraying of wastewater or sludge disposal on unpaved areas may improve soil moisture and quality. The resultant turf growth requires more frequent mowing, which in turn may mutilate or flush insects or small animals and produce straw. The maimed or flushed organisms and the straw can attract hazardous wildlife and jeopardize aviation safety. In addition, the improved turf may attract grazing wildlife such as deer and geese.

Problems may also occur when discharges saturate unpaved airport areas. The resultant soft, muddy conditions can severely restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

e. Underwater waste discharges. The underwater discharge of any food waste, e.g., fish processing offal, that could attract scavenging wildlife is not recommended within the separations identified in the siting criteria in 1-3.

2-4. WETLANDS.

a. Wetlands on or near Airports.

(1) Existing Airports. Normally, wetlands are attractive to many wildlife species. Airport operators with wetlands located on or nearby airport property should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations.

(2) Airport Development. When practicable, the FAA recommends siting new airports using the separations identified in the siting criteria in 1-3. Where alternative sites are not practicable or when expanding existing airports in or near wetlands, the wildlife hazards should be evaluated and minimized through a wildlife management plan prepared by a wildlife damage management biologist, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the U.S. Army Corps of Engineers (COE).

NOTE: If questions exist as to whether or not an area would qualify as a wetland, contact the U.S. Army COE, the Natural Resource Conservation Service, or a wetland consultant certified to delineate wetlands.

b. Wetland mitigation. Mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects. Wetland mitigation should be designed so it does not create a wildlife hazard.

(1) FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in the siting criteria in 1-3. Wetland mitigation banks meeting these siting criteria offer an ecologically sound approach to mitigation in these situations.

(2) Exceptions to locating mitigation activities outside the separations identified in the siting criteria in 1-3 may be considered if the affected wetlands provide unique ecological functions, such as critical habitat for threatened or endangered species or ground water recharge. Such mitigation must be compatible with safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife should be avoided. On-site mitigation plans may be reviewed by the FAA to determine compatibility with safe airport operations.

(3) Wetland mitigation projects that are needed to protect unique wetland functions (see 2-4.b.(2)), and that must be located in the siting criteria in 1-3 should be identified and evaluated by a wildlife damage management biologist before implementing the mitigation. A wildlife damage management plan should be developed to reduce the wildlife hazards.

NOTE: AC 150/5000-3, *Address List for Regional Airports Division and Airports District/Field Offices*, provides information on the location of these offices.

2-5. DREDGE SPOIL CONTAINMENT AREAS.

FAA recommends against locating dredge spoil containment areas within the separations identified in the siting criteria in 1-3, if the spoil contains material that would attract hazardous wildlife.

SECTION 3. LAND USES THAT MAY BE COMPATIBLE WITH SAFE AIRPORT OPERATIONS.

3-1. GENERAL. Even though they may, under certain circumstances, attract hazardous wildlife, the land use practices discussed in this section have flexibility regarding their location or operation and may even be under the airport operator's or sponsor's control. In general, the FAA does not consider the activities discussed below as hazardous to aviation if there is no apparent attraction to hazardous wildlife, or wildlife hazard mitigation techniques are implemented to deal effectively with any wildlife hazard that may arise.

3-2. ENCLOSED WASTE FACILITIES. Enclosed trash transfer stations or enclosed waste handling facilities that receive garbage indoors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles, generally would be compatible, from a wildlife perspective, with safe airport operations, provided they are not located on airport property or within the runway protection zone (RPZ). No putrescible-waste should be handled or stored outside at any time, for any reason, or in a partially enclosed structure accessible to hazardous wildlife.

Partially enclosed operations that accept putrescible-waste are considered to be incompatible with safe airport operations. FAA recommends these operations occur outside the separations identified in the siting criteria in 1-3.

3-3. RECYCLING CENTERS. Recycling centers that accept previously sorted, non-food items such as glass, newspaper, cardboard, or aluminum are, in most cases, not attractive to hazardous wildlife.

3-4. COMPOSTING OPERATIONS ON AIRPORTS. FAA recommends against locating composting operations on airports. However, when they are located on an airport, composting operations should not be located closer than the greater of the following distances: 1,200 feet from any aircraft movement area, loading ramp, or aircraft parking space; or the distance called for by airport design requirements. This spacing is intended to prevent material, personnel, or equipment from penetrating any Obstacle Free Area (OFA), Obstacle Free Zone (OFZ), Threshold Siting Surface (TSS), or Clearway (see AC 150/5300-13, *Airport Design*). On-airport disposal of compost by-products is not recommended for the reasons stated in 2-3.d.

a. Composition of material handled. Components of the compost should never include any municipal solid waste. Non-food waste such as leaves, lawn clippings, branches, and twigs generally are not considered a wildlife attractant. Sewage sludge, wood-chips, and similar material are not municipal solid wastes and may be used as compost bulking agents.

b. Monitoring on-airport composting operations. If composting operations are to be located on airport property, FAA recommends that the airport operator monitor composting operations to ensure that steam or thermal rise does not affect air traffic in any way. Discarded leaf disposal bags or other debris must not be allowed to blow onto any active airport area. Also, the airport operator should reserve the right to stop any operation that creates unsafe, undesirable, or incompatible conditions at the airport.

3-5. ASH DISPOSAL. Fly ash from resource recovery facilities that are fired by municipal solid waste, coal, or wood, is generally considered not to be a wildlife attractant because it contains no putrescible matter. FAA generally does not consider landfills accepting only fly ash to be wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

Since varying degrees of waste consumption are associated with general incineration, FAA classifies the ash from general incinerators as a regular waste disposal by-product and, therefore, a hazardous wildlife attractant.

3-6. CONSTRUCTION AND DEMOLITION (C&D) DEBRIS LANDFILLS. C&D debris (Class IV) landfills have visual and operational characteristics similar to putrescible-waste disposal sites. When co-located with putrescible-waste disposal operations, the probability of hazardous wildlife attraction to C&D landfills increases because of the similarities between these disposal activities.

FAA generally does not consider C&D landfills to be hazardous wildlife attractants, if those landfills: are maintained in an orderly manner; admit no putrescible-waste of any kind; and are not co-located with other disposal operations.

3-7. WATER DETENTION OR RETENTION PONDS. The movement of storm water away from runways, taxiways, and aprons is a normal function on most airports and is necessary for safe aircraft operations. Detention ponds hold storm water for short periods, while retention ponds hold water indefinitely. Both types of ponds control runoff, protect water quality, and can attract hazardous wildlife. Retention ponds are more attractive to hazardous wildlife than detention ponds because they provide a more reliable water source.

To facilitate hazardous wildlife control, FAA recommends using steep-sided, narrow, linearly-shaped, rip-rap lined, water detention basins rather than retention basins. When possible, these ponds should be placed away from aircraft movement areas to minimize aircraft-wildlife interactions. All vegetation in or around detention or retention basins that provide food or cover for hazardous wildlife should be eliminated.

If soil conditions and other requirements allow, FAA encourages the use of underground storm water infiltration systems, such as French drains or buried rock fields, because they are less attractive to wildlife.

3-8. LANDSCAPING. Wildlife attraction to landscaping may vary by geographic location. FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. All landscaping plans should be reviewed by a wildlife damage management biologist. Landscaped areas should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-9. GOLF COURSES. Golf courses may be beneficial to airports because they provide open space that can be used for noise mitigation or by aircraft during an emergency. On-airport golf courses may also be a concurrent use that provides income to the airport.

Because of operational and monetary benefits, golf courses are often deemed compatible land uses on or near airports. However, waterfowl (especially Canada geese) and some species of gulls are attracted to the large, grassy areas and open water found on most golf courses. Because waterfowl and gulls occur throughout the U.S., FAA recommends that airport operators exercise caution and consult with a wildlife damage management biologist when considering proposals for golf course construction or expansion on or near airports. Golf courses should be monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be implemented immediately.

3-10. AGRICULTURAL CROPS. As noted above, airport operators often promote revenue-generating activities to supplement an airport's financial viability. A common concurrent use is agricultural crop production. Such use may create potential hazards to aircraft by attracting wildlife. Any proposed on-airport agricultural operations should be reviewed by a wildlife damage management biologist. FAA generally does not object to agricultural crop production on airports when: wildlife hazards are not predicted; the guidelines for the airport areas specified in 3-10.a-f. are observed; and the agricultural operation is closely monitored by the airport operator or sponsor to ensure that hazardous wildlife are not attracted.

NOTE: If wildlife becomes a problem due to on-airport agricultural operations, FAA recommends undertaking the remedial actions described in 3-10.f.

a. Agricultural activities adjacent to runways. To ensure safe, efficient aircraft operations, FAA recommends that no agricultural activities be conducted in the Runway Safety Area (RSA), OFA, and the OFZ (see AC 150/5300-13).

b. Agricultural activities in areas requiring minimum object clearances. Restricting agricultural operations to areas outside the RSA, OFA, OFZ, and Runway Visibility Zone (RVZ) (see AC 150/5300-13) will normally provide the minimum object clearances required by FAA's airport design standards. FAA recommends that farming operations not be permitted within areas critical to the proper operation of localizers, glide slope indicators, or other visual or electronic navigational aids. Determinations of minimal areas that must be kept free of farming operations should be made on a case-by-case basis. If navigational aids are present, farm leases for on-airport agricultural activities should be coordinated with FAA's Airway Facilities Division, in accordance with FAA Order 6750.16, *Siting Criteria for Instrument Landing Systems.*

NOTE: Crop restriction lines conforming to the dimensions set forth in Table 2 will normally provide the minimum object clearance required by

FAA airport design standards. The presence of navigational aids may require expansion of the restricted area.

c. Agricultural activities within an airport's approach areas. The RSA, OFA, and OFZ all extend beyond the runway shoulder and into the approach area by varying distances. The OFA normally extends the farthest and is usually the controlling surface. However, for some runways, the TSS (see AC 150/5300-13, Appendix 2) may be more controlling than the OFA. The TSS may not be penetrated by any object. The minimum distances shown in Table 2 are intended to prevent penetration of the OFA, OFZ, or TSS by crops or farm machinery.

NOTE: Threshold Siting standards should not be confused with the approach areas described in Title 14, Code of Federal Regulations, Part 77, (14 CFR 77), *Objects Affecting Navigable Airspace.*

d. Agricultural activities between intersecting runways. FAA recommends that no agricultural activities be permitted within the RVZ. If the terrain is sufficiently below the runway elevation, some types of crops and equipment may be acceptable. Specific determinations of what is permissible in this area requires topographical data. For example, if the terrain within the RVZ is level with the runway ends, farm machinery or crops may interfere with a pilot's line-of-sight in the RVZ.

e. Agricultural activities in areas adjacent to taxiways and aprons. Farming activities should not be permitted within a taxiway's OFA. The outer portions of aprons are frequently used as a taxilane and farming operations should not be permitted within the OFA. Farming operations should not be permitted between runways and parallel taxiways.

f. Remedial actions for problematic agricultural activities. If a problem with hazardous wildlife develops, FAA recommends that a professional wildlife damage management biologist be contacted and an on-site inspection be conducted. The biologist should be requested to determine the source of the hazardous wildlife attraction and suggest remedial action. Regardless of the source of the attraction, prompt remedial actions to protect aviation safety are recommended. The remedial actions may range from choosing another crop or farming technique to complete termination of the agricultural operation.

Whenever on-airport agricultural operations are stopped due to wildlife hazards or annual harvest, FAA recommends plowing under all crop residue and harrowing the surface area smooth. This will reduce or eliminate the area's attractiveness to foraging wildlife. FAA recommends that this requirement be written into all on-airport farm use contracts and clearly understood by the lessee.

Table 2. Minimum Distances Between Certain Airport Features And Any On-Airport Agriculture Crops.

Aircraft Approach Category And Design Group [1]	Distance In Feet From Runway Centerline To Crop		Distance In Feet From Runway End To Crop		Distance In Feet From Centerline Of Taxiway To Crop	Distance In Feet From Edge Of Apron To Crop
	Visual & ≥ ¾ mile	< ¾ mile	Visual & ≥ ¾ mile	< ¾ mile		
Category A & B Aircraft						
Group I	200 [2]	400	300 [3]	600	45	40
Group II	250	400	400 [3]	600	66	58
Group III	400	400	600	800	93	81
Group IV	400	400	1,000	1,000	130	113
Category C, D & E Aircraft						
Group I	530 [3]	575 [3]	1,000	1,000	45	40
Group II	530 [3]	575 [3]	1,000	1,000	66	58
Group III	530 [3]	575 [3]	1,000	1,000	93	81
Group IV	530 [3]	575 [3]	1,000	1,000	130	113
Group V	530 [3]	575 [3]	1,000	1,000	160	138
Group VI	530 [3]	575 [3]	1,000	1,000	193	167

1. Design Groups are based on wing span, and Category depends on approach speed of the aircraft.

Group I: Wing span up to 49 ft.
Group II: Wing span 49ft. up to 78 ft.
Group III: Wing span 79 ft. up to 117 ft.
Group IV: Wing span 118 ft. up to 170 ft.
Group V: Wing span 171 ft. up to 213 ft.
Group VI: Wing span 214 ft. up to 261 ft.

Category A: Speed less than 91 knots
Category B: Speed 91 knots up to 120 knots
Category C: Speed 121 knots up to 140 knots
Category D: Speed 141 knots up to 165 knots
Category E: Speed 166 knots or more

2. If the runway will only serve small airplanes (12,500 lb. And under) in Design Group I, this dimension may be reduced to 125 feet; however, this dimension should be increased where necessary to accommodate visual navigational aids that may be installed. For example farming operations should not be allowed within 25 feet of a Precision Approach Path Indicator (PAPI) light box.

3. These dimensions reflect the TSS as defined in AC 150/5300-13, Appendix 2. The TSS cannot be penetrated by any object. Under these conditions, the TSS is more restrictive than the OFA, and the dimensions shown here are to prevent penetration of the TSS by crops and farm machinery.

Appendix I

CALTRANS TYPE E MOUNTABLE BERM SECTION DETAIL

APPENDIX I

REPLY FROM OCSD ON DRAFT TM

Oceano Community Services District

1655 Front Street, P. O. Box 599, Oceano, CA 93445 (805) 481-6730 FAX (805) 481-6836

February 3, 2003

Dean Benedix, Project Manager
Department of Public Works
County of San Luis Obispo
County Government Center, Suite 207
San Luis Obispo, CA 93408

RE: Reply to Oceano Draft Technical Memorandum - Community Drainage & Flood Control Study

Dear Mr. Benedix:

Thank you for the opportunity to comment on the Draft Memorandum concerning drainage and flooding within Oceano. Specifically our comments are:

a. Now that some of the issues that are well known to Oceano officials and residents have been technically reviewed, how do the suggestions/recommendations contained in the report become operational and what resources and funding does San Luis Obispo County, the political entity responsible for flood control within Oceano, plan to put into this effort?

b. One of the suggestions, pumping drainage into the Creek, appears to run contrary to Regional Water Quality Control policy. Is this a viable option?

c. May we suggest two items that we believe can be added to the list of suggestions/recommendations that are effective and very cost effective:

   1. Review all development within the community. Some development has been allowed that has large areas paved over. If a qualified hydraulic engineer were to review any and all planned development for drainage, some flooding issues could be addressed prior to them becoming an issue or adding to the problem.

P. O

2. Clean and maintain existing drainage systems. Drainage channels and culverts have been allowed to become clogged with willows and debris. If the existing drainage facilities were maintained, flooding and drainage issues would be lessened.

d. The impact of the Oceano Lagoon on flooding and drainage has not been addressed. The Oceano Lagoon is a major collector of runoff during storms. Since the Lagoon has been allowed to silt over the capacity of this natural resource has been reduced which has created flooding issues which did not exist as little as a few years ago.

In conclusion, we again thank you for the opportunity to add input to the Draft Memorandum and we look forward to hearing how the County of San Luis Obispo plans to address these problems. We suggest initially that the County concentrate on the flooding on Front Street/Cienaga since the majority of drainage in this area can be corrected through some routine maintenance. Flooding on Cienaga/Front Street presents a safety concern when water covers the roadway.

Sincerely,

David Angello
Director

Rick Searcy
Director

APPENDIX J

RESPONSE TO COMMENTS

Comment 1: Now that some of the issues that are well known to Oceano officials and residents have been technically reviewed, how do the suggestions/recommendations contained in the report become operational and what resources and funding does San Luis Obispo County, the political entity responsible for flood control within Oceano, plan to put into this effort?

Response 1: This issue is specifically addressed in Chapter 6 "Implementation Strategy" of the report. The implementation strategy discusses the proposed method to fund the recommended projects.

Comments 2: One of the suggestions, pumping drainage into the Creek, appears to run contrary to Regional Water Quality Control policy. Is this a viable option?

Response 2: If the proposed pump station is implemented and requires a U.S. Army Corps of Engineers 404 Clean Water Act Permit (see Chapter 4 of the report for permit criteria), then a Regional Water Quality Control Board (RWQCB) 401 Water Quality Certification will be required for construction of the pump station outfall. The permit will likely require some form of erosion and sediment control measures during construction. It is not believed that the proposed use of a pump station to route storm water runoff to the Arroyo Grande Channel runs contrary to RWQCB policy. The proposed sump pump could be designed to improve water quality of the runoff by settling out suspended sediment prior to discharge.

The reader should also know that Oceano has been designated by the State Water Resources Control Board, as one of the communities in San Luis Obispo County that must comply with the Phase II rule. The County prepared a storm water management plan for all areas in the County requiring compliance with the Phase II rule. Most of the projects proposed in this report will likely require an NPDES General Construction Permit.

Comment 3: May we suggest two items that we believe can be added to the list of suggestions/recommendations that are effective and very cost effective:

1. Review all development within the community. Some development has been allowed that has large areas paved over. If a qualified hydraulic engineer were to review any and all planned development for drainage, some flooding issues could be addressed prior to them becoming an issue or adding to the problem.

2. Clean and maintain existing drainage systems. Drainage channels and culverts have been allowed to become clogged with willows and debris. If the existing drainage facilities were maintained, flooding and drainage issues would be lessened.

Response 3: 1. Currently all new discretionary development, commercial and multifamily development, and development in areas identified as problem drainage areas are reviewed in detail by the County for needed drainage improvements. However, ministerial permits and single family home construction may not be reviewed, since they may not be strictly required to provide drainage facilities under the current County ordinances. Section 3.6.2.2 recommends that the County's Department of Planning and Building implement a policy change and require that new development plans identify drainage routes and determine whether the increased runoff will negatively impact downstream properties. This recommendation is applicable to discretionary and ministerial permits, and all new single family home construction.

2. Section 3.6.4 discusses maintenance responsibility (County, Caltrans, railroad, and private residents') and recommends the creation of a maintenance district. The County

maintenance staff conducts regular cleaning of culverts, inlets and roadway shoulders within County public right-of-way.

Comment 4: The impact of the Oceano Lagoon on flooding and drainage has not been addressed. The Oceano Lagoon is a major collector of runoff during storms. Since the Lagoon has been allowed to silt over, the capacity of this natural resource has been reduced which has created flooding issues which did not exist as little as a few years ago.

Response 4: The Oceano Lagoon is in the jurisdiction of the California State Parks. Proposed projects to dredge the accumulated sediment could not be implemented by the County, District or any local lead agency, therefore, analysis of the lagoon was omitted from the report.

Comment 5: We suggest initially that the County concentrate on the flooding on Front Street/Cienaga since the majority of drainage in this area can be corrected through some routine maintenance. Flooding on Cienaga/Front Street presents a safety concern when water covers the roadway.

Response 5: Section 3.6.3 recommends that maintenance on existing drainage channels be conducted to maximize conveyance capacity. Specifically the drainage channels between Highway 1 and the railroad, and between the railroad and Arroyo Grande Creek Channel should be maintained on a regular basis. The primary obstacle to regular maintenance is determining who is responsible for maintaining the drainage channels. The County regularly cleans drainage facilities located within County public right-of-way. However, the open channels around Highway 1 and the railroad cross between State, UPRR, private and County property or right-of-way. The County or District should serve as the lead in identifying owner responsibility and secure commitments from the various parties to conduct routine maintenance.

Implementing the improvements to mitigate Highway 1 flooding as a first phase project is discussed in Section 3.5.2.3. It is recommended that a detention basin and Highway 1 improvements be implemented as the first phase of a comprehensive drainage and flood protection project in Oceano. More discussion on improving the area around Cienaga and Front Street to improve safety is included in this section.

Comment 6: Significant flooding occurs on 17th Street between The Pike and Wilmar Avenue. A local drainage swale with no outlet exists from 18th to 16th Street through this area. It appears a local infiltration solution would be the most expedient to resolve this problem.

Response 6: Section 3.5.3.2 discusses proposed subsurface infiltration chambers for smaller isolated areas within the community that are located within swales or low points with no outlet. An infiltration chamber was recommended on 16th Street to collect runoff from the drainage swale described in Comment 6. An existing vacant lot on 16th Street was also considered as a possible location for an infiltration basin, but the infiltration chamber was proposed instead.

Comment 7: Consider using the apparently unused railroad property along Highway 1 in the vicinity of 13th to 17th Street for drainage/open space purposes. Evaluate the practicality of the use of this property for detention/retention.

Response 7: The unused property adjacent to the railroad was proposed as the alignment for the 36-inch diameter storm drain that would convey runoff away from the area around Paso Robles, 13th Street and Highway 1 that currently floods. There are existing structures between Highway

1 and the railroad (between Ocean Street and Paso Robles Street) that limit the area available for a detention basin. The area available for a detention basin is too small to store runoff generated from the upper watershed. At least one acre would be necessary to construct a detention basin and the appurtenant facilities. In addition to the available land constraints, the ownership of this land is not known. If the land belongs to the railroad, then acquiring land from Union Pacific Railroad will increase the cost of this alternative.

Comment 8: One citizen noted that there was objectionable mud and standing water in the vicinity of 23rd Street and The Pike, causing school children access problems to and from the elementary school. It appears that proposed Alternative project 3, installation of storm drain, curb and gutter, would resolve this. Please add the location of the elementary school to all appropriate figures in the final report.

Response 8: Location of Oceano Elementary School now identified in all figures (when shown) in the final report.

Comment 9: Drainage from Highway 1 and Casitas Street flows into a drainage channel and onto a property at 2679 Cienega Highway (Highway 1). This property is about one acre, completely undeveloped except for the home located at the very front of the lot. There are developed subdivisions to the north and east of this property which have detention basins.

Response 9: It appears that this property is at the low point on Cienega and runoff from Highway 1 and Casitas flows towards this lot as the natural low point in the area. The undeveloped portion of the property could be purchased and serve as an infiltration basin for the contributing watershed. An alternative to the infiltration basin is to construct a subsurface infiltration chamber as described in Section 3.5.3.2 to capture the runoff prior to entering onto the property at 2679 Cienaga. The size of the infiltration chamber would depend on the size of the contributing watershed. If we assume that the infiltration chamber was similar size to the one proposed for Holden Street, then the total project cost for the chamber would be approximately $312,000.

Comment 10: An underground spring exists in the vicinity of Highway 1 and 24th Street which continuously drains to Caltrans storm drain in Highway 1.

Response 10: Comment noted.