WATER AND SEWER
MASTER PLAN UPDATE

Prepared for

Nipomo Community Services District

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List of Acronyms/Abbreviations

AAF	Average Annual Flow
ADD	Average Daily Demand
AF	Acre feet
AFY	Acre feet per year
C	Current
CA DHS	California Department of Health Services
CCWA	Water Supplied by the State Water Project
CMMS	Computerized Maintenance Management System
CY	Cubic Yards
d	Depth
D	Diameter
DBP	Disinfection Byproduct
DBPR2	Stage 2 Disinfectants and Disinfection Byproducts Rule
District	Nipomo Community Services District
DU	Dwelling Units
F	Future
FY	Fiscal Year
FOG	Fats, Oils, and Grease
FTE	Full Time Equivalent
GIS	Global Information System
GPD	Gallons per Day
GPM	Gallons per Minute
GWR	Ground Water Rule
HAA or HAA5	Haloacetic Acids
I/I	Inflow and Infiltration
IDSE	Initial Distribution System Evaluation
LAFCO	Local Agency Formation Commission
LRAA	Locational Running Annual Average
LT2	Long Term 2 Enhanced Surface Water Treatment Rule
MCL	Maximum Contaminant Level
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDD	Maximum Daily Demand

Mg/L	Milligrams per Liter
MGD	Million Gallons Daily
MPU	Master Plan Update
MRDL	Maximum Residual Disinfectant Level
NCSD	Nipomo Community Services District
NERRTC	National Emergency Response and Rescue Training Center
NFPA	National Fire Protection Association
NMMA	Nipomo Mesa Management Area
NPDWRs	National Primary Drinking Water Regulations
NPDES	National Pollutant Discharge Elimination System
NSDWRs	National Secondary Drinking Water Regulations
PDWF	Peak Dry Weather Flow
PHD	Peak Hourly Demand
PMP	Preventative Maintenance Plan
PWWF	Peak Wet Weather Flow
RO	Reverse Osmosis
RWQCB	Regional Water Quality Control Board
SCADA	Supervisory Control and Data Acquisition
SDWA	1974 Federal Safe Drinking Water Act
SLO	San Luis Obispo
SOCs	Synthetic Organic Chemicals
SOI	Sphere of Influence
SSMP	Sewer System Monitoring Plan
SSO	Sanitary Sewer Overflow Regulations
TCR	Total Coliform Rule
TTHM	Total Trihalomethanes
UCMR 2	Unregulated Contaminant Monitoring Regulation 2
US EPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan 2005 Update
VOCs	Volatile Organic Chemicals
VSS	Very Small System
WDRs	Waste Discharge Requirements
WWTF	Waste Water Treatment Facility
WWTP	Waste Water Treatment Plant

Executive Summary

In October 2006, the Nipomo Community Services District (NCSD or District) Board of Directors authorized this Master Plan Update (MPU) to its March 2002 Water and Sewer Master Plan Update. Much has changed since the last update, including increased SLO LAFCO sphere of influence service areas, water supply limitations, and overall growth in residential development. The purpose of this MPU is to acknowledge projects completed under previous master plans, add new projects to meet current and future needs, estimate costs and priorities for these new projects, and evaluate the District's current and future Utility Department staffing to operate and maintain these improvements.

This MPU was performed in conjunction with several other District studies and efforts, including the Water Supply Alternatives Study, the Southland Wastewater Treatment Facility Master Plan, and the Sanitary Sewer Overflow Regulations. The recommendations resulting from these studies are integrated into this MPU.

Both the Town and Blacklake water and sewer systems are evaluated in this MPU. Given the anticipated integration of the Town and Blacklake water systems, the entire water system is analyzed as a whole. The sewer systems for Town and Blacklake are analyzed as two independent systems due to the separate natures of their wastewater collection systems and treatment plants.

Also incorporated into this MPU's Scope of Work is the evaluation of a wide-ranging list of project ideas and concepts from water-reuse and reclamation to desalination, to water-tank mixing, to conversion of well-motors from electric to natural gas. These miscellaneous additional projects are reviewed briefly in this MPU and discussed in detail in the Appendices.

The overall methodology used in preparing this MPU consists of developing future water demand and sewer flow projections, analyzing the existing and future water and sewer systems using advanced hydraulic computer software programs, reviewing current and anticipated regulatory requirements, reviewing hazard and security preparation requirements, reviewing and evaluating miscellaneous projects and programs envisioned by the District, developing cost estimates and a prioritized list of recommended water and sewer system improvements, and developing the complement utility department staffing levels to support the new facilities.

The MPU is organized into five main sections, Section 1 – Introduction, Section 2 – Water System, Section 3 – Sewer System, Section 4 – Staffing, and Section 5 - Implementation. Section 1 presents background information and the overall purpose of the document. Sections 2 and 3 present the analysis and project recommendations for the water and sewer systems, respectively. Section 4 presents staffing information and a system-wide preventative maintenance program. And, Section 5 presents a general sequencing plan for implementing the various projects and recommendations.

The remainder of this Executive Summary reviews the key points of this MPU.

- **Water Demand and Sewer Flow Projections.** This MPU presents an analysis of population and system use projections to the year 2030, based on General Plan at Build-Out (Scenario 1) discussed in Technical Memorandum 1 (Appendix A). Load projections based on this build-out scenario were used for system modeling. The load projections used are shown in the tables below:

ES-1: Summary of Water Demand Projections & Peaking Factors (Based on Observed FY05-06 Water Use Rates)

Condition/ Demand	Annual Demand	Average Daily Demand (ADD)	Maximum Daily Demand (MDD)	Peak Hourly Demand (PHD)
units	AFY	MGD	MGD	MGD
Peaking Factor[1]		*(1 MGD = 1121 AFY)*	*1.7 x ADD*	*3.78 x ADD*
Existing	3,000	2.67	4.53	10.09
Future	6,200	5.57	9.47	21.05

1. Refer to Appendix A, Tech Memo 1 for more information.

ES-2: Summary of Sewer Flow Projections & Peaking Factors (Based on Observed FY05-06 Water Use Rates)

Southland WWTP	Average Annual Flow (AAF)	Peak Dry Weather Flow (PDWF)	Peak Wet Weather Flow (PWWF)
units	MGD	MGD	MGD
Peaking Factor[1]		*1.73 x AAF*	*2.17 x AAF*
Existing	0.63	1.09	1.37
Future	1.28	2.21	2.78

1. Refer to Appendix A, Tech Memo 1 for more information.

- **Water and Sewer Systems Analysis.** Advanced hydraulic computer software models were developed to review both systems under current and future conditions. Modeling included a review of system response to various impact scenarios identified by the District and to peak demand events (i.e. max. day demand plus fire-flow or peak hour demand for the water system, and peak dry- and wet-weather flows for the sewer system). Models were used to identify appropriate system improvements to respond to current and anticipated future system needs.

  Modeling of the water system required consideration of future sources of supplemental water supply. NCSD is developing outside sources of supplemental water to help offset existing groundwater use and to meet future needs. For purposes of this MPU, it was assumed that supplemental water sources would include state water (CCWA) in the near- to interim-terms, and desalinated water in the interim- and future-terms, in amounts as shown in the table below.

ES-3: Assumed Annual Water Supply (AFY) from Sources

Source\Condition	Current	Near-Term	Interim	Future
NCSD Wells	3,000	1,000	1,000	1,000
CCWA	-	2,500	1,500	0
Desalination	-	0	2,000	5,200
Total	3,000	3,500	4,500	6,200

- **Current and Anticipated Regulatory Requirements Impacts.** A number of new regulations have recently been adopted which govern acceptable water quality standards or specify system monitoring or operating requirements. This MPU reviews the regulations relevant to District operations and recommends actions the District should consider to comply with those regulations.

  Water System

  Four water quality regulations have recently been enacted by the US EPA which affect potable public water systems. The regulations include the Unregulated Contaminant Monitoring Regulation 2 (UCMR 2), the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), the Ground Water Rule (GWR), and the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR2). The District is currently either exempt or in compliance with these regulations. Introduction of CCWA as a supplemental water source may require modifications to certain operations in order to remain in compliance.

  Sewer System

  The District's sewer system is currently regulated under separate Waste Discharge Requirements (WDRs) for both Blacklake and Southland WWTPs and their associated collection systems. These WDRs are up for periodic renewal, and may be modified by the RWQCB on renewal to reflect revised effluent quality limitations, flow rates, or system operating parameters. Additionally, recently-passed WDR Order 2006-0003 (known as the Sanitary Sewer Overflow Regulation or "SSO") requires that the District develop a Sewer System Monitoring Plan (SSMP). The District is currently in compliance with their WDRs and conditions of the SSO, and is developing their SSMP according to the published schedule.

- **Hazard and Security Preparation.** System hazard and security preparation must consider not just natural disasters and *force majeure* events but also human threats and malicious acts. This MPU discusses the potential threats to system security and functionality, and identifies specific steps the District can take to offset those threats. Appendix O of this MPU also includes a discussion of possible funding sources to help finance those disaster-mitigation projects.

- **Recommended Water and Sewer Improvement Projects.** This MPU provides recommendations for system projects to address current needs as well as the projected needs for the future. Projects were developed to allow the NCSD system to expand appropriately as development occurs or respond to regulatory and security requirements. Several miscellaneous projects, including upgrades to the Southland Shop, system improvements necessary to accommodate County drainage improvement projects, and security/disaster mitigation projects are included and prioritized in their respective water and sewer Recommended Improvement Project listings.

Water System

Projects for the water system were developed to address system needs as identified through modeling, including: system modifications necessary to resolve flow bottlenecks, develop essential backbone pipe segments to accommodate supplemental water supply and projected growth, and address dead end lines. This MPU also reviewed a number of additional improvement projects or studies, including a desalination Feasibility Study, system modifications to improve mixing within the storage tanks, and system modifications necessary to accommodate County drainage system improvements.

These water-system projects are categorized as to those that address existing system needs and are necessary to bring CCWA water on line (near term projects); projects which address intermediate-term needs or are associated with bringing the desalination facility on line (interim term projects); or those which address needs in response to future development (long-term projects). Projects were then prioritized as to whether they address health, safety, or ability to serve customers (Priority 1) or whether they address system operational improvements, efficiency improvements, or water quality improvements (Priority 2).

The table below summarizes costs associated with recommended water system projects.

ES-4: Water System Improvements - Capital Requirements Summary

	Near-Term	Interim-Term	Future-Term	Total
Priority 1 ($)	9,874,000	4,250,000	4,800,000	18,924,000
Priority 2 ($)	826,000		1,170,000	1,996,000
Total	$10,700,000	$4,250,000	$5,970,000	$20,920,000

Sewer System

Projects for the sewer system were categorized into the following major components: collections systems, wastewater treatment, and water reclamation. Projects are categorized as to whether they address immediate (near-term) system needs, or whether they are necessary prior to future development (future-term).

Collections projects include those required to eliminate system deficiencies for current and anticipated future needs, to serve orphan areas within the Prohibition Zone, and to serve areas where future growth may occur by extending existing facilities.

Wastewater treatment projects address improvement, upgrades, or modifications to either the Southland or Blacklake Wastewater Treatment Plants. Projects considered include those recommended in the Southland Wastewater Treatment Plan Facility Master Plan, sludge handling projects, and effluent handling projects.

The water reclamation projects consist of the development of an alternative to the current method of discharging effluent from the Southland WWTF. This project would require additional feasibility analysis in the *near-term* and the construction of additional treatment and effluent discharge systems in the *future-term*.

The table below summarizes costs associated with recommended sewer system projects.

ES-5 Sewer System Improvements - Capital Requirements Summary

	Near-Term	Future-Term
Collection System		
Town (tributary to Southland WWTF)	$1,800,000	$6,100,000
Blacklake	$90,000	
Wastewater Treatment		
Southland WWTF (Town)	$6,230,000	$200,000
Blacklake WWTF	$325,000	
Water Reclamation		
Southland WWTF (Town)	$75,000	$7,000,000
Total	$8,580,000	$13,300,000

- **Review system staffing requirements.** This MPU reviews current staffing levels and recommends future staffing levels under anticipated conditions. For current staffing needs, the MPU recommends a staff increase of two or three positions, including one management position and one or two field positions. Water use is expected to double from current levels by the year 2030. Future staffing needs may be expected to increase to 150% - 200% of current levels and should remain flexible depending on the level of water and wastewater treatment imposed on the District as well as the types of facilities that are constructed to meet these requirements.

  This MPU includes a review of the District's preventative maintenance program and provides recommendations for modification, including, continued development of the accuracy of the District's GIS database, Computerized Maintenance Management System software procurement, and a systematic approach to integrating the current work practices into the selected software package.

- **Implementation Plan.** This MPU presents a recommended order of implementation of the proposed improvement projects. A Program EIR is recommended for CEQA review, so that no subsequent environmental review will be required as implementation progresses.

1. Introduction

This Master Plan Update (MPU) presents an analysis of the current and anticipated future water and wastewater systems of the Nipomo Community Services District (NCSD or District), and provides recommendations for system and process improvements to accommodate current and future needs.

This section presents an overview of the NCSD water and sewer systems and describes the overall scope of the MPU.

1.1 Background

NCSD Water and Wastewater Systems. The town of Nipomo is an unincorporated area located in southern San Luis Obispo County on the Central Coast. The District provides water and wastewater services to the approximately 12,000 residents of Nipomo. Figure 1-1, Limits of Study Area, shows the current District boundaries for the water and sewer systems. This Figure also shows the NCSD Sphere of Influence areas, or areas where District service could expand within the foreseeable future.

The existing water system consists of one main pressure zone, separated by Highway 101 and Nipomo Creek, with two area designations, Town Division (Town) and Blacklake. The Town water system is expected to combine with the Blacklake Community system to become a single water system. Due to the topography of the area, static pressures range from as low as 40 psi to over 150 psi. The system comprises approximately 85 miles of distribution system piping ranging in size from 6- to 16-inches, 4,000 service connections, 600 hydrants, and 1,300 valves. Thirteen groundwater wells (8 of which are active) provide the main source of water for the community. Six above-ground steel storage tanks totaling 4.4 million gallons (3.7 MG useable) provides the necessary fire- and emergency-storage volumes and helps equalize system pressure during high demand periods.

The existing wastewater system includes two independent treatment and collection systems, one serving the Town area and the other serving the Blacklake community. The Town system is comprised of approximately 35 miles of gravity sewer pipe ranging in sizes 6- to 15-inches, 3 miles of forcemain sizes 4- to 8-inches, and 11 lift stations which all convey waste water to the Southland Wastewater Treatment Facility. The Blacklake system is comprised of approximately 4 miles of gravity sewer pipe ranging in sizes from 6- to 12-inches, 0.5 miles of forcemain sizes 4- to 6-inches, and 3 lift stations which all convey waste water to the Blacklake Wastewater Treatment Plant. Approximately half of the Town area is not yet served by the sewer system and is currently on septic; almost all of the area within the Blacklake community is sewered.

Master Planning Scenarios. Technical Memorandum 1 (Appendix A) describes three build-out scenarios which were reviewed: Existing Land Use Under the General Plan (Scenario 1), Proposed Land Use Under Pending Land Use Amendments (Scenario 2), and High Density Land Use under a hypothetical assumption (Scenario 3).

The scenario selected by the NCSD Board of Directors as the basis of future demographics was Scenario 1. This scenario assumes no changes in the existing land use designations and 2.3% population growth between now and the year 2030. Water demand and sewer load projections based on this scenario were used for modeling and further analysis.

1.2 Purpose

This MPU updates the 1995 NCSD Master Plan and the 2001 Master Plan Update, both prepared by Boyle Corporation. Since completion of the 2001 Master Plan Update, there have been several changes in the Nipomo area or in the regulations which affect the District, including the stipulated judgment of water use in the Nipomo Mesa Area, the Urban Water Management Plan 2005 Update, completion of several large development projects, an update to LAFCO's Sphere of Influence Study, and revisions to the Sewer System Overflow Regulations.

This MPU was prepared to address these changes and respond to other planning needs identified by the District. This MPU encompasses the following primary tasks:

- **Determine the future load projections.** This MPU presents an analysis of population and system use projections to the year 2030. As discussed above, the most likely of the three build-out scenarios was selected for further review and analysis. Load projections based on the General Plan scenario (Scenario 1) were used for system modeling and subsequent deficiency analysis and project identification.
- **System modeling.** Models were developed to review both the water and sewer systems under both current and future conditions. Modeling included a review of system response to various impact scenarios identified by the District. Design criteria used to determine system deficiencies for modeling purposes are described in detail below.
- **Review of current and anticipated regulatory requirements affecting the system.** A number of new regulations have recently been adopted which govern acceptable water quality standards or specify system monitoring or operating requirements. This MPU reviews the regulations relevant to District operations and recommends actions the District should consider to comply with those regulations.
- **Review of hazard and security preparation requirements affecting the system.** System hazard and security preparation must consider not just natural disasters but human threats as well. This MPU discusses the potential threats to system security and functionality, and identifies specific steps the District can take to offset those threats. Appendix O of this MPU also includes a discussion of possible funding sources to help finance those disaster-mitigation projects.
- **Provide recommendations for future projects.** This MPU provides recommendations and priorities for system projects to address current and future needs, as identified by system modeling and analysis of current and anticipated storage, supply, and distribution needs.
- **Review system staffing requirements.** This MPU reviews current staffing levels and recommends future levels under anticipated conditions. This MPU includes a review of the District's preventative maintenance program and recommends modifications.

The above tasks were completed for both the water and sewer systems. The remainder of this MPU presents the results of these efforts, organized by type of system.

Section 2 addresses the water system and describes the water system flow projections, system modeling and design criteria, regulatory requirements, hazard and security issues, and recommended system improvement projects.

Section 3 addresses the wastewater system and describes the sewer load projections, system modeling and design criteria, regulatory requirements, hazard and security issues, and recommended projects to address the collection system and treatment facilities.

Section 4 includes staffing information and the system-wide preventative maintenance program.

Section 5 develops an implementation plan for sequencing projects and recommendations.

1.3 Previous Studies and Reports

The following reports, studies, and other materials were reviewed and incorporated into the preparation of the MPU.

- Sphere of Influence Update, 2004 – NCSD
- Urban Water Management Plan 2005 Update – NCSD
- Water and Sewer Master Plan 2001 Update – Boyle Engineering Corporation
- Southland Wastewater Treatment Facility Master Plan, 2007 – Boyle Engineering Corporation
- Water Alternatives Study, 2006 – Boyle Engineering Corporation
- Stipulated Judgment between Santa Maria Valley Conservation District and City of Santa Maria, 2005
- Order No. 2006-0003 Fact Sheet, 2006 – State Water Resources Control Board
- Current RWQCB Permits and Compliance Monitoring Reports

Additional reports, studies, and references are listed in Section 6: References.

2. Water System

This Section is organized into the following sections: Water Demand Projections, Water Demand Patterns, Water Supply, Water Storage, Water Distribution, Regulatory Requirements, Hazards and Security, Miscellaneous Projects, and Projects Summary.

This Section first reviews the factors considered in development of the water system model. These factors include: water demand projections for determination of future need and calculation of peaking factors; water demand patterns; current and anticipated supply sources; the anticipated near-term, interim-term and long-term supply requirements and sources of supplemental water to meet those requirements; storage capacity and potential shortfalls.

Next, this Section presents the methodologies, assumptions, configuration, and results of the water modeling and analysis itself. This section reviews current and upcoming regulatory requirements which may affect the water system, as well as hazard and security issues which should be considered. These analyses generated recommendations for system improvement projects.

Finally, this Section presents an analysis and tabulated summary of the recommended projects for system improvements identified through modeling. This section briefly addresses additional projects may benefit the water system as well; these additional projects are described in detail in the Appendices of this MPU.

2.1 Water Demand Projections

This section summarizes the method of analysis and assumptions used in determining water demand projections. Appendix A, Technical Memorandum 1 – Water Demand and Sewer Flow Projections, provides additional detail into how these values were calculated. Three water demand scenarios based on three land use assumptions were evaluated in this technical memorandum: General Plan, General Plan with Pending Land Use Amendments, and a High Density Scenario. The NCSD Board of Directors selected the General Plan scenario as the planning condition. This scenario is used as the basis for the demand calculations for this MPU.

Water demand projections were derived from several sources: District-provided operational data and records for the Town and Blacklake Divisions, Urban Water Management Plan 2005 Update (UWMP), SLO LAFCO Sphere of Influence 2004 Update (SOI), and District supplied FY05-06 Observed Water Use Rates for specific land use types.

From these sources, water duty factors (estimates of water demand expressed in terms of acre-feet of water used per acre of land per year) were calculated for each of the land use categories within the District's service area and are summarized in Table 2-1 below.

Table 2-1 Water Duty Factors by Land Use Category

Land Use Designation	Units per Acre (DU/acre)	Demand per unit (afy/DU)	Water Duty Factor (afy/acre)
Residential			
REC – Recreation	1	0.980	0.98
RMF – Residential Multi-Family	15	0.250	3.75
RR – Residential Rural	0.2	0.980	0.20
RSF – Residential Single Family	3.5	0.600	2.10
RS – Residential Suburban	1	0.980	0.98
RL – Rural Lands	0.1	0.980	0.10
Southland Specific Plan	1	0.980	0.98
Blacklake			1.04
Non-Residential			
AG – Agriculture			0.00
CR – Commercial Retail			1.42
CS – Commercial Services			0.35
IND – Industrial			0.67
OP – Office Professional			0.26
OS – Open Space			1.18
PF – Public Facility			0.59

The water duty factors were then applied to the land area acreage estimates for each of the land use categories within the District's existing service area and an assumed level of development "occupancy rate" was chosen such that predicted water demand closely matched existing use. Table 2-2 summarizes the results from this effort.

Table 2-2: Existing Annual Water Demand by Land Use, FY05-06

Land Use	Acres	Water Duty Factor afy/acre[1]	Occupancy Rate in 2005	Estimated Water Use (afy)	Unaccounted for Water (% of production)	Est. Water Production (afy)
Town Division						
RMF	150	3.75	59%	332	8%	361
RSF	700	2.1	59%	867	8%	943
RS	900	0.98	59%	520	8%	566
RR	1,380	0.2	59%	163	8%	177
RL	3	0.1	59%	0.18	8%	0.19
AG	110	0	59%	0	8%	0
PF	37	0.59	59%	13	8%	14
OP	34	0.26	59%	5	8%	6
CR	160	1.42	59%	134	8%	146
CS	80	0.35	59%	17	8%	18
OS	11	1.18	59%	8	8%	8
REC	116	0.98	59%	67	8%	73
Subtotal	3,681			2,126		2,312
Black Lake Division						
BL	510	1.04	87%	461	8%	501
NCSD Total	4,191			2,587		2,813

1. Based on observed water use rates FY05-06

As a cross-check, water demand was then calculated based on properties currently being served and the duty factors shown in Table 2-1. This calculation yielded similar results and was used as the basis for calibrating the computer model of the water system under existing conditions (discussed further below). Figure 2-1, Existing Water Service Area, shows the properties that are currently being served along with their designated land use type.

Future water demand projections were based on the UWMP methodology and updated to reflect the water duty factors listed in Table 2-1. Results are summarized in Table 2-3. Figure 2-2, Future Water Service Area, shows all of the properties within the proposed future District boundary and their designated land use.

Table 2-3: Future Annual Water Demand by Land Use, Buildout and 2030

Land Use	Water Duty Factor(2)	2005 Water Service Area (1)	SOI-1	SOI-2	SOI-3	SOI-4	SOI-7	SOI-8	Total Area served	Estimated Water Use at Buildout	Estimated Water Use in Year 2030 4
(units)	afy/ac	ac	ac	ac	ac	ac	ac	ac	ac	afy	afy
Residential Land Uses											
REC	0.98	631							631	618	4,300
RR	0.20	1,404	662				1,264	181	3,511	688	
RSF	2.10	686			91				777	1,632	
RS	0.98	905			84	245	28		1,262	1,237	
RL	0.10	4				1,073			1,077	106	
Blacklake (1)	1.04	510							510	530	
Southland Specific Plan	0.98					100			100	98	
RMF	3.75	160							160	600	600
Non-Residential Land Uses											
AG	0	12	420	132	58		83		705	0	0
OP	0.26	33							33	9	289
CR	1.42	160							160	227	
CS	0.35	94				104			198	69	
IND	0.67	0							0	0	0
OS	1.18	11							11	13	13
PF	0.59	38			5				43	25	24
MUC									0	0	
Total Use		4,648	1,082	132	238	1,522	1,375	181	9,178	5,852	5,226
In-Lieu NMMA Groundwater Recharge (3)											600
Unaccounted System Losses (8%)											420
Total Demand											6,246

1: UWMP 2005 Update Appendix E

2: Residential Rates Observed FY05-06, Non-residential rates UWMP Table 15

3: UWMP 2005 Update Appendix Table 35.

4: Limited by 2.3% Growth Rate

The values shown in Table 2-4 below are used throughout the remainder of this MPU to simplify discussions of the Existing and Future conditions. The Existing Condition water demand projection is rounded to 3,000 acre-feet per year and the Future Condition (Year 2030) to 6,200 acre-feet per year. Refer to Technical Memorandum 1 (Appendix A) for additional information.

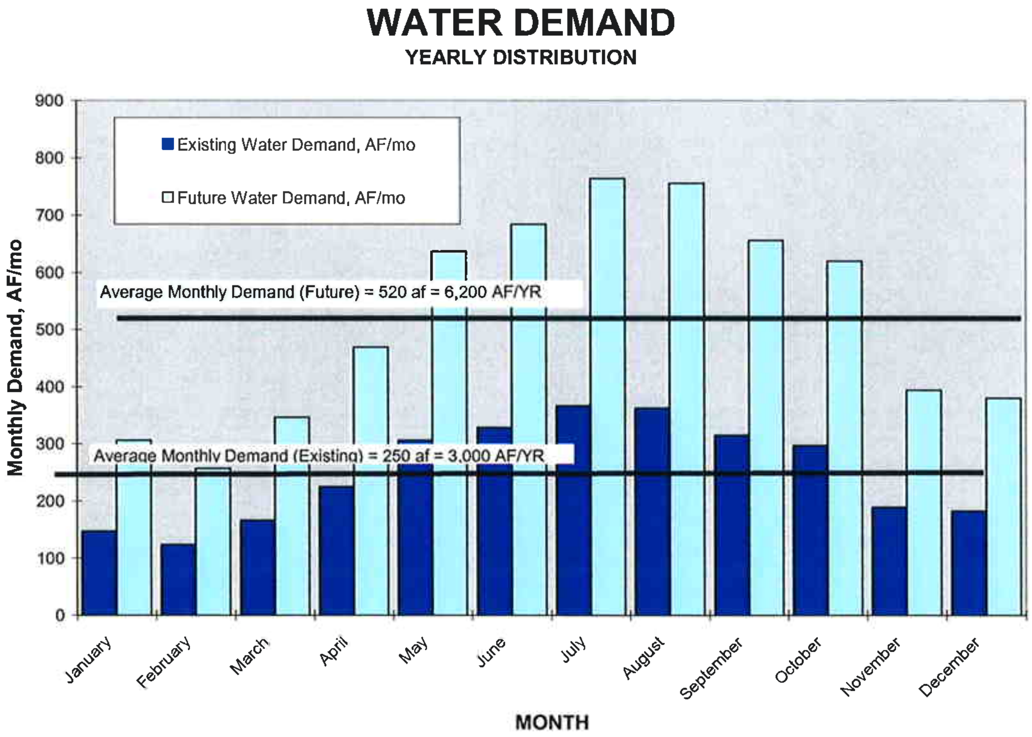
Table 2-4: Summary of Water Demand Projections & Peaking Factors (Based on Observed FY05-06 Water Use Rates)

Condition/ Demand *Peaking Factor*[(1)]	Annual Demand	Average Daily Demand (ADD)		Maximum Daily Demand (MDD) 1.7 x ADD		Peak Hourly Demand (PHD) 3.78 x ADD	
units	AF/YR	MGD	gpm	MGD	gpm	MGD	gpm
Existing	3,000	2.67	1,854	4.53	3,152	10.09	7,008
Future	6,200	5.57	3,868	9.47	6,575	21.05	14,620

1. Refer to Appendix A, Tech Memo 1 for more information.

2.2 Water Demand Patterns

Water demand within the District varies throughout the year on a seasonal basis, with higher use in the dry summer months and lower use in the winter, rainy months. Figure 2-3, Water Demand – Yearly Distribution, shows the relative amounts of water used on a monthly basis, over the course of a typical year. The data was estimated from the percent distributions reported in the 2001 Water and Sewer Master Plan Update. Figure 2-3 shows the distribution for current demand, 3,000 AFY, and anticipated future demand, 6,200 AFY. This annual distribution pattern is important when considering supplemental water supply. CCWA-water, for example, is typically delivered on a constant flow basis at a rate equal to or less than the yearly average use. Therefore, during summer periods when monthly demand is greater than the annual average, the District will need to rely on its existing wells or a future desalination facility to meet demand during these peak periods.



2.3 Water Supply

This section briefly reviews the District's current water supply situation for the purpose of developing realistic assumptions in planning for the District's future water system improvements needs.

2.3.1 Existing Well Supply

As shown in Table 2-4, the District's supply is currently produced by eight active groundwater wells, with an additional five wells in standby mode or out of service. The active wells have a combined capacity of approximately 3,920 GPM.

Table 2-5: Water Supply Summary

Water Well Description	Flowrate Range, gpm	Average Flow Capacity, gpm	Cumulative Capacity, gpm
Active Wells			
Sundale	800-1,200	1,000	1,000
Eureka	820-965	890	1,890
Via Concha	700-800	750	2,640
BL Well No. 4	300-450	375	3,015
Bevington	330-405	370	3,385
Knollwood	210-270	240	3,625
BL Well No. 3	120-210	165	3,790
Olympic	110-150	130	3,920
Standby Wells			
Church*	130-160	145	
Dana No. 1 (Cheyene)	75-125	100	
Dana No. 2 (Mandi)	75-125	100	
Savage	Out of Service	---	
Omiya	Out of Service	---	

* Water Quality less than desirable.

2.3.2 Future Supplemental Water Assumptions

The District has been mandated by a stipulated judgment to develop alternate water sources to reduce demand on groundwater resources. As a result, the District is developing outside sources of supplemental water to help offset existing groundwater use and to meet future needs. Several iterations of water supply scenarios have been considered over the past several months as part of the on-going Water Alternatives Evaluation Study. For purposes of this MPU, it was assumed that supplemental water sources would include state water (CCWA) and desalinated water. The table below shows the assumptions made for transitioning from current conditions using wells, to CCWA/wells, and ultimately to desalination/wells. In general, Near-Term is defined as needing to occur between now and the Year 2010, Interim by 2020, and Future by 2030.

Table 2-6: Assumed Annual Water Supply (AF) from Sources

Source\Condition	Current	Near-Term	Interim	Future
NCSD Wells	3,000	1,000	1,000	1,000
CCWA	-	2,500	1,500	0
Desalination	-	0	2,000	5,200
Total	3,000	3,500	4,500	6,200

Note that these scenarios all show a dramatic reduction in District well usage from current levels. Wells will primarily be used to offset seasonal peak demand, once the supplemental water sources are on line.

Tie-in locations for supplemental water sources to the existing system were assumed to be near the intersection of Thompson and Tefft for CCWA and at Highway 101/Willow Road for the desalinated water.

The analysis for CCWA supplemental water assumed a fixed-flow condition; that is, a constant volume of supplemental water would be supplied at a rate equivalent to no more than the average annual daily demand of the system. In regard to Desalination, it was assumed that desalinated water can be provided on an as-needed basis, much as the District's wells are operated currently, to meet the future maximum daily demand requirements.

2.3.3 Analysis and Recommendations

The District is required by State law (Title 22 Requirements) to have sufficient water delivery capacity equal to or greater than the maximum daily demand (MDD) on the system in a 24 hour period. At present, the pumping capacity of the existing active wells is approximately 3,920 gpm, which is slightly greater than the maximum day demand of 3,152 gpm. Many jurisdictions require total system capacity to be quantified assuming the largest producing well out of service. It is recommended that the District strive to meet this criterion by not only developing new supplemental water supply sources (as discussed above) but also by upgrading its existing standby wells to consistently meet water quality and pumping capacity objectives. We recommend the District undertake a feasibility study to upgrade Church Well to bring it up to active status. Alternatives for Church Well include (1) well-head treatment or (2) a dedicated line, blending tank, and booster pump. Recommended pumping capacities are shown on the table below for both existing and future conditions.

Source/Condition	Current Available Capacity, gpm	Existing Recommended Capacity, gpm	Future Recommended Capacity, gpm
Wells	3,920	3,920	3,920
CCWA	-	1,550	-
Desalination	-	-	6,575
Total Capacity	3,920	5,470	10,495

MDD Required	3,152	3,152+	6,575

2.4 Water System Storage

2.4.1 Existing Water Tank Capacity

The District's existing storage capacity is summarized in the table below. Presently, the District has approximately 3.68 MG of useful storage (3.28 MG elevated and 0.4 MG low pressure storage at Blacklake) as summarized in the following table.

Existing Storage Capacity

Facility	**Total Storage Volume (gal)**	**Useful Storage Volume (gal)**
Elevated Storage		
Quad Tank Site		
Twin Tank(1)	500,000	500,000
Twin Tank(2)	500,000	500,000
Quad Tank(3)	1,000,000	1,000,000
Quad Tank(4)	1,000,000	1,000,000
Stand Pipe	1,000,000	280,000
Subtotal:	**4,000,000**	**3,280,000**
Low Pressure Storage		
Blacklake	400,000	400,000
Totals:	**4,400,000**	**3,680,000**

2.4.2 Analysis and Recommendations

The District is required by State law (Title 22 Requirements) to maintain sufficient water storage capacity within its system to meet the three basic needs: fire storage, emergency storage, and equalization storage. Fire flow storage must be greater than that required to produce the maximum anticipated fire flow for a specified duration. Emergency storage must be on hand to produce at least 50 gallons per capita per day for three days. Equalization storage is necessary to maintain availability of demand during peak conditions when system demands are greater than that being fed directly from supply sources. An additional need, Operational Storage, was also considered to accommodate for delivery of CCWA supplemental water which is fed on a constant-flow basis.

Fire flow storage is calculated by multiplying the fire-fighting flowrate by the duration of the fire-fighting event. A 3,000 gpm flowrate for a duration of three hours was used to determine the minimum fire storage required for the system (540,000 gallons). This minimum value was assumed to be equal for both existing and future conditions.

Emergency storage is calculated by multiplying population by 50 gallons per day for three days. Existing population is estimated at 12,000 which yields an emergency storage requirement of 1.8 MG. Future population is estimated at 21,190 and yields a requirement of 3.18 MG. The District is allowed to meet this requirement by having a sufficiently-sized well on emergency back-up power. The Sundale well is capable of producing 3.71 MG over a three day period, thereby satisfying this requirement. However, District staff prefers to have a least a portion of this "emergency water" in tanks rather than in the ground.

Equalization storage is estimated by the formula: (1.5 – 1) times (MDD, gpm) times (14 hours) times (60 minutes per hour). The calculated values for the existing and future conditions are 1.32 MG and 2.76 MG, respectively.

Operational storage to accommodate for delivery of CCWA water is estimated by approximating the potential difference between actual water delivered vs. actual daily demand. The worst case scenario would be the over-ordering of water, whereby a portion of the water delivered from CCWA would need to be stored due to low demand in the system. Assuming that water will be delivered daily and ordered on a monthly basis, the worst case would occur during the low demand period of the year. If the District were to order an average day delivery (2,500 ac-ft/yr = 2.3 MG/day) and actual demand was at its lowest value (say 1.3 MG/day), then approximately 1.0 MG of storage would be needed to handle the over-order.

The following table illustrates the District's storage requirements based on the master-plan water supply scenarios and storage calculations described above for both existing and future conditions.

Water System Storage Capacity

Storage Requirements	Existing Condition (gallons)	Future Condition (gallons)
Fire	540,000	540,000
Equalization	1,320,000	2,760,000
Emergency	1,800,000	3,180,000
Operational (CCWA)	1,000,000	
Total Needs:	4,660,000	6,480,000
Elevated Storage Available:	3,280,000	4,280,000
Gross Surplus/(Deficiency):	(1,380,000)	(2,200,000)
Credit for Sundale Well*	1,800,000	3,180,000
Net Surplus/(Deficiency)	420,000	980,000
Proposed Additional Storage	1,000,000	1,000,000
Net Surplus/(Deficiency)	1,420,000	1,980,000

* Assumes Sundale Well can reliably produce 1,000-gpm of emergency water supply for three day period, which is equivalent to 3,710,000 gallons.

As shown, the District's existing tank storage is adequate to meet current and future needs given the four major storage requirement components discussed above. However, this is based on the assumption that Sundale Well has reliable backup emergency power and that the well itself will be available during an emergency. The District should prioritize making sure that reliable back-up power is available for this well, as part of its ongoing maintenance program.

From an operational perspective, we recommend the District construct approximately 2.0 MG of additional storage, 1 MG in the near-term and another 1 MG in the future. This will serve several purposes including, (1) meeting the District's desire to have a larger component of its Emergency Storage in above-ground, elevated storage tanks, and (2) providing sufficient tank capacity to handle differences between CCWA ordered deliveries and actual demand.

2.5 Water Distribution System

The District is required to maintain a water distribution system that provides water to its customers at a volume and pressure sufficient to meet demand.

A computer model of the water distribution system was developed to analyze existing conditions, determine system conditions with future supplemental water sources, predict system response to various demand scenarios, and identify appropriate system improvements to respond to existing and future needs. This section presents the basis for that model, an explanation of the various source and demand scenarios considered, and a discussion of potential system deficiencies.

Computer Model, Calibration, and System Configuration

To create the computer model, a base map of the existing water distribution system was first prepared in AutoCAD. GIS data provided by NCSD was used to create the base map showing parcel lines, contours, and the water system itself. Separate NCSD/County of San Luis Obispo-provided maps were used to delineate service areas and sphere-of-influence boundaries, as well as land use types within current and future service areas.

The model was created in WaterGems (version 8 by Bentley) and calibrated using results of fire flow tests performed on the system. SCADA data on tanks and field pump data were incorporated into the model. Friction factors within the model were adjusted so that predicted results using the model approximated actual fire flow test results. Because of the limited pressure range available for field pump data, flow curves outside of the available range were extrapolated based on measured data.

Once the model was calibrated for existing conditions, alternative system configurations were developed through an iterative process to meet existing and future demand projections and analyzed under the supplemental water supply scenarios (described above). Existing and future water use demands were based on General Plan projections discussed in Technical Memorandum 1 (Appendix A).

Evaluation Criteria and Results

The District's distribution system design criteria specify that pipeline velocities must remain at or below five feet per second and that residual pressures remain at or above 20 psi, under all system-demand conditions. For purposes of this analysis, a conservative minimum system pressure of 40 psi was maintained.

The two most significant events that a distribution system experiences are a fire flow occurring during a Maximum Demand Day, and the Peak Hourly flowrate. Flow bottlenecks were analyzed under these two "worst case" scenarios. Service connection pressures and main line velocities were used to evaluate the system's performance. The table below shows the values used in the evaluation of the District's system.

Water Demand Projections[1]

	Existing Condition (3,000 AF/YR)	Future Condition (6,200 AF/YR)
Average Day Demand (ADD)	1,860	3,872
Maximum Day Demand (MDD)	3,162	6,590
Peak Hour Demand (PHD)	7,030	14,650

1. Results from Technical Memorandum 1

If the model showed that the system did not meet these criteria for any of the existing and future conditions, system improvements were identified and incorporated into the listing of recommended projects, discussed below.

Analysis and Recommendations

This section describes the recommended projects to upgrade or improve the water system in response to current or anticipated needs identified in the modeling. This section briefly describes additional projects which were reviewed as well, but are not directly related to system improvements. These additional projects are described in detail in the Appendices.

System project address either existing system deficiencies identified in the modeling, or improvements that will be necessary to accommodate CCWA water as a near- and interim-term supplemental water source.

Two types of system deficiencies were identified during model runs: flow bottlenecks and dead end lines.

A list of known dead-end lines was provided by NCSD staff. Additional dead end lines were identified using the GIS data provided. Loops were proposed for each dead-end line. Each loop was examined for feasibility, based on factors such as code, length, necessary easements, future benefit to the water system, presence of natural or pre-existing barriers (trees, creeks, etc.) along the proposed loop route. Remaining feasible loops were prioritized and cost estimates were developed.

Flow bottlenecks were analyzed by running the model under two types of demand scenarios: (1) maximum daily demand on the system plus fire flow, and (2) peak hour demand. Service connection pressures and velocities were used to evaluate the system's performance. It was determined that peak hour demand scenarios load the system backbone; max daily demand plus fire flow placed load on the smaller arterial pipelines throughout the system. For all scenarios, when pressures and/or velocities did not meet system design criteria, appropriate improvements were proposed and evaluated.

Additional system improvements are required to accommodate supplemental water sources into the existing system. These improvements include additional pipeline segments to tie in CCWA water to the existing tanks and upgrading existing pipelines to accommodate water from the desalination facility when it is brought on line. These anticipated improvements are listed as backbone improvements on the Project List in Section 2.9 and shown on Figure 2-4: Recommended Water System Improvements.

2.6 Regulatory Requirements

This section provides an evaluation of potable water quality regulations that are either currently in effect or that are being considered by the United States Environmental Protection Agency (US EPA) and/or the California Department of Health Services (CA DHS), and presents the District's status regarding compliance with those regulations.

Water System Regulatory Overview

Under the 1974 Federal Safe Drinking Water Act (SDWA) and subsequent amendments in 1986 and 1996, the US EPA set national limits on contaminant and disinfectant levels in drinking water for human consumption. These limits are known as *Maximum Contaminant Levels (MCLs)* and *Maximum Residual Disinfectant Levels (MRDLs)*. The *National Primary Drinking Water Regulations* (NPDWRs or primary standards) are legally enforceable standards that protect the public health by limiting the levels of specific contaminants in drinking water that can adversely affect public health.

To date, primary standards have been established for 87 contaminants including turbidity, six microbial or indicator organisms, four radionuclides, 16 inorganic contaminants, 53 organic contaminants, three disinfectants and four disinfectant byproducts. MCLs have been set for 74 contaminants, MRDLs have been set for three disinfectants, and ten contaminants have treatment technique requirements. Public water systems are also required to monitor for unregulated contaminants to assist in providing data or future regulatory development. The US EPA has designated the CA DHS as the primacy agency responsible for the administration of the SDWA requirements in California.

The *National Secondary Drinking Water Regulations* (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. In addition to the primary standards discussed above, the State of California has chosen to adopt 15 secondary drinking water constituents as enforceable standards.

NCSD Compliance with Existing Water Quality Standards

The most recent CA DHS Inspection Report and the accompanying Engineering Report, issued March 7, 2006, provides monitoring requirements and sampling schedules for monitored water quality components, including General Mineral and General Physical Requirements, Radioactivity Requirements, Inorganic Chemicals, Asbestos Monitoring Requirements (source and distribution), Nitrate, Nitrite, Volatile Organic Chemicals (VOCs), Synthetic Organic Chemicals (SOCs), Total Coliform Rule Distribution System Sampling Requirements, Stage I Disinfectants and Disinfection Byproducts, and Lead and Copper Rule Requirements. The Report indicates that the District is generally in compliance with the permit requirements.

The *2006 Consumer Confidence Report* for the Blacklake Division reports 11 detected water quality constituents/contaminants, none of which exceed existing water quality standards.

The *2006 Consumer Confidence Report* for the Town Division reports 32 detected water quality constituents/contaminants, including two that exceeded secondary standards - color and iron. These exceedances were from the Church Well which is operated infrequently. NCSD Operations staff report that the Church Well water quality improves when it is operated more frequently. The Omiya well shows exceedances as well, and is operated infrequently as a result. Other District wells may show higher sampling results when they are tested after they have not been operated for an extended period. More frequent operation or extended flushing prior to sampling generally resolves these issues.

Upcoming Potable Water Quality Regulations and Requirements

Four water quality regulations, or "Rules", have recently been enacted by the US EPA (discussed below). The regulations include the Unregulated Contaminant Monitoring Regulation 2 (UCMR 2), the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), the Ground Water Rule (GWR), and the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR2). As the current sources of water for the District are groundwater basins (including the Nipomo Mesa Sub-Basin of the Santa Maria Groundwater Basin and the Nipomo Valley Basin), a majority of these Rules will have minimal effect on the current operations of the NCSD water system.

- **Unregulated Contaminant Monitoring Regulation 2 (UCMR2)**

The US EPA revised the federal regulations affecting the monitoring of unregulated contaminants for public water systems on January 4, 2007. The purpose of monitoring for unregulated contaminants is to provide the EPA with data to support decisions concerning whether or not to regulate these contaminants in the future. Under UCMR2, large public water services are required to monitor ten contaminants (UCMR2 List 1 Contaminants) for each source entry point into the distribution system.

NCSD is exempt from this monitoring requirement due to their recorded population served as of June 30, 2005. No further District action is required to achieve compliance.

- **Long Term 2 Enhanced Surface Water Treatment Rule (LT2)**

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) was published in the Federal Register on January 5, 2006, with the purpose of improving public health protection through the control of microbial contaminants, focusing on systems with elevated *Cryptosporidium* risk. The primary intent is to prevent significant increases in microbial risk that might otherwise occur when systems implement the Stage 2 Disinfectants and Disinfection Byproducts Rule (discussed below).

The LT2 applies to public water systems that use surface water, ground water under the direct influence of surface water, or that maintain uncovered finished water reservoirs. As the District currently uses groundwater not under the direct influence of surface water, none of these criteria apply.

No further District action is required to achieve compliance under current operations. Should future supplemental water sources meet LT2 criteria, alternative disinfection methods may be necessary, as discussed below.

- **Ground Water Rule (GWR)**

The Ground Water Rule (GWR) was promulgated in October 2006 and was published in the Federal Register on November 8, 2006. The GWR applies to all systems that use groundwater and is effective on January 8, 2007, but the compliance date for triggered monitoring and compliance monitoring is December 1, 2009.

The purpose of the GWR is to reduce disease incidence associated with disease-causing microorganisms (bacteria and viruses) in drinking water. The GWR establishes a risk-based approach to target ground water systems that are vulnerable to fecal contamination. Ground water systems that are identified as being at risk of fecal contamination must take corrective action to reduce potential illness from exposure to microbial pathogens.

The GWR addresses risks through a risk-targeting approach that relies on four major components:

1) *Periodic Sanitary Surveys* of ground water systems which require the evaluation of eight critical elements and the identification of significant system deficiencies in these elements (e.g., a well located near a leaking septic system):
   - Source;
   - Treatment;
   - Distribution system;
   - Finished water storage;
   - Pumps, pump facilities, and controls;
   - Monitoring, reporting, and data verification;
   - System management and operation;
   - Operator certification.

   District operations staff has indicated that sanitary surveys are conducted by the State annually to meet this requirement.
2) *Source Water Monitoring* is required to test for the presence of *E. coli*, enterococci, or coliphage in the sample. There are two monitoring provisions:
   - *Triggered monitoring* – Required for systems that do not already provide treatment that achieves at least 99.99 percent (4-log) inactivation or removal of viruses and that have a total coliform-positive routine sample under Total Coliform Rule sampling in the distribution system.
   - *Assessment monitoring* – As a complement to triggered monitoring, a state has the option to require systems to conduct source water assessment monitoring to help identify high risk systems.
3) *Corrective Actions* are required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following correction action options:
   - correct all significant deficiencies;
   - eliminate the source of contamination;
   - provide an alternate source of water; or,
   - provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.
4) *Compliance Monitoring* is required to ensure that a treatment technology installed to treat drinking water reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

If a water system is notified that a total coliform sample collected under the Total Coliform Rule (TCR) is positive, the water system must collect at least one source water sample for one of the fecal indicators (*E. coli*, enterococci, or coliphage) from each ground water source within 24 hours. The District would need to sample every source (that is, every well) running at the time when the positive test was indicated. Triggered compliance monitoring does not apply if the water system provides at least 4-log virus inactivation and removal before the first customer.

When the triggered source water sample is positive for a fecal indicator, the water system must collect five additional source water samples within 24 hours unless immediate corrective action is required by the state. Water systems must respond to any fecal indicator positive source water sample using one of the acceptable corrective action options.

The District is currently in compliance with this requirement. The District's current practices include disinfection down the well and achieving sufficient retention time within the system to attain 4-log disinfection. The District is installing chlorine analyzers at each well injection point to monitor chlorine levels. The District will be required to maintain 4-log disinfection and continue with compliance monitoring as described above, but additional action to achieve compliance should not be required.

- **Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR2)**

The US EPA has developed the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR2) to increase public health protection by reducing the potential risk of adverse health effects associated with disinfection byproducts (DBPs). The DBPR2 builds upon earlier rules that addressed disinfection byproducts and strengthens public health protection by tightening compliance monitoring requirements for two groups of DBPs: trihalomethanes (TTHM) and haloacetic acids (HAA5).

Most water systems, including NCSD, disinfect water to inactivate microbial pathogens that may cause gastrointestinal illness and other health risks. However, disinfectants like chlorine can react with naturally-occurring materials in the water to form byproducts such as:

- Trihalomethanes (THM)
- Haloacetic acids (HAA)
- Chlorite
- Bromate

These byproducts, if consumed in excess of EPA's standard over many years, may lead to increased potential for health risks such as cancer and reproductive and developmental health problems. EPA has developed the DBPR2 rule to protect public health by limiting exposure to these disinfectant byproducts in drinking water. MCLs for TTHMs and HAA5s are shown in the table below.

Regulated DBPR2 Contaminants	MCLG (mg/L)	MCL (mg/L)
Total Trihalomethanes (TTHM)		*0.080 LRAA*
Chloroform	0.07	
Bromodichloromethane	zero	
Dibromochloromethane	0.06	
Bromoform	zero	
Five Haloacetic Acids (HAA5)		*0.060 LRAA*
Monochloroacetic acid	0.07	
Dichloroacetic acid	zero	
Trichloroacetic acid	0.02	
Bromoacetic acid	-	
Dibromoacetic acid	-	

This rule strengthens public health protection by requiring water systems to meet maximum contaminant levels as an average at each compliance monitoring location (instead of as a system-wide average as in previous rules) for two groups of DBPs: total trihalomethanes (TTHM) and five haloacetic acids (HAA5). The DBPR2 is being released simultaneously with LT2 to address concerns about risk tradeoffs between pathogens and DBPs.

Compliance requirements of the DBPR2 are discussed below.

Initial Distribution System Evaluation (IDSE)

Under the DBPR2 rule, the District is required to conduct an evaluation of their distribution system, known as an Initial Distribution System Evaluation (IDSE), to identify locations within the system with high disinfection byproduct concentrations. These locations will then be used as the sampling sites for DBPR2 rule compliance monitoring.

There are four ways to comply with the IDSE requirements: Standard Monitoring, System Specific Study, 40/30 Certification (40/30), and Very Small System (VSS) Waiver. Because the District has demonstrated very low levels of TTHMs and HAA5s in previous annual samples, they have satisfied the IDSE requirement with a 40/30 Certification. Certification has been submitted to EPA and DHS. No further action is required at this time for IDSE compliance.

After complying with the IDSE requirement, there are several critical reports and deadlines to be met leading up to the final date of the DBPR2 compliance monitoring which begins October 1, 2013 (discussed below).

DBPR2 Compliance Monitoring

DBPR2 Compliance monitoring will require that TTHM and HAA5 samples be collected quarterly from four separate sample locations. Compliance with the TTHM and HAA5 MCLs will be calculated for each separate monitoring location in the distribution system. This approach, referred to as the locational running annual average (LRAA), differs from current requirements, which determine compliance by calculating the running annual average of samples from all monitoring locations across the system.

Issues relating to disinfection byproducts (DBPs) and compliance with the DBPR2 will likely be negligible under current operations. The District's existing groundwater has very low potential for forming DBPs, and recent annual distribution system samples for TTHMs and HAA5s have yielded results well below the respective MCLs. The District will need to develop and submit a Stage 2 DBPR Compliance Monitoring Plan and begin compliance monitoring no later than October 1, 2013. District operations staff has indicated that the District plans to initiate sampling at six remote water system sites in anticipation of meeting DBPR2 Stage 2 monitoring requirements.

2.7 Hazard and Security Analysis

This section evaluates the security of the District's water production, storage and transmission facilities. Potential threats to the District's systems may come from human sources or from natural causes such as flooding, earthquakes or wildfires.

Human Intrusion: Human intrusion into District facilities may pose as much of a threat to the District as natural disasters. Human intrusion problems can range from minor theft or vandalism to acts of terrorism. Entry into or near District facilities by ill-intentioned people can potentially cause greater public health damage than any natural disaster the region has experienced. The public water supply should be made reasonably secure from all non-authorized access.

Security measures to be considered should include protection for site perimeters, site areas between the perimeter and facility, facility structures themselves, power and wiring systems, and physical security for SCADA monitoring systems.

Flooding impact: Several small streams flooded in 2001, causing damage to between 20 and 30 Nipomo homes. Flooding was primarily along Nipomo Creek and its tributaries, such as Deleissiques Creek and Tefft Road Creek. FEMA's 100-year floodplain encompasses the areas adjacent to these watercourses, as well as extensive areas east of U.S. Highway 101. Flooding is unlikely to cause damage to District wells and reservoirs; however, access to these facilities could be affected and utilities over or under streams could be damaged. District equipment could be damaged or lost. Storms could disrupt communications to power facilities.

Earthquake and Fault Rupture/Groundshaking/Liquefaction Impact: According to the County Local Hazard Mitigation Plan, the Santa Maria River and Foxen Canyon faults extend from south of Sisquoc about 40 kilometers north of Nipomo and parallel the Santa Maria River and Highway 101. They extend into the southern end of the Wilmar Avenue fault zone and are potentially active. The eastern segment of the Wilmar Avenue fault extends southerly from Arroyo Grande Creek to the Santa Maria River, following Highway 101. It is also considered potentially active. Additional faults may also have an impact upon the area.

Unreinforced masonry buildings typically provide little resistance to earthquakes and may pose a risk to property, life and safety. Unsecured furnishings, equipment and structural contents can be damaged. Motion-sensitive equipment is particularly vulnerable to earthquakes. Structures on or near the fault are most likely to receive damage from rupture.

Wildfire impact: The County Local Hazard Mitigation Plan states there is greater need for increased water supplies in the Nipomo area due to the intermixed wooded and wildland urban area. Wildfires can deplete water reserves, create low water flows and pressures for firefighting, down power lines, disrupt telephone service, and block roads. Flood control facilities may be inadequate to handle increased silt from runoff, sediment, and debris from barren and burned hillsides.

2.8 Miscellaneous Projects

At the District's request, a number of additional projects were reviewed which may benefit the water system. These projects, discussed in detail in the Appendices, are described briefly below:

- Technical Memorandum 2: *Hydrant Flow Color Coding* (Appendix B):

  This memorandum analyzes the pressure and capacity of District water hydrants and proposes a color classification scheme to align with National Fire Protection Association (NFPA) standards.

  The NFPA has established a color code system for fire hydrants to allow quick determination of available flow and pressure at each hydrant. Using the calibrated WaterGEMS model of the current water system, steady-state model runs were performed to simulate fire flow conditions at hydraulic nodes adjacent to each of the existing hydrants. Based on the results of these simulations, all hydrants were categorized according to the NFPA classification system. The color classification system and analysis results are shown in the table below. A detailed database was prepared which lists the location of each hydrant within the District system.

  Classification and Color Markings Results

Class	Capacity (GPM)	Color	# of Hydrants
AA	P1500	Light Blue	544
A	1000-1499	Green	12
B	500-999	Orange	59
C	Less than 500	Red	1
Abandoned			35
Outside District			9

  As the vast majority of hydrants are to be painted light blue, this memorandum recommends painting all the other color hydrants first.

- Technical Memorandum 3: *Electric to Natural Gas Conversion* (Appendix C):

  This memorandum reviews the potential cost savings and operational advantages to conversion of the Eureka well from an electrically-driven motor to a natural gas-driven pump.

  Natural gas engines can offer several advantages over electric motors for water pumping, including reliability, net operating savings, and operational flexibility. The Eureka well produced approximately 170 acre-feet of water in 2006 at a cost of approximately $325/acre-foot. Conversion of this well to natural gas would allow additional operating hours, resulting in potential for production of up to 720 acre-feet of water per year.

  A cost analysis comparing production of this 720 acre-feet of water via electric-only, natural gas-only, or a hybrid combination of gas and electric is shown in the table below. The hybrid analysis considers production of 170 acre-feet of water from the Eureka well, driven by natural gas (assuming current operating hours are maintained), and the remaining 550 acre-feet generated by other electric-powered wells in the system. This analysis estimates a 7.4 year payback by converting the well to natural gas.

	Electric			Natural Gas			Total			Savings	Pay-back (yrs)
	AFY	O&M Costs	$/AF	AFY	O&M Costs	$/AF	AFY	O&M Costs	$/AF		
Scenario 1 (elec. only)	720	96,120	133	0	0	0	720	96,120	133	--	--
Scenario 2 (hybrid)	550	73,150	133	170	19,550	115	720	92,700	129	$3420	30.7
Scenario 3 (gas only)	0	0	0	720	82,000	115	720	82,000	115	$14,120	7.4

Due to the relatively high payback period, the technical memorandum does not recommend proceeding with this conversion. As an alternative, the District may wish to study the feasibility and economic viability of adding an emergency back-up generator to the well to improve system reliability.

- Technical Memorandum 4: *Water System Storage, Tank Mixing and Standpipe Tank Modifications* (Appendix D):

  This memorandum reviews three options for improving mixing in the Standpipe Tank and proposes modifications to the piping system.

  Maintaining proper mixing in tanks is important to minimize thermal stratification within the tank, taste and odor problems, loss of chlorine residuals due to long detention times, and nitirification. NCSD operations staff has identified the Standpipe Tank as having the greatest potential for mixing problems. Due to the elevation of the Standpipe Tank relative to the Quad Tanks and the single inflow/outflow piping configuration, there is minimal opportunity for mixing within the tank, potentially leaving approximately 60 feet of stagnant water within the tank.

  At the District's request, three tank mixing systems were reviewed for possible use at the Standpipe Tank: the Solar Bee, the Tank Shark, and piping modifications. The proposed piping modifications consist of rerouting the existing inflow line so that it discharges into the top of the tank rather than the bottom. The resulting top-in/bottom-out design encourages mixing within the tank by creating a slight rotation in the water.

  The technical memorandum includes a costs and benefit comparison for the three technologies. Costs for the recommended Standpipe Tank piping modifications are estimated at up to $150,000, depending on whether or not the proposed inflow pipe can be mounted to the outside of the Standpipe Tank without affecting the tank's structural integrity.

- Technical Memorandum 5: *Summit Station Booster Pump* (Appendix E):

  This memorandum suggests system improvements to increase water pressure in the Summit Station area.

  The Summit Station area in the northern western portion of the NCSD currently experiences reduced water pressure due to its high elevation. It is proposed to add a booster station to the system to raise the system pressure in the Summit Station area. This project also includes seven pressure reducing valves within the Summit Station area distribution system to maintain pressure in the lower-elevation areas in Summit Station that do not have pressure problems. The estimated cost for installation of the booster station and additional valves within the Summit Station distribution system is approximately $500,000.

  This technical memorandum includes a detailed exhibit showing the recommended improvements and a cost breakdown.

- Technical Memorandum 6: *County Drainage Projects, Impacts to NCSD Water System* (Appendix F):

  This memorandum reviews the potential impact of planned County drainage system improvement projects to District water lines in the vicinity of the planned projects, and addresses costs for proposed system modifications.

  San Luis Obispo County intends to complete six drainage system improvement projects within the next three years. Some of these projects will affect the NCSD water system by requiring either permanent pipeline relocation or a temporary system modification during construction. The following potential impacts were identified.

  Water System Impacts

Drainage Project	Water System Impact
1. Tefft St. Box Culvert Improvements	Existing 10" and 12" water mains to be relocated
2. Thompson Ave. Arch Culvert Improvements	Existing 6" water main to be relocated, currently hanging within planned culvert structure
3. Mallagh St. Arch Culvert Improvements	Existing water line in project area; will need to be relocated to accommodate new arch culvert
4. Mallagh St. Box Culvert Improvements	Existing 6" water line in project area will need to be relocated to accommodate new box culvert. No impacts anticipated for pipe culvert replacement.
5. Burton St. Box Culvert Improvements	Existing 6" water line in project area; will need to be relocated to accommodate new box culvert.

  Working with NCSD staff, likely alternate permanent locations or temporary modifications for each project were identified and have been designed. The technical memorandum includes a cost estimate for each project.

- Technical Memorandum 7: *ConocoPhillips Water Supply Feasibility Study* (Appendix G):

  This memorandum reviews the potential for developing a desalination facility at the existing ConocoPhillips plant and develops a scope for a Feasibility Study for further review.

  ConocoPhillips currently processes almost 1.3 MGD of ground water extracted from four groundwater wells. They are permitted to discharge up to 575,000 GPD of treated plant effluent and brine from their reverse osmosis (RO) facility, via an ocean outfall pipeline (Outfall). NCSD would like to explore the possibility of utilizing slant drilling technologies to draw seawater or brackish groundwater, treating this water in a separate RO desalination (desal) plant to provide supplemental potable water for the NCSD system, and discharging brine waste from the desal process to the ocean via the Outfall.

  ConocoPhillips currently utilizes all of the permitted capacity in the Outfall, so there is no excess capacity for brine discharge from a NCSD desal plant. However, NCSD could potentially generate Outfall capacity by providing alternate disposal of ConocoPhillips' treated plant effluent, such as groundwater recharge, direct injection, or landscape irrigation. Financial viability for this project concept depends on two assumptions: that sufficient capacity can be generated is the Outfall, and that sufficient recovery can be achieved through RO.

For purposes of this technical memorandum, it was assumed that up to 430,000 GPD of capacity would be available made in the Outfall by handling ConocoPhillips wastewater through alternate means of disposal or reuse. With 430,000 GPD of capacity for brine and assuming an 80% recovery form the desal plant, approximately 2.2 MGD of potable water could be processed, providing up to 1,900 AFY of desalinated water to the NCSD potable water system.

Based on discussions with other water agencies utilizing desal technologies, construction costs could range between $5 million and $9 million, and operating cost are estimated between $2,000 to $4,000/AF. Assuming up to 1,900 AFY water produced, this project would cost NCSD between $3,800,000 and $7,600,000 per year for water treatment.

This technical memorandum recommends that NCSD conduct a Feasibility Study to determine if this is truly a technically and economically viable project. A recommended Scope of Work for this Feasibility Study is included in the technical memorandum.

- Technical Memorandum 16: *CCWA Disinfection and Regulatory Compliance* (Appendix P):

  CCWA water uses chloramines for disinfection, a method which is incompatible with the chlorine-based disinfection method currently used by the District. Use of CCWA supplemental water may necessitate additional compliance requirements or operational modifications to accommodate this alternate disinfection method. This technical memorandum reviews compliance challenges and operational choices available to meet the regulatory requirements for use of CCWA water.

  Compliance challenges may include additional disinfection profiling and benchmarking to comply with LT2 and additional system monitoring for compliance with DBPR2.

  Disinfection system alternatives include uncontrolled blending of chloraminated CCWA water with chlorinated District water either in the system or at a single location prior to entry in the system. This alternative may result in water quality problems due to the incompatibility of the two disinfection methods.

  A second disinfection alternative involves removing the chloramines from the CCWA water and disinfecting with chlorine prior to entry to the District system. However, CCWA water is more likely to form DBPs that District water, so DBP monitoring and treatment may be required.

  A third disinfection alternative involves conversion of the District system from chlorine to chloramines. This alternative presents the lowest potential for water quality problems, the lowest maintenance cost, and a comparable capital cost to the second alternative.

  This technical memorandum recommends conversion of the District system to a chloramines disinfection method as part of the CCWA water tie-in projects.

2.9 Summary of Recommended Projects

The recommended projects described in the Sections above are summarized on the following table. This table presents a recommended capital improvement program for implementation of these water system projects.

This table includes both Design/Bid/Build projects and Feasibility Study projects. These projects were developed based on system deficiencies identified during model runs, model analysis and discussions with NCSD staff about solutions, and cost analysis for the proposed solutions to determine the most effective options. Projects are shown on Figure 2-4.

Costs for Design/Bid/Build projects are based on current standard unit costs, and include materials costs, typical construction costs, a contingency for design, and an additional contingency for administrative and other unknown factors. Costs for Feasibility Studies were estimated between $25,000 and $75,000, depending on the recommended extent of study and degree of detail. Cost estimates are included for budgeting purposes only. Actual costs may vary depending on site conditions, environmental mitigations, market conditions at the time of construction, etc.

Note that this table also includes annual maintenance and rehabilitation projects. These projects are shown for budgeting considerations, but costs for these projects would be pulled from the District's maintenance reserves rather than the Capital Improvement Budget. Note also that some of the projects listed would be financed by the development area benefiting from these projects. The total costs shown would not be realized entirely by the District.

The attached project list includes three categories of recommended projects:

- *Near-term projects*, which address existing system needs and/or projects necessary to bring CCWA water on-line;
- *Interim-term projects*, which address longer-term projects and/or projects necessary to tie-in the desalination facility. Note that projects related to the desalination facility itself are identified in a separate document;
- *Long-term projects*, which address those necessary to serve future development as the Nipomo area grows.

Note that one project, Willow-Road Extension Improvements, should fall under Interim-term projects to provide for Supplemental water delivery and development within the District. However, it is included with the Near-term projects to coordinate the pipeline extension with the County's planned extension of Willow Road. This coordination will save the District construction costs that would be required later to install the pipeline into the completed road. While not technically necessary at this time, the pipeline extension will also improve system performance.

Within each category, projects are prioritized according to District need:

- Priority 1 projects address issues related to life, safety, and ability to serve customers;
- Priority 2 projects address operational improvements, efficiency improvements, water quality improvements, etc.;
- Priority 3 projects include long term operation and maintenance projects, and situations where the code is currently met but where service could be improved, such as the proposed water pressure improvements in the Summit Station area.

RECOMMENDED WATER SYSTEM IMPROVEMENTS

Improvements to meet NEAR-TERM needs

DISTRIBUTION SYSTEM		Diam. (in)	Unit	Quantity	Unit Cost[1]	Total Cost[2]
PRIORITY 1 - ELIMINATING EXISTING BOTTLENECKS						
1	Camino Caballo - Blue Gum west to existing 16" main	16	LF	1,325	$200	$265,000
2	Willow Road - Pomeroy west to Misty Glen Place	14	LF	1,500	$180	$270,000
3	Grande from Cyclone to Orchard	8	LF	660	$140	$92,400
4	Frontage from Story to Banyon	12	LF	290	$170	$49,300
5	Frontage from Hill to Grande	12	LF	1,180	$170	$201,000
					Subtotal	*$878,000*
PRIORITY 1 - UPGRADING STANDBY WELLS TO ACTIVE WELLS						
6	Church Well - Wellhead Treatment Feasibility Study		LS	1	$25,000	$25,000
					Subtotal	*$25,000*
PRIORITY 1 - ELIMINATING EXISTING BOTTLENECKS - BLACKLAKE						
7	Misty Glen Place - Willow Road north to existing 8" main	8	LF	85	$140	$11,900
					Subtotal:	*$11,900*
PRIORITY 1 - SLO COUNTY DRAINAGE PROJECT - RELOCATING WATER MAINS						
8	Tefft Street Box Culvert Improvements	10	LF	150	$160	$24,000
9	Thompson Avenue Arch Culvert Improvements	8	LF	150	$140	$21,000
10	Mallagh Arch Culvert Improvements	8	LF	150	$140	$21,000
11	Mallagh Box Culvert Improvements	8	LF	150	$140	$21,000
12	Burton Street Box Culvert Improvements	8	LF	150	$140	$21,000
					Subtotal	*$108,000*
PRIORITY 1 - BACKBONE IMPROVEMENTS TO ACCOMMODATE NEW SUPPLY AT THOMPSON & MEHLSCHAU						
13	North Dana Foothill Road - Quad Tanks to Mehlschau	24	LF	4,900	$260	$1,280,000
14	Mehlschau - North Dana Foothill Road to Thompson	24	LF	5,650	$260	$1,470,000
15	Thompson - Mehlschau to High School	14	LF	900	$180	$162,000
16	Disinfection: conversion for chloramination at each well.		LS	1	$960,000	$960,000
17	Pressure reducing station at CCWA tie-in.		LS	1	$75,000	$75,000
18	Land Acquisition / Lease Entitlements for Water Storage Tank				TBD	TBD
19	Water Storage Tank (1MG) above Mehlschau/N.Dana Foothill Rd.		MG	1	$1,000,000	$1,000,000
20	Mehlschau Extension - Intersection N.Dana Rd. to New Tank	24	LF	2,100	$260	$546,000
					Subtotal	*$5,500,000*
PRIORITY 1 - WILLOW ROAD EXTENSION IMPROVEMENTS						
21	Mehlschau (Future Extension) - Thompson to Oakglen	18	LF	2,900	$250	$725,000
22	Hwy 101 Crossing - Oakglen/Mehlschau(Future) Intersection to N.Frontage Rd.	18	LF	250	$1,500	$375,000
23	N. Frontage Rd - along Hwy 101 to Sandydale	16	LF	600	$200	$120,000
24	N. Frontage Rd - along Hwy 101 to Willow Road Extension	12	LF	3,650	$170	$621,000
25	Willow Rd. (Future Extension) - N. Frontage Rd to Hetrick	12	LF	4,600	$170	$782,000
26	Willow Rd. (Future Extension) - Hetrick to Pomeroy	12	LF	3,700	$170	$629,000
					Subtotal	*$3,252,000*
PRIORITY 2 - OPERATIONAL IMPROVEMENTS						
27	Standpipe Mixing		LS	1	$150,000	$150,000
28	Security System		LS	1	$121,000	$121,000
					Subtotal	*$271,000*
PRIORITY 2 - LOOPING DEAD-END MAINS						
29	Brytec Ct - extend 8" dead-end to Division	8	LF	20	$140	$2,800
30	N. Blume - extend 8" dead-end to Grande	8	LF	370	$140	$51,800
31	N. Crosby - extend 8" dead-end to Camino Caballo	8	LF	90	$140	$12,600
32	Eve Street - from Burton to Thompson	8	LF	440	$140	$61,600
33	Colt Lane from Glory to Amado	8	LF	1,800	$140	$252,000
34	Grove from Oakglen to Colt	8	LF	650	$140	$91,000
35	Branch from Wilson to Carrillo	8	LF	730	$140	$103,000
36	Camino Caballo from Lindon to Frontage	8	LF	500	$140	$70,000
					Subtotal	*$645,000*
			Total cost to meet NEAR-TERM needs:			***$10,700,000***
PRIORITY 1 - ANNUAL PIPE REPLACEMENT PROGRAM[3]						
37	Replace 5% of Valves per year (1840 total)		EA	92	$2,000	$184,000
38	Replace 5% of Fire Hydrants per year (660 total)		EA	33	$2,200	$72,600
39	Replace 5% of Air/Vac's per year (205 total)		EA	11	$1,500	$16,500
40	Replace 10% of Water Meters per year (3000 total)		EA	300	$500	$150,000
					Subtotal :	*$424,000*
PRIORITY 3 - SUMMIT STATION PRESSURE/FIRE PROTECTION UPGRADES[4]						
41	Hydro-pneumatic Tanks, Booster Pump Station, & Valving		LS	1	$500,000	$500,000
					Subtotal:	*$500,000*

NOTES:
1. Cost Estimate derived from adjusting 2001 Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
2. Costs rounded to 3-significant figures.
3. Costs are expressed in approximate annual present worth values to be funded from District's maintenance reserves.
4. Facilities required to bring fire flow capacity to 1,000 gpm at 20 psi. Improvements to be funded by properties receiving benefit.

RECOMMENDED WATER SYSTEM IMPROVEMENTS

Improvements to meet INTERIM-TERM needs

	DISTRIBUTION SYSTEM	**Diam. (in)**	**Unit**	**Quantity**	**Unit Cost[1]**	**Total Cost[2]**
	PRIORITY 1 - BACKBONE IMPROVEMENTS TO ACCOMMODATE NEW SUPPLY AT WILLOW & HWY 1					
1	Willow Road from Hwy 1 to Bevington Well (parallel)	24	LF	6,800	$260	$1,770,000
						$1,770,000
	PRIORITY 1 - BACKBONE IMPROVEMENTS TO MEET INTERIM NEEDS					
2	S. Oakglen - Tefft to Amado	14	LF	3,050	$180	$549,000
3	Amado - S. Oakglen to Highway 101	14	LF	650	$180	$117,000
4	Freeway Crossing - Oakglen to Frontage at Amado	14	LF	250	$1,400	$350,000
5	N. Frontage - Sandydale to Lindon	16	LF	650	$200	$130,000
6	N. Frontage - Lindon to Juniper	14	LF	1,600	$180	$288,000
7	Calle Fresa - Pomeroy to Camino Caballo	10	LF	1,200	$160	$192,000
8	S. Frontage - Tefft to Hill Street	12	LF	900	$170	$153,000
9	S. Frontage - Grande to Banyon	12	LF	2,250	$170	$383,000
10	S. Frontage - Story to Southland	12	LF	1,850	$170	$315,000
					Subtotal	*$2,480,000*
					Total cost to meet INTERIM-TERM needs:	***$4,250,000***

NOTES:

1. Cost Estimate derived from adjusting 2001 Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
2. Costs rounded to 3-significant figures.

RECOMMENDED WATER SYSTEM IMPROVEMENTS

Improvements to meet FUTURE-TERM needs

DISTRIBUTION SYSTEM		Diam. (in)	Unit	Quantity	Unit Cost[1]	Total Cost[2]
PRIORITY 1 - BACKBONE IMPROVEMENTS TO ACCOMMODATE FUTURE NEEDS						
1	Future Road - Hetrick to Pomeroy	12	LF	2,500	$170	$425,000
2	Pomeroy - Willow to Future Road	12	LF	3,600	$170	$612,000
3	Pomeroy - Future Road to Summit Station	10	LF	2,050	$160	$328,000
4	Willow Road from Bevington Well to Misty Glen Place	18	LF	5,000	$250	$1,250,000
5	Mesa - Charro to Evergreen	10	LF	2,200	$160	$352,000
6	Evergreen - extend to Mesa	8	LF	1,400	$140	$196,000
7	Southland - Frontage to Orchard	10	LF	3,900	$160	$624,000
8	Addtnl. Water Storage Tank (1MG) above Mehlschau/N.Dana Foothill Rd.		MG	1	$1,000,000	$1,000,000
					Subtotal	*$4,790,000*
PRIORITY 1 - ELIMINATING BOTTLENECKS - BLACKLAKE						
9	Augusta Drive - extend 8" to future line in Pomeroy	8	LF	20	$140	$2,800
					Subtotal:	*$2,800*
PRIORITY 2 - PROPOSED LOOPS						
10	Widow Lane / Twilight - extend 8" to loop dead-ends	8	LF	1300	$140	$182,000
11	Tanis - extend 6" dead-end to Nellie	8	LF	900	$140	$126,000
12	Spruce - extend 6" dead-end to Nellie	8	LF	250	$140	$35,000
13	Bristlecone - extend 6" dead-end to Nellie	8	LF	200	$140	$28,000
14	Terrace - extend 6" dead-end to Souza	8	LF	1850	$140	$259,000
15	Souza - Terrace to Oakglen	8	LF	300	$140	$42,000
16	Glenhaven - San Ysidro to Amber	8	LF	800	$140	$112,000
17	Hunter Ridge - Pomeroy to Glenhaven	8	LF	1050	$140	$147,000
18	Future Road - Glenhaven to Pomeroy (between Jennie and Ten Oaks)	8	LF	1050	$140	$147,000
19	Future Road - Honey Grove to Drumm	8	LF	650	$140	$91,000
					Subtotal	*$1,170,000*
					Total cost to meet FUTURE-TERM needs:	***$5,970,000***

NOTES:
1. Cost Estimate derived from adjusting 2001 Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
2. Costs rounded to 3-significant figures.

3. Sewer System

This Section is organized into the following sections: Sewer Flow Projections, Daily Flow Patterns, Collection Systems, Regulatory Requirements, Hazards and Security, Miscellaneous Projects, and Projects Summary.

This Section first reviews the factors considered in development of the sewer system model. These factors include: demand projections for determination of future need and calculation of peaking factors; daily use patterns; and capacity of the treatment plants.

Next, this Section presents the methodologies, assumptions, and results of the sewer modeling and analysis itself. This section reviews current and upcoming regulatory requirements which may affect the sewer system, as well as hazard and security issues which should be considered. These analyses generated recommendations for system improvement projects.

Finally, this Section presents an analysis and tabulated summary of the recommended projects for system improvements identified through modeling as well as special topics of study.

3.1 Flow Projections

This section summarizes the method of analysis and assumptions used in determining sewer flow projections. Appendix A, Technical Memorandum 1 – Water Demand and Sewer Flow Projections, provides additional detail into how these values were calculated. Three sewer flow scenarios based on three land use assumptions were evaluated in this technical memorandum for the Town Division: General Plan, General Plan with Pending Land Use Amendments, and a High Density Scenario. The NCSD Board of Directors selected the General Plan scenario as the planning condition which is used as the basis for the flow calculations for this MPU.

Sewer flow projections were derived from several sources: District-provided operational data and records for the Town (Southland) and Blacklake Divisions, Urban Water Management Plan 2005 Update (UWMP), SLO LAFCO Sphere of Influence 2004 Update (SOI), District supplied FY05-06 Observed Water Use Rates for specific land use types, and the 2001 NCSD Water and Sewer Master Plan Update.

Town Division (Southland Wastewater Treatment Facility)

From these sources, sewer duty factors (estimates of sewer flow expressed in terms of million-gallons-per-day (MGD) of sewage generated per acre of land per year) were calculated for each of the land use categories within the District's service area and are summarized in Table 3-1 below. The sewer duty factors were estimated as follows:

1. Land use within the existing sewer service area was quantified (e.g., 126 acres within the existing sewer service area is zoned Residential Multi-Family).
2. The District GIS data was used to estimate the fraction of each land use area that is connected to the wastewater collection system in 2005 (e.g., 58 acres of Residential Multi-Family area appears to be connected to the collection system). Figure 3-1, Existing Sewer Service Area, shows the areas currently being served.
3. The water use analysis information presented above (i.e., based on observed rates) was used to estimate water use within the areas connected to the collection system.
4. For each type of land use, a fraction of the delivered water was assumed to flow to the sewer. The fractions used were taken from the 2001 Water and Sewer Master Plan Update, and adjusted so that the total wastewater flow matched the reported average flow rate in 2005 (0.626 MGD).
5. A sewer flow duty factor was calculated for each land use by dividing the wastewater flow by the contributing area connected to the collection system.

Table 3-1: Sewer Flow Duty Factors for Existing Wastewater Production under General Plan Land Use, Southland WWTP– based on Observed FY05-06 Water Duty Factors

Land Use	Acres with Sewer Service	Water Duty Factor, Observed FY05-06 Uses (afy/acre)	Estimated percent of area connected to sewer in 2005	Estimated Water Use (afy)	Fraction of Delivered Water going to Sewer [(1)]	Estimated Sewage Production (MGD)	Sewer Flow Duty Factor (MGD/acre)
Town Division							
RMF	126	3.75	46%	216	79%	0.152	0.002634
RSF	604	2.10	51%	644	49%	0.283	0.000924
RS	139	0.98	4%	5	38%	0.002	0.000330
RR	0	0.20	0%	0	0%		
RL	0	0.10	0%	0	0%		
AG	11	0.00	0%	0	0%		
PF	19	0.59	81%	9	84%	0.007	0.000442
OP	31	0.26	28%	2	84%	0.002	0.000195
CR	121	1.42	38%	65	84%	0.049	0.001064
CS	47	0.35	51%	8	84%	0.006	0.000262
OS	11	1.18	0%	0	0%		
REC	5	0.62	100%	3	0%		
Subtotal	1116					0.500	
Galaxy Park and People's Self-Help Housing							
RSF	85	2.10	100%	179	79%	0.125	0.001475
High School (2)							
PF	76	0.12	100%	9	79%	0.006	0.000083
Southland WWTP							
Total	1277			188		0.626	

1: 2001 NCSD Water and Sewer Master Plan Update, Table 2 estimates, adjusted by 5%

2: Domestic water use as reported by NCSD

Average future condition annual wastewater flow rates to the Southland WWTP under the General Plan scenario were estimated as follows:

1. Land use within the future sewer service area was quantified as shown on Figure 3-2, Future Sewer Service Area.
2. The wastewater production rates noted above were used to estimate average flow rates under full build-out conditions. Note that some land uses are assumed to generate no wastewater.
3. The water demand analysis presented above showed that in 2030 water demand will be equivalent to 88%, 84%, and 76% of "build out" demand under Scenarios 1, 2, and 3, respectively. These fractions were used to estimate wastewater production in 2030 as a fraction of "build out" wastewater production.

The results are shown below:

Table 3-2: Future Wastewater Production under General Plan Land Use (based on Observed FY05-06 Water Use Rates)

Land Use	Total Area Served	Sewer Flow Duty Factor	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	acre	MGD/acre	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	86%	0.000
RR	0	0	0.000	86%	0.000
RSF	888	0.000924	0.821	86%	0.706
RS	270	0.00033	0.089	86%	0.077
RL	0	0	0.000	86%	0.000
RMF	126	0.002634	0.332	100%	0.332
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000195	0.006	95%	0.006
CR	128	0.001064	0.136	95%	0.129
CS	67	0.000262	0.018	95%	0.017
IND (1)	4	0.000442	0.002	95%	0.002
OS	0	0	0.000	100%	0.000
PF	22	0.000442	0.010	95%	0.009
High School	76	0.000083	0.006	100%	0.006
Total Use	1,617		1.419		1.283

1: Sewer Duty Factor assumed equal to PF land use.

The values shown in Table 3-3 below are used throughout the remainder of this MPU for the Existing and Future conditions for the Town Division. The peaking factor values shown are taken from Appendix A, Technical Memorandum 1, and are discussed further below.

Table 3-3: Summary of Sewer Flow Projections & Peaking Factors, Town Division (Based on Observed FY05-06 Water Use Rates)

Southland WWTP	Average Annual Flow (AAF)	Peak Dry Weather Flow (PDWF)	Peak Wet Weather Flow (PWWF)
units	MGD	MGD	MGD
Peaking Factor		*1.73 x AAF*	*2.17 x AAF*
Existing	0.63	1.09	1.37
Future	1.28	2.21	2.78

Blacklake Division

A comparable analysis was not performed for the Blacklake Division. However, records were reviewed to determine the annual average daily flow for the Blacklake WWTP is approximately 90,000 GPD. For modeling purposes, the residential single family sewer duty factor described above was used in the analysis.

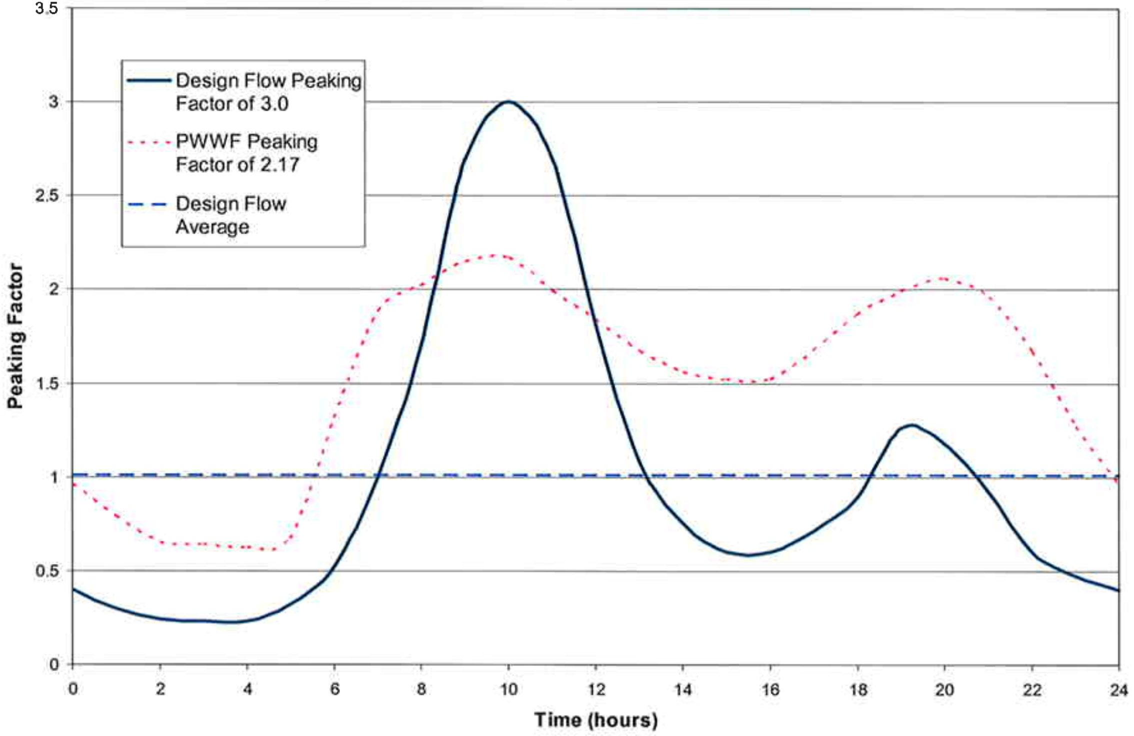
3.2 Daily Flow Patterns

This section describes the further breakdown of average daily sewer flows as they occur throughout the day. Several factors typically contribute to these fluctuations: lift station pump cycling, rainfall inflow/infiltration, and land use type.

As described in Technical Memorandum 1 (Appendix A), a review was performed of the effect lift station pump station cycling has on peak flows within the system. The Tefft Lift Station is the largest of the District's stations and consequently has the largest impact downstream.

Typical daily flow fluctuations are shown in the figure below. This figure represents a diurnal curve, which shows peaks in usage corresponding with early morning activities (such as showering) and evening activities (such as food preparation).

Typical NCSD Sanitary Sewer Diurnal Curve



Three basic patterns in daily use fluctuations were developed for the major land use types: Residential, Office, and Commercial. Variations for these three types of use were considered to develop further breakdown in flow projections.

An additional consideration in modeling system flows is the effect of inflow and infiltration (I/I) on the system. Storm water and groundwater may sometimes leak into system pipes, resulting in flows at the wastewater plant that are greater than might be expected based on metered water usage. Technical Memorandum 1 (Appendix A) includes a detailed analysis of the effects of I/I on the Town and Blacklake Divisions.

Flow projections in system modeling were based on diurnal curve patterns, peaking factors calculated in Technical Memorandum 1 (Appendix A), and I/I estimates (also discussed in Technical Memorandum 1).

3.3 Wastewater Treatment Plants

The District operates two wastewater treatment plants: Southland and Blacklake.

Boyle Engineering Corp. analyzed the current and anticipated capacity of the Southland WWTP in the *Southland Wastewater Treatment Plant Facility Master Plan*, prepared in February 2007. Recommended projects to improve the capacity and operating efficiency of the plant are described in this document, and summarized in Technical Memorandum 11 (Appendix K).

Recommended near-term improvements include:

- replacement or paralleling the Frontage Road trunk main;
- modifications to the influent pump station by installation of variable frequency drives;
- Phase I Wave Oxidation System improvements to increase capacity to 1.7 MGD;
- sludge removal;
- installation of screening and grit removal equipment.

Recommended future improvements include:

- Phase II Wave Oxidation System improvements to increase capacity to 2.4 MGD.

A similar capacity analysis was performed for the Blacklake WWTP in Technical Memorandum 8 (Appendix H). Several improvements have recently been completed, including:

- pond liner replacement;
- conversion of the aeration system from bottom aeration to surface aeration;
- replacement of the remote monitoring/telemetry system and effluent metering.

The WWTP is currently operating at approximately half of the design capacity, with a peak monthly flow at approximately 63% of capacity. As the area served by the Blacklake WWTP is now at or approaching full build out, additional projects to increase capacity are not anticipated.

3.4 Lift Stations

This section describes the methodology, analysis, and results of the evaluation of the existing sewer lift station facilities. The three major components of a lift station facility are its wetwell, pump(s), and forcemain. Additional components are its power supply and its remote monitoring and control capabilities. Each lift station was analyzed with respect to these standard design criteria as follows:

Wetwell – the operating volume shall be large enough to minimize pump/motor cycling (less than or equal to 4 cycles per hour) and limited in size to avoid septic conditions associated with infrequent pumping.

Pump(s) – the pumping capacity shall be large enough to handle the peak hourly flow condition with at least one duty pump(s) out of service. The 2001 MPU established the criteria that small lift stations (100 gpm and less) shall be equipped with two pumps and larger lift stations (>100 gpm) shall be equipped with three pumps.

Forcemain – ideally, the pipe shall be sized to maintain fluid velocities between 3.5 to 5 feet per second but flow rates may vary between 3 to 7 feet per second.

Back-up Power Supply – fixed emergency power generators with automatic transfer switches shall be placed at all critical lift stations where the allowable response time is minimal and where the consequences of an overflow are significant.

Central Alarms and Controls – all lift station status shall be connected to the District's telemetry system and at a minimum have basic monitoring and alarming of station power, pumping status and wetwell level sent to Operations on a real-time basis.

3.4.1 Existing and Future Lift Stations

All of the District's lift stations are considered small stations from an industry perspective with the exception of Tefft Lift Station, which currently has peak influent flows of approximately 350 gpm. Peak influent flows for the remaining lift stations vary from 13 gpm to 182 gpm. All stations have two pumps and operate in an alternating pump mode under normal conditions (i.e. both pumps are duty pumps and take turns operating between lead and standby). Each station's pumps are also capable of operating in parallel (at the same time) in the event inflows exceed the capacity of the lead pump.

The following table is a summary of the analysis of the existing lift stations with respect to these criteria. A combination of telemetry data, field observations and measurements, and previous reports were used as the basis of information for these calculations.

Lift Station Analysis

Town Division

										Existing Conditions		Future Conditions		Existing Conditions		Future Conditions	
WW ID	Lift Station Name	WW Diam. (ft)	On/Off Depth(3)(4) (ft)	Approx. Wetwell Volume (Utilized) (gallons)	Approx. Design Pumping Capacity(1) (gpm)	Approx. Runtime (Calc.) (minutes)	Forcemain Diameter (in.)	Forcemain Velocity @ Pump Capcacity (ft/s)	Theo. Forcemain Velolcity @ Future PDWF (ft/s)	Ave. Dry Weather Flow In (gpm)	Peak Wet Weather Flow In (gpm)	Ave. Dry Weather Flow In (gpm)	Peak Wet Weather Flow In (gpm)	Approx. # of Start/Stops per hour per pump at ADWF	Approx. # of Start/Stops per hour per pump at PDWF	Approx. # of Start/Stops per hour per pump at ADWF	Approx. # of Start/Stops per hour per pump at PDWF
1	HONEY GROVE	6	2.1	444	200	2.2	4	5.1	1.1	5	14	14	43	0	1	1	2
2	GALAXY PARK	---	---	---	300	---	6	3.4	1.5	34	102	44	133	---	---	---	---
3	NIPOMO PALMS	6	2.0	423	175	2.4	4	4.5	5.4	61	182	70	211	3	6	4	7
4	LA MIRADA(2)	5	4.8	705	190	3.7	4	4.9	0.8	10	30	10	30	0	1	0	1
5	TEJAS	5	3.9	573	111	5.2	4	2.8	2.8	36	109	36	109	1	3	1	3
6	BRACKEN	6	2.4	508	110	4.6	4	2.8	1.3	4	13	17	52	0	1	1	2
7	GARDENIA(2)	7	1.5	432	111	3.9	4	2.8	3.5	19	58	45	136	1	3	2	4
8	JUNIPER	6	2.2	465	175	2.7	4	4.5	1.5	17	50	20	59	1	3	1	3
9	N. OAK GLEN	6	3.6	761	175	4.4	4	4.5	0.7	4	12	9	26	0	0	0	1
10	TEFFT(5)	8	8.8	3309	641	5.2	6	7.3	5.0	115	344	148	444	1	2	1	2
11	SELF HELP	---	---	---	150	---	4	3.8	0.8	7	22	10	30	---	---	---	---
12	AMADA (PROPOSED)(5)	---	---	---	---	---	---	---	---	---	---	58	174	---	---	---	---
13	MONARCH (PROPOSED)	---	---	---	---	---	---	---	---	---	---	2	7	---	---	---	---
14	WIDOW (PROPOSED)	---	---	---	---	---	---	---	---	---	---	13	39	---	---	---	---
15	MARIA VISTA (PROPOSED)	---	---	---	---	---	---	---	---	---	---	56	167	---	---	---	---

Blacklake Division

										Existing Conditions		Future Conditions		Existing Conditions		Future Conditions	
WW ID	Lift Station Name	WW Diam. (ft)	On/Off Depth(3)(4) (ft)	Approx. Wetwell Volume (Utilized) (gallons)	Approx. Design Pumping Capacity(1) (gpm)	Approx. Runtime (Calc.) (minutes)	Forcemain Diameter (in.)	Forcemain Velocity @ Pump Capcacity (ft/s)	Theo. Forcemain Velolcity @ Future PDWF (ft/s)	Ave. Dry Weather Flow In (gpm)	Peak Wet Weather Flow In (gpm)	Ave. Dry Weather Flow In (gpm)	Peak Wet Weather Flow In (gpm)	Approx. # of Start/Stops per hour per pump at ADWF	Approx. # of Start/Stops per hour per pump at PDWF	Approx. # of Start/Stops per hour per pump at ADWF	Approx. # of Start/Stops per hour per pump at PDWF
1	WOODGREEN	6	2.6	550	200	2.7	4	5.1	1.1	14	42	14	42	1	2	1	2
2	THE OAKS	5	1.4	206	150	1.4	4	3.8	0.4	5	14	5	14	1	2	1	2
3	MISTY GLEN	5	3.3	485	150	3.2	4	3.8	0.2	2	7	2	7	0	0	0	0

(1) Pumping capacity from 2001 Water and Sewer Master Plan Update

(2) Sites where raw data may be unreliable; high water level greater than invert of influent sewers in some cases

(3) Approximate On/Off Depth refers to depth from when pump comes on to when pump turns off

(4) Generally pump "on" settings were at invert of highest pipe.

(5) Future condition flow rates for each of these stations assumes the Tefft LS Diversion gravity sewer main is constructed thereby diverting a portion of existing flows to Amada LS.

3.4.2 Analysis and Recommendations

All of the existing lift stations major components appear to be adequately sized to accommodate existing and future projected flows with only a few exceptions. The combination of wetwell volumes, high- and low- pump setpoints, and pump capacities for each of the lift stations are in range to allow for adequate operations. Pump on/off cycling for existing and future flow conditions is within the acceptable range. Pumping capacities are for the most part greater than the existing peak hourly flow estimates. Future flow projections suggest that Nipomo Palms and Gardenia are in need of larger pumps for the future condition. Forcemain velocities are also within the acceptable range for both existing and future conditions.

3.5 Wastewater Collection System

The District operates two sewer collection systems to serve the two WWTPs: Southland (Town) Division and Blacklake Division. These collection systems must be of sufficient capacity to prevent overflow and accommodate daily and seasonal fluctuating usage patterns.

A computer model of the sewer system was developed to analyze existing conditions, predict conditions under future flows, and determine system response to various demand, usage, and improvement scenarios.

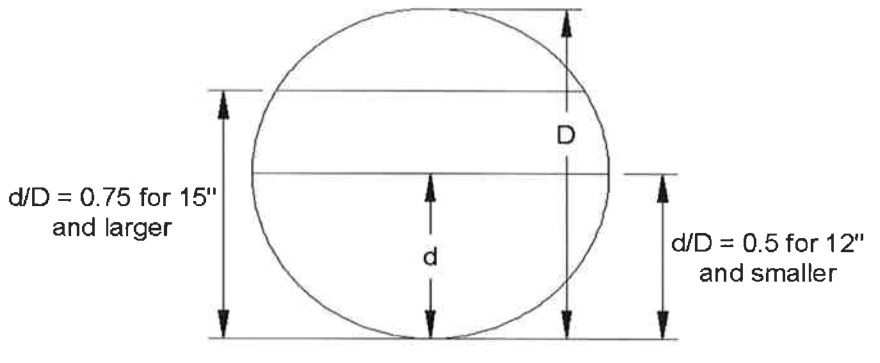
Computer Model, Calibration, and System Configuration

To create the model, a base map was first prepared in AutoCAD. GIS data provided by NCSD was used to create the base map showing parcel lines, zoning, contours, and the existing sewer system itself. Separate NCSD-provided maps were used to delineate service area boundaries. Sewersheds were delineated in AutoCAD as well, and compared to land uses to determine load areas on manholes within each sewershed.

The model was based on Scenario 1, General Plan Land Use, demand projections discussed in Tech Memo 1 (Appendix A). Current observed conditions were used to calibrate the model and to confirm appropriate duty factors for analysis of future conditions. Field measurements were taken as well, to determine physical properties and flows for model calibration.

Evaluation Criteria and Results

The model was run first to analyze existing conditions. Design criteria specified in District Standards were considered to ensure that the capacity requirements of the State's Sewer System Overflow Regulations were satisfied. One standard measure used to prevent overflow problems is maximum d/D, or the ratio of depth (d) of wastewater flow to diameter (D) of sewer main. The model used peak hourly flow thresholds of d/D of >0.5 for pipes 12" and less, and d/D of >0.75 for 15" pipes and larger. If the d/D value exceeded the threshold limit, the system was noted as deficient. Additionally, while an actual peaking factor of 2.17 was measured at the Southland WWTP, a more conservative peaking factor of 3.0 was used throughout the system to further ensure protection from sewer system overflows.



DESIGN PEAK FLOW CRITERIA

The model was first run to identify deficiencies in the existing system. Improvements to ensure adequacy under peak current conditions were identified, as discussed below. Future conditions were analyzed as well, with anticipated future improvements built into the model to accommodate new loads. Additional projects were identified to address future needs.

Analysis and Recommendations

This section describes the recommended projects to upgrade or improve the sewer system in response to current or anticipated needs identified in the modeling. This section briefly describes additional projects which were reviewed as well, but are not directly related to system improvements. These additional projects are described in detail in the Appendices.

System projects include those to address orphan areas in the Prohibition Zone, projects to correct system deficiencies identified in modeling, and projects to address requirements of the SSO.

Orphan Areas

Figure 3-3 identifies orphan areas, or those neighborhoods within the Septic Tank Prohibition Zone that are not currently connected to the sewer system. Projects to serve Orphan Areas are included on the prioritized project recommendation list in Section 3.6.

System Deficiencies

Figure 3-4 shows the recommended sewer system improvements which were considered in the model run and identifies Zones of Benefit for each current and future lift station.

3.6 Regulatory Requirements

Sewer systems in California are generally regulated under either an NPDES permit, authorized by the Federal Clean Water Act, or by Waste Discharge Requirements (WDRs), authorized at the state level by the Porter-Cologne Act.

NPDES permits address discharges to surfaces water of the US and generally apply specifically to the Wastewater Treatment Plant (WWTP). Depending on ownership, the collection system itself may also be covered by the NPDES permit, or may be covered separately under WDRs. WDRs address discharges that may affect groundwater, including percolation ponds or water reclamation systems at WWTPs, and the collection systems themselves.

The District's sewer system is currently regulated under separate WDRs for both Blacklake and Southland WWTPs and their associated collection systems. These WDRs are up for periodic renewal, and may be modified by the RWQCB on renewal to reflect revised effluent quality limitations, flow rates, or system operating parameters. There is currently no information available from the Regional Water Quality Control Board (RWQCB) on pending revisions to the WDRs. Additional wastewater system regulations are currently in development with the RWQCB, but have not yet been published.

However, a Statewide General WDR addressing overflows from sanitary sewer systems was recently passed. WDR Order 2006-0003 was passed in 2004 and is known as the Sanitary Sewer Overflow (SSO) Regulation. The SSO requires that the District develop a Sewer System Monitoring Plan (SSMP). The SSMP must include the District's plans for system management, operations, and maintenance, as well as a spill response plan. The SSO outlines 20 to 30 benchmarks for safe and effective system operations, requiring District compliance.

The District is currently in compliance with the conditions of the SSO, and is developing their SSMP according to the published schedule.

3.7 Hazard and Security

The purpose of this section is to evaluate the security of the District's wastewater treatment and collection facilities. Potential threats to the District's systems may come from human sources or from natural causes such as flooding, earthquakes or wildfires.

Human Intrusion: Human intrusion into District facilities may pose as much of a threat to the District as natural disasters. Human intrusion problems can range from minor theft or vandalism to acts of terrorism. Entry into or near District facilities by ill-intentioned people can cause greater public health damage than any natural disaster the region has experienced. Public waste water facilities should be made reasonably secure from all non-authorized access.

Security measures to be considered should include protection for site perimeters, site areas between the perimeter and facility, facility structures themselves, power and wiring systems, and physical security for SCADA systems.

Flooding impact: Several small streams flooded in 2001, causing damage to between 20 and 30 Nipomo homes. Flooding was primarily along Nipomo Creek and its tributaries, such as Deleissiques Creek and Tefft Road Creek. FEMA's 100-year floodplain encompasses the areas adjacent to these watercourses as well as extensive areas east of U.S. Highway 101. Flooding is unlikely to cause damage to District wastewater facilities; however, access to these facilities could be affected and utilities over or under streams could be damaged. District equipment could be damaged or lost. Storms could disrupt communications to power facilities.

Earthquake and Fault Rupture/Groundshaking/Liquefaction impact: According to the County Local Hazard Mitigation Plan, the Santa Maria River and Foxen Canyon faults extend from south of Sisquoc about 40 kilometers north of Nipomo and parallel the Santa Maria River and Highway 101. They extend into the southern end of the Wilmar Avenue fault zone and are potentially active. The eastern segment of the Wilmar Avenue fault extends southerly from Arroyo Grande Creek to the Santa Maria River, following Highway 101. It is also considered potentially active. Additional faults may also have an impact upon the area.

Unreinforced masonry buildings typically provide little resistance to earthquakes and may pose a risk to property, life and safety. Unsecured furnishings, equipment and structural contents can be damaged. Motion-sensitive equipment is particularly vulnerable to earthquakes. Structures on or near the fault are most likely to receive damage from rupture.

Wildfire impact: The County Local Hazard Mitigation Plan states there is greater need for increased water supplies in the Nipomo area due to the intermixed wooded and wildland urban area. Wildfires can deplete water reserves, create low water flows and pressures for firefighting, downed power lines, disrupt telephone service, and block roads. Flood control facilities may be inadequate to handle increased silt from runoff, sediment, and debris from barren and burned hillsides.

3.8 Miscellaneous Projects

At the District's request, a number of additional projects were reviewed which may benefit the wastewater system. These projects, discussed in detail in the Appendices, are described briefly below:

- Technical Memorandum 8: *Capacity at Blacklake WWTP* (Appendix H):

  This memorandum analyzes the capacity at Blacklake WWTP.

  The Blacklake Wastewater Treatment and Reclamation Facility has a permitted capacity for treatment of up to 200,000 gallons per day. The plant is currently operating at approximately half of the design capacity, with a peak monthly flow at approximately 63% of capacity. The District has recently completed several projects to improve the capacity and effluent quality of the Facility, including replacement of pond liners, conversion of the aeration system, and replacement of the remote telemetry/metering system.

  As the area served by the Facility is now at or approaching full build out, this technical memorandum recommends that additional projects to increase capacity at the Facility are not anticipated.

- Technical Memorandum 9: *Sewage Treatment Pond Sludge/Solids Disposal* (Appendix I):

  This memorandum evaluates the anticipated volume of sludge generated at each WWTP, reviews whether a biosolids facility may be a viable disposal operation, and proposes a scope of study for further review.

  At the District's WWTPs, sludge removal from the ponds occurs occasionally, using pumps which direct settled solids from the ponds to the sludge drying beds. Periodically, the ponds are also drained for maintenance, and accumulated solids are removed at that time. Sludge from Blacklake WWTP is hauled to Southland for drying. Current and future sludge production rates at both WWTPs were estimated, as shown in the table below.

  Annual Sludge Production After Drying

	Southland WWTP		**Blacklake WWTP**		**Total**	
	Current	Future	Current	Future	Current	Future
Mass Sludge (tons)	260	710	40	100	300	750
Volume Sludge (CY)*	290	800	45	110	335	910

  *Assume 50% dry before disposal

  After drying, sludge and solid wastes from the WWTPs are currently transported to a landfill for disposal. With off site disposal costs on the rise, it may be desirable to develop a less-expensive disposal option.

  One such option is land application as biosolids. One potential use of biosolids would be land application on available land at the Southland WWTP. The biosolids land application area consists of 10 acres where the solids would be spread and allowed to dry further. Plant materials would be grown on the areas where the biosolids are applied to absorb nitrates and other nutrients and help break down the solids.

The technical memorandum recommends a Feasibility Study be conducted to investigate this option further, and recommends a scope for such a Study.

- Technical Memorandum 10: *Relocation and Groundwater Recharge of Southland WWTP Effluent* (Appendix J):

  The Board has not yet determined its preferred Liquids Disposal Plan for the Southland WWTP. Technical Memorandum 10 reviews one alternative: discharge of effluent from the Southland WWTP as a possible source of groundwater recharge.

  Technical Memorandum 10 identifies potential upgradient locations to recharge treated wastewater from the Southland WWTP. Based on guidance from District staff, initial screening was performed to identify potential areas for groundwater recharge. Three sites were selected as possible discharge locations.

  Costs were calculated for conceptual alignments to each of the three potential discharge locations. Detailed cost analyses are included in the technical memorandum. As would be expected, the costs for disposal of effluent increases with the distance to the disposal site as well as the flow rate desired for pumping to that area.

  The District should determine if the value of groundwater recharge in upgradient locations merits the additional costs associated with transporting the effluent. This technical memorandum recommends a Feasibility Study be conducted to investigate this option further, and recommends a scope for such a Study.

  Also included in Appendix J is a detailed scope of work for a Phase 2 Hydrogeologic Investigation of the Southland WWTF, prepared by Fugro West Inc. This proposal includes an exploration of alternative new disposal sites; an assessment of the potential for extracting discharge water from beneath the Southland WWTP; recommendations for new monitoring wells at the WWTF; an investigation into the relationship between the WWTF and Nipomo Creek; and as assessment of the water quality of the deep aquifer in the vicinity of the WWTF and potential new percolation pond sites.

- Technical Memorandum 11: *Southland Wastewater Treatment Plant Facility Master Plan* (Appendix K):

  This memorandum reviews current status and associated costs for projects originally presented in the Southland Wastewater Treatment Plant Facility Master Plan.

  Of the Current System Improvements noted, the majority are already proposed to be accomplished by the year 2009. The technical memorandum recommends that installation of appropriately sized and rated variable frequency drives is the most economical method to forestall the periodic influent pump station pump failures. Additionally, the oxidation ditch (Biolac Wave Oxidation System) is recommended as the most cost effective future treatment option. Although not part of the Capital Improvement Plan presented in the Master Plan, the technical memorandum further recommends that sludge removal through the use of rental dredge equipment should be explored in the near term.

- Technical Memorandum 12: *Southland Shop Upgrades* (Appendix L):

  This memorandum reviews costs associated with potential upgrades to the Southland Shop and reviews the viability of installing solar panels to meet the Shop electric needs.

  The proposed upgrade will enlarge the existing office and storage space, provide shower facilities, expand garage space, improve security features such as lighting and fencing, and provide paved access to some interior areas. Estimated costs for this upgrade are approximately $400,000.

One possible additional aspect of the shop upgrade may be installation of solar panels to offset electrical usage. Currently, the Shop uses an average of approximately 775 kwh per month. With the planned upgrade, this usage may double. Costs and savings for installation of solar panels to offset current usage are estimated on the table below.

Item	**Approximate Cost**
Installation	$24,000
Currently Average Monthly Electrical Costs	$127.00
Anticipated Average Monthly Electric Costs	$38.00
Anticipated Monthly Savings	$89.00
Estimated Payback Period	12 years

This technical memorandum does not recommend inclusion of the solar system installation as part of the Southland Shop Upgrade.

- Technical Memorandum 13: *County Drainage Projects, Impacts to NCSD Sewer System* (Appendix M):

  This memorandum reviews the potential impact of planned County drainage system improvement projects to District sewer lines in the vicinity of the planned projects.

  San Luis Obispo County intends to complete six drainage system improvement projects within the next three years. The majority of projects have sewer lines within the immediate vicinity of the construction. Proposed projects were reviewed with San Luis Obispo County staff and NCSD Operations staff and it was determined that no permanent or temporary relocations for NCSD sewer lines seem to be required.

3.9 Summary of Recommended Projects

The recommended projects described in the Sections above are summarized on the following table. This table presents a recommended capital improvement program for implementation of these sewer system projects.

This table includes both Design/Bid/Build projects and Feasibility Study projects. These projects were developed based on system deficiencies identified during model runs, model analysis and discussions with NCSD staff about solutions, and cost analysis for the proposed solutions to determine the most effective options. Projects are shown on Figure 3-3: Existing Sewer Orphan Areas within Prohibition Zone, and Figure 3-4: Recommended Sewer System Improvements.

Costs for Design/Bid/Build projects are based on current standard unit costs, and include materials costs, typical construction costs, a contingency for design, and an additional contingency for administrative and other unknown factors. Costs for Feasibility Studies were estimated between $25,000 and $75,000, depending on the recommended extent of study and degree of detail. Cost estimates are included for budgeting purposes only. Actual costs may vary depending on site conditions, environmental mitigations, market conditions at the time of construction, etc.

The attached project list includes prioritized projects for sewer system collection or treatment improvements. Projects were prioritized according to District need and cost effectiveness.

- Priority 1 projects address issues related to life, safety, and ability to serve customers;
- Priority 2 projects address operational improvements, efficiency improvements, water quality improvements, etc., as well as long term operation and maintenance projects, and situations where the code is currently met but where service could be improved.

RECOMMENDED SEWER SYSTEM IMPROVEMENTS

IMPROVEMENTS TO MEET EXISTING NEEDS

COLLECTION SYSTEM		Diam. (in)	Unit	Quantity	Unit Cost[2]	Total Costs[3]
Town						
	PRIORITY 1 - FRONTAGE TRUNK LINE					
1	Upsize Frontage Trunk Line - Southland to WWTP	21	LF	1,160	$375	$435,000
2	Upsize Frontage Trunk Line - Story to Southland	18	LF	1,780	$330	$587,400
3	Upsize Frontage Trunk Line - Division to Story	18	LF	1,350	$330	$445,500
					Frontage Subtotal:	*$1,500,000*
	PRIORITY 2 - DIVISION RELIEF					
4	Upsize Division Gravity Collector - Beverly to Frontage	12	LF	1,415	$210	$297,150
					Division Subtotal:	*$297,150*
					Town Total:	*$1,800,000*
Blacklake						
	PRIORITY 1 - GOLF COURSE TRUNK LINE					
5	Remove Sag/Belly from golf course mainline along 9th hole	10	LF	450	$200	$90,000
					Blacklake Total:	*$90,000*
					Total Collection System Costs:	***$1,900,000***
WASTEWATER TREATMENT						
Southland WWTP (Town Division)						
	PRIORITY 1 - WWTP IMPROVEMENTS					
5	Influent Pump Station and Flowmeter Improvements[1]		LS	1	$620,000	$620,000
6	Spiral Screening System[1]		LS	1	$468,000	$468,000
7	Grit Removal System[1]		LS	1	$560,000	$560,000
8	Phase I Wave Oxidation System[1]		LS	1	$4,060,000	$4,060,000
9	Solids Handling Proposals		LS	1	TBD	TBD
10	Shop Upgrade		LS	1	$400,000	$400,000
11	Hazard, Security, and Safety Upgrades		LS	1	$50,000	$50,000
					Subtotal:	*$6,200,000*
	PRIORITY 2 - WWTP IMPROVEMENTS					
12	Shop Solar Panels		LS	1	$30,000	$30,000
					Subtotal:	*$30,000*
					Southland WWTP Total:	*$6,230,000*
Blacklake WWTP						
	PRIORITY 1 - WWTP IMPROVEMENTS					
13	Hazard, Security, and Safety Upgrades		LS	1	$25,000	$25,000
14	Liner Replacement (2007)		LS	1	$300,000	$300,000
					Blacklake WWTP Total:	*$325,000*
					Total WWTP Costs:	***$6,600,000***
WATER RECLAMATION						
Southland WWTP						
	PRIORITY 1 - WATER RECLAMATION					
15	Southland Effluent Recharge/Reuse Feasibility Study		LS	1	$75,000	$75,000
					Southland Reclamation Total:	*$75,000*
					Total Reclamation Cost:	***$75,000***
	TOTAL COST OF IMPROVEMENTS TO MEET EXISTING NEEDS					***$8,580,000***
	PRIORITY 1 - ANNUAL REHABILITATION / REPLACEMENT[4]					
16	Rehabilitate 7% of Lift Stations per year (1 per year with 14 total)		EA	1	$50,000	$50,000
17	Rehabilitate 5% of Manholes per year (600 total)		EA	30	$3,000	$90,000
					Rehab./Replacement Subtotal:	*$140,000*

NOTES:

1. Improvements and costs incorporated from Southland Wastewater Treatment Facility Master Plan 2007
2. Cost Estimate derived from adjusting Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
3. Total Costs are rounded to 2-significant figures.
4. Costs are expressed in approximate annual present worth values to be funded from District's maintenance reserves.

RECOMMENDED SEWER SYSTEM IMPROVEMENTS

IMPROVEMENTS TO MEET FUTURE NEEDS

COLLECTION SYSTEM		Diam (in)	Unit	Quantity	Unit Cost[2]	Total Costs[4]
Town						
PRIORITY 1 - OAKGLENN TRUNK LINE[3]						
1	Upsize Oakglen Trunk Line - Amado to Freeway Crossing	15	LF	2,300	$240	$552,000
2	Upsize Oakglen Trunk Line - Glory to Amado	15	LF	1,830	$240	$439,200
3	Upsize Oakglen Trunk Line - Mads Place to Glory	12	LF	965	$210	$202,650
4	Upsize Oakglen Trunk Line - Oakglen at Tefft	10	LF	330	$180	$59,400
					Subtotal	*$1,253,250*
PRIORITY 2 - FRONTAGE TRUNK LINE						
5	Upsize Frontage Trunk Line - Grande to Division	15	LF	1,150	$240	$276,000
6	Upsize Frontage Trunk Line - Juniper to Grande	12	LF	3,515	$210	$738,150
					Subtotal	*$1,014,150*
PRIORITY 3 - UPGRADES						
7	Branch Bypass Gravity Collector - Mallagh to Wilson	8	LF	480	$155	$74,400
8	Tejas Lift Station Upgrade to 150 gpm		LS	1	$150,000	$150,000
					Subtotal	*$224,400*
PRIORITY 4 - ORPHAN AREA IMPROVEMENTS[5, 6]						
9	Project 1 - Upgrade Gravity Collector - Story from Peacock to Meredith	8	LF	875	$155	$135,625
	Monarch Lift Station - 50 gpm		LS	1	$150,000	$150,000
	Monarch Force Main	4	LF	800	$140	$112,000
10	Project 2 - Gravity Collector - Story from Orchard to Peacock	8	LF	1,970	$155	$305,350
	Gravity Collector - Orchard from Soares to Story	8	LF	700	$155	$108,500
	Gravity Collector - Orchard from Primavera to Story	8	LF	700	$155	$108,500
11	Project 3 - Frontage Trunk Line - Camino Caballo to Juniper	8	LF	1,300	$155	$201,500
	Gravity Collector - Camino Caballo to Frontage	8	LF	2,685	$155	$416,175
12	Project 4 - Widow Lift Station - 200 gpm		LS	1	$150,000	$150,000
	Widow Force Main	4	LF	325	$140	$45,500
	Gravity Collector - Southland from Honey Grove to Frontage	12	LF	2,840	$210	$596,400
13	Project 5 - Gravity Collector - Orchard and Southland to Drumm Lane	8	LF	915	$155	$141,825
14	Project 6 - Gravity Collector - Hill Street to Frontage	8	LF	1,475	$155	$228,625
					Orphan Area Subtotal	*$2,700,000*
PRIORITY 5 - AMADO LIFT STATION & FORCEMAIN[6]						
15	Amado Lift Station - 350 gpm		LS	1	$300,000	$300,000
	Amado Force Main	6	LF	920	$155	$142,600
	Gravity Collector - Sparks Bypass extension to Amado LS	8	LF	3,000	$155	$465,000
					Subtotal	*$907,600*
					Town Total:	*$6,099,400*
					Total Collection System Costs:	***$6,100,000***
WASTEWATER TREATMENT[1]						
Southland WWTP						
PRIORITY 1 - WWTP IMPROVEMENTS						
16	Phase II Wave Oxidation System		LS	1	$198,000	$198,000
					Southland WWTP Total:	*$198,000*
					Total WWTP Costs:	***$200,000***
WATER RECLAMATION						
Southland WWTP						
PRIORITY 1 - WATER RECLAMATION						
17	Tertiary Filtration		LS	1	$1,898,000	$1,898,000
18	Chlorination System		LS	1	$1,546,000	$1,546,000
19	Southland Effluent Discharge and Percolation Basin		LS	1	TBD	TBD
20	Lift Station		LS	1	$300,000	$300,000
21	New Effluent Force Main		LF	28,260	$115	$3,249,900
					Southland Reclamation Total:	*$6,993,900*
					Total Reclamation Cost:	***$7,000,000***
					TOTAL COST OF IMPROVEMENTS TO MEET FUTURE NEEDS:	***$13,300,000***

NOTES:

1. Improvements and costs incorporated from Southland Wastewater Treatment Facility Master Plan 2007
2. Cost Estimate derived from adjusting Master Plan Estimate April 2001 cost to May 2007 ENR CCI.
3. Tefft Street Lift Station has major affect on this line, reducing flow rate or VFD may alleviate issues.
4. Total Costs are rounded to 2-significant figures.
5. Orphan areas are those neighborhoods within the Septic Tank Prohibition Zone that are not currently connected to the sewer system.
6. Improvements to be funded by properties receiving benefit.

4. NCSD Staffing

This section reviews the District's current Operations and Maintenance staff and develops a staffing plan to anticipate the District's changing needs as Nipomo continues to develop. Specifically, this Section reviews the current work load requirements and staff positions in charge of meeting those requirements; projects future work load and reviews staffing changes that will be necessary to meet that anticipated work load; and, proposes a Preventative Maintenance Program to improve the District's ability to maintain the water and sewer systems and effectively address unforeseen problems when they occur.

4.1 Current and Recommended Work Load and Staffing

Koff and Associates prepared a *Classification Study and Organizational Review* (Koff Review) for the District in February 2007. A complete copy of the Koff Review is included in Appendix Q. The Koff Review presents current District Utility staff job classifications and descriptions and develops a classification plan and organizational chart to meet staffing requirements. Appendix I of the Koff Review includes recommended class descriptions, Appendix II reviews recommended employee allocations, and Appendix III presents a recommended organizational structure.

The entire text of the Koff Review is included in Appendix Q for reference. A summary of their findings and recommendations is included below.

- The District currently employs six full-time Utility Department staff people, with two part-time interns.
- The Utility Department is currently headed by the Utility Supervisor, under the Direction of the General Manager. It is recommended that the Utility Supervisor position be reclassified as a Department Head with the title Utility Superintendent. The addition of a new field person would allow the Utility Superintendent to delegate the field work that he now shoulders as Supervisor.
- The position of Utility Field Foreman has experienced a work increase in the past few years, and currently has a split focus between construction inspection and field supervision. By splitting this job into two positions – the Utility Field Supervisor and the Inspection Maintenance Supervisor – both positions could be handled more effectively, and the field work currently performed by the Utility Supervisor could be absorbed into the responsibilities of the new supervisor positions.
- One to two additional lower-level field staff positions are eventually recommended as well, to allow implementation of a pro-active preventative maintenance program (discussed further below) and to keep up with anticipated growth as Nipomo continues to develop.
- Cross-training certifications to allow District workers to switch between water and wastewater work as demands require would increase flexibility of staff.

As a supplement to the Koff Review, the Workload and Staffing Table (also in Appendix Q) was prepared to estimate actual staff hours spent per different type of Utility Department activities. The spreadsheet provides a breakdown of the typical O&M work activities into several categories as well as an approximation of the current annual hours each job classification spends on each activity. The categories include Operations, Maintenance, Construction, Inspections, Inter-Agency Coordination, Customer Service, Reporting & Compliance, Training, Management Assistance, and Engineering Assistance. The purpose of this effort was to benchmark the recommendations in the Koff Review and to help predict future requirements.

Currently, the District employs six full-time workers and two part time interns. Note that the spreadsheet does not reflect interns' involvement in Utility Department activities. This spreadsheet shows that a staff of approximately nine full-time Utility workers is appropriate for the work load required for regular maintenance and repair activities. The analysis of the spreadsheet agrees with the recommendation of the Koff Review of an additional supervisor position and one or two additional field workers.

The spreadsheet also shows that the District currently outsources certain maintenance and operations tasks, at a level of approximately 1.3 full-time equivalents (FTEs).

4.2 Future Staffing Levels

Future staffing levels are hard to predict, owing primarily to uncertainty regarding the source of supplemental water. Development of desalination as a supplemental water source may require additional treatment staff. Use of CCWA water may require additional staff to handle modifications to the disinfection system. Similarly, monitoring, reporting and compliance requirements will vary depending on the source of supplemental water.

Water use is projected to more than double from current levels of approximately 3,000 AFY to approximately 6,200 AFY by the year 2030. As a general rule of thumb, necessary staffing levels may be expected to increase proportionally, to approximately 150 to 200% of current levels by 2030.

The staffing table below shows a comparison of the current (C) breakdown of FTEs per job classification with the anticipated future (F) breakdown of FTEs, based on consideration of factors presented in the Koff Review and the attached recommended Preventative Maintenance Plans. Note that the table does not include the position of District Engineer, a position that has recently been filled. It is anticipated that the District Engineer will take on some of the administrative responsibilities currently managed by the Utility Department.

Current and Future FTE Staffing Levels, by Work Category and Job Classification

	Super-intendent		Field Supervisor		Inspection/ Maintenance Supervisor		Operator/ Water Quality Technician		Utility Worker		Maintenance Utility Worker		Outside Service Provider		Total	
	C	**F**	**C**	**F**	**C**	**F**	**C**	**F**	**C**	**F**	**C**	**F**	**C**	**F**	**C**	**F**
Operations	0.1	0.2	0.3	0.5	0.5	0.8	0.5	0.8	2.0	3.5	0.3	0.5	0.1	0.2	3.8	6.5
Maintenance	0.3	0.5	0.2	0.3	0.2	0.3	0.7	1.2	0.8	1.4	0.5	0.8	0.9	1.7	3.6	6.2
Construction	0	0	0	0	0	0	0	0	0	0	0.4	0.8	0	0	0.4	0.8
Inspections	0.1	0.2	0.4	0.7	0.3	0.5	0	0	0	0	0	0	0	0	0.8	1.4
Inter-Agency Coordination	0.1	0.2	0.1	0.2	0.1	0.2	0	0	0	0	0	0	0	0	0.3	0.6
Customer Service	0.1	0.2	0.1	0.2	0	0	0.1	0.2	0.1	0.2	0.3	0.5	0.4	0.7	1.1	2.0
Reporting & Compliance	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1
Training	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0	0	0.6	1.2
Management Assistance	0.3	0.3	0.2	0.3	0.1	0.2	0	0	0	0	0	0	0	0	0.6	0.8
Engineering Assistance	0.2	0.2	0.1	0.2	0.1	0.2	0	0	0	0	0	0	0	0	0.4	0.6
Total	**1.4**	**2.1**	**1.5**	**2.6**	**1.4**	**2.4**	**1.4**	**2.4**	**3.0**	**5.3**	**1.6**	**2.8**	**1.4**	**2.6**	**11.7**	**20.2**

4.3 Preventative Maintenance Program

As stated in the Koff Review, the District currently operates largely on a responsive basis, handling problems as they occur. This operations model may be cost effective in general, but in the event of a serious problem or a series of problems, the District could be understaffed to maintain required operations. A proactive operations approach that incorporates a Preventative Maintenance Plan (PMP) is more likely to (a) minimize the likelihood of problems occurring and (b) leave more staff available to handle emergencies when they do occur, while minimizing additional staff cost.

The Water System PMP presented herein was developed based on discussion with District Operations staff and a review of the current maintenance and replacement practices and goals. Note that the District's inspection and maintenance frequencies are compared to recommended inspection and maintenance frequencies in common practice in the industry. To better maintain water system performance and reliability, the District should strive to meet the recommended inspection and maintenance frequencies noted. Additional staffing as discussed above should facilitate this goal.

Development of a Sewer System Prioritized PMP is a required element of the SSMP mandated under SSO regulations. The District's SSMP is in development now, in accordance with the published compliance schedule. The Sewer System PMP recommendations presented herein are offered to provide guidance in the District's efforts toward developing a Prioritized PMP for their sewer system.

A successful PMP for either system must incorporate documentation of all tasks and procedures. Documentation establishes standard and approved methodologies, helps with training new staff, simplifies compliance with regulatory requirements, and retains standard methodologies in case of staff turn over or retirement.

Another key factor in a successful PMP is having appropriate software for managing, scheduling, and tracking preventative maintenance activities. The District's current database is not user friendly and does not tie into either the GIS database or the accounting system. A Computerized Maintenance Management System (CMMS) software package such as *gbaMS, Cartêgraph* or *Datastream* would better meet the District's need for implementing the PMPs described below. (Additional information on these CMMS options is included in Appendix Q.)

The District's GIS database should form the link between the Accounting System and the CMMS. Given the requirements of GASB 34 and the need to document, track, and fund replacement of publicly-owned assets, and the requirements of the SSO to prepare a PMP, we recommend that the District continue with development of the GIS database and these essential links.

Water System Preventative Maintenance Plan

Activity	Current Frequency	Recommended Frequency
1. Fire Hydrant Maintenance a. Clear around heads b. Operate hydrant i. Open and close outlets; note ease of operation c. Paint and number d. Operate gate valve that services hydrant e. Lubricate cap covers f. Check atlas and record when complete	12 per month, 660 total. Maintenance occurs approximately every 4.5 years	Annual inspection and maintenance
2. Valve Maintenance g. Clean out valve box h. Operate valve i. Note number of turns; note ease of operation i. Paint valve box lid (blue for main lines; white for laterals) j. Replace any broken or cracked lids k. Check atlas and record when complete	30 per month; 1840 valves total. Maintenance occurs approximately every 5 years.	Inspection and maintenance every two years
3. Air/Vac Maintenance l. Clean area around air can m. Check overall condition of cover and paint if needed n. Operate control valve that services air/vac o. Check atlas and record when complete	5 per month; 203 total. Maintenance occurs approximately every 3 years	Inspection and maintenance every two years
4. Blow Off Maintenance p. Clean out box q. Install blow off pipe r. Operate valve i. Open and close; note ease of operation s. Flush until water is clear and clean t. Check atlas and record when complete	6 per month; 175 total. Maintenance occurs approximately every 2.5 years	Inspection and maintenance every two years
5. Storage Tanks and Tank Sites u. Remove any trash or debris and check for tampering v. Drive or walk the site for any problems (fencing repair, weed abatement, etc.) w. Make certain that all valves are chained and locked x. Record the time of day checked	Check sites weekly	
6. System Flushing y. Begins late fall or early winter z. System will be divided into sections	1 section per year, minimum	
7. Meter Replacement and Repairs	10% per year	Anticipated lifespan of meter is 15 to 20 years.
8. Buildings and Grounds aa. Remove trash and debris from around each site bb. Clean inside of well houses i. Mopping, sweeping, clean walls cc. Note when buildings need attention (painting or repairs) dd. Keep weeds in check (spray or weed whack as needed)		

Sewer System Preventative Maintenance Plan Recommendations

The SSMP requires development of a Prioritized PMP for the sewer system (already in development). A comprehensive PMP should incorporate the following considerations:

- Preventative maintenance;
- Corrective maintenance and system expansion;
- Emergency response.

Preventative Maintenance measures address ongoing maintenance to the system to keep it in good operating order and prevent problems before they occur. Measures should include:

- Routine system-wide inspections (minimum 5- to 10-year cycle is recommended)
- Routine system-wide cleanings (minimum 3- to 7-year cycle is recommended, with increased frequency for areas with known problems)
- Force main and air/vacuum release valve inspection and maintenance (minimum 2 year-cycle is recommended)
- Implementation of repairs before nuisances become problems
- Inflow and infiltration (I/I) reduction program
- Fats, oils and grease (FOG) reduction program
- Root control program
- Long-term rehabilitation program

Corrective Maintenance measures address existing (known) problems or system inadequacies. They may include:

- Pipeline repairs, sealing, relining, and/or replacements
- Manhole repairs, rehabilitation, and/or replacements
- Service lateral reinstatements

System Expansion measures address improvements or system modifications that will be necessary as the system expands to incorporate growth and development in the area. These measures are predictable requirements for the system and can be prioritized in the budget to be addressed in a timely rather than responsive manner. Measure may include:

- Installation of new pipelines
- Upsizing of existing pipelines
- Treatment system upgrades
- System connections and establishment of redundancies to incorporate existing service areas which undergo growth or development

Emergency Response measures are by nature unpredictable, but having a plan in place for response is crucial for maintaining all system operations in the event of an emergency. Planned response measures should include:

- Customer response
- Sewer investigations
- Pipeline cleaning and repair
- Manhole service and repair
- Pump station and force main maintenance and repair
- Bypass pumping

Additional consideration should be given to which of the prioritized PMP tasks can be effectively handled by outside providers on an "on-call" basis, to reduce the number of staff needed on a full-time basis.

5. Implementation

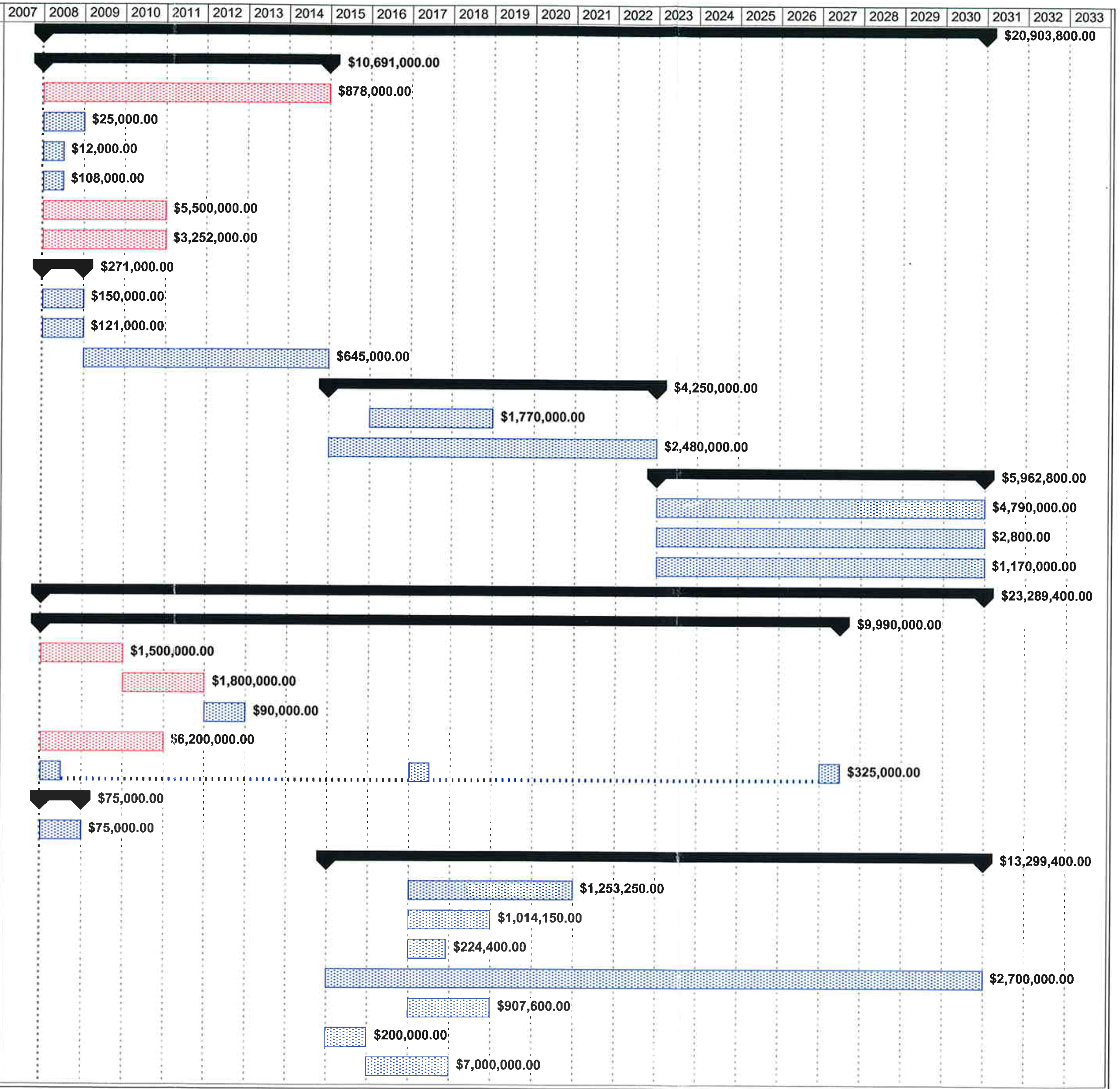
Implementation of the projects described in this MPU must be prioritized and authorized by the Board, and reviewed under CEQA prior to construction.

The Gantt Chart on the following page shows a recommended prioritization for implementation of the projects recommended in this MPU. Water, sewer, and supplemental projects are all shown and are prioritized based on operational necessity (safety, health, and ability to serve customers) and cost/benefit considerations. The Board should determine the highest priority projects for authorization and implementation each year.

This Gantt chart shows both Design/Bid/Build projects and Feasibility Studies. Design/Bid/Build project are those identified for construction. Identified Feasibility Studies may result in construction projects eventually, once the issue goes through further review.

These projects must also undergo CEQA analysis prior to implementation. The District has the option to review all the projects described herein under a Program EIR rather than under separate individual CEQA reviews. A Program EIR may be prepared on a series of actions that can be characterized as one larger project and a related either geographically, as logical parts of a series of actions, or as individual actions carried out by the same regulatory authority.

ID	Task Name	Priority
1	**Water System Projects**	
2	**Phase 1: Near-Term Projects**	
3	Eliminating Existing Bottlenecks - Town	1
4	Upgrading Standby Wells to Active Wells	1
5	Eliminating Existing Bottlenecks - Blacklake	1
6	SLO County Drainage Project - Relocating Water Mains	1
7	Backbone Improvements to Accommodate New Supply at Thompson & Mehlschau	1
8	Willow Road Extension Improvements	1
9	**Operational Improvements**	
10	Standpipe Mixing	2
11	Security Upgrades	2
12	Looping Dead-End Mains	2
13	**Phase 2: Interm-Term Projects**	
14	Backbone Improvements to Accommodate New Supply at Willow & Highway 1	1
15	Backbone Improvements to Meet Interim Needs	1
16	**Phase 3: Future-Term Projects**	
17	Backbone Improvements to Accommodate Future Needs	1
18	Eliminating Bottlenecks - Blacklake	1
19	Proposed Loops	2
20	**Sewer System Projects**	
21	**Phase 1: Existing Needs**	
22	Town System Frontage Trunk Line	1
23	Town System Division Relief	2
24	Blacklake System Golf Course Trunk Line	1
25	Southland WWTP Improvements	1
26	Blacklake WWTP Improvements	1
27	**Southland WWTP Water Reclamation**	
28	Feasibility Study	1
29	**Phase 2: Future Needs**	
30	Town System Oakglenn Trunk Line	1
31	Town System Frontage Tunk Line	2
32	Town System Upgrades	3
33	Town System Orphan Area Improvements	4
34	Town System Amado Lift Station & Forcemain	5
35	Southland WWTP Improvements	1
36	Southland WWTP Water Reclamation	1



roject: MPU_Implementation Gantt C
Date: Wed 12/19/07

Task	▨	Progress	▬	Summary	▬	External Tasks	▨
Split	┈┈┈	Milestone	◆	Project Summary	▬	External Milestone ◆	
Deadline	⇩						

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Figures

List of Figures:

*** Full-size copies of these Figures are included in sleeves in the back of this document.**

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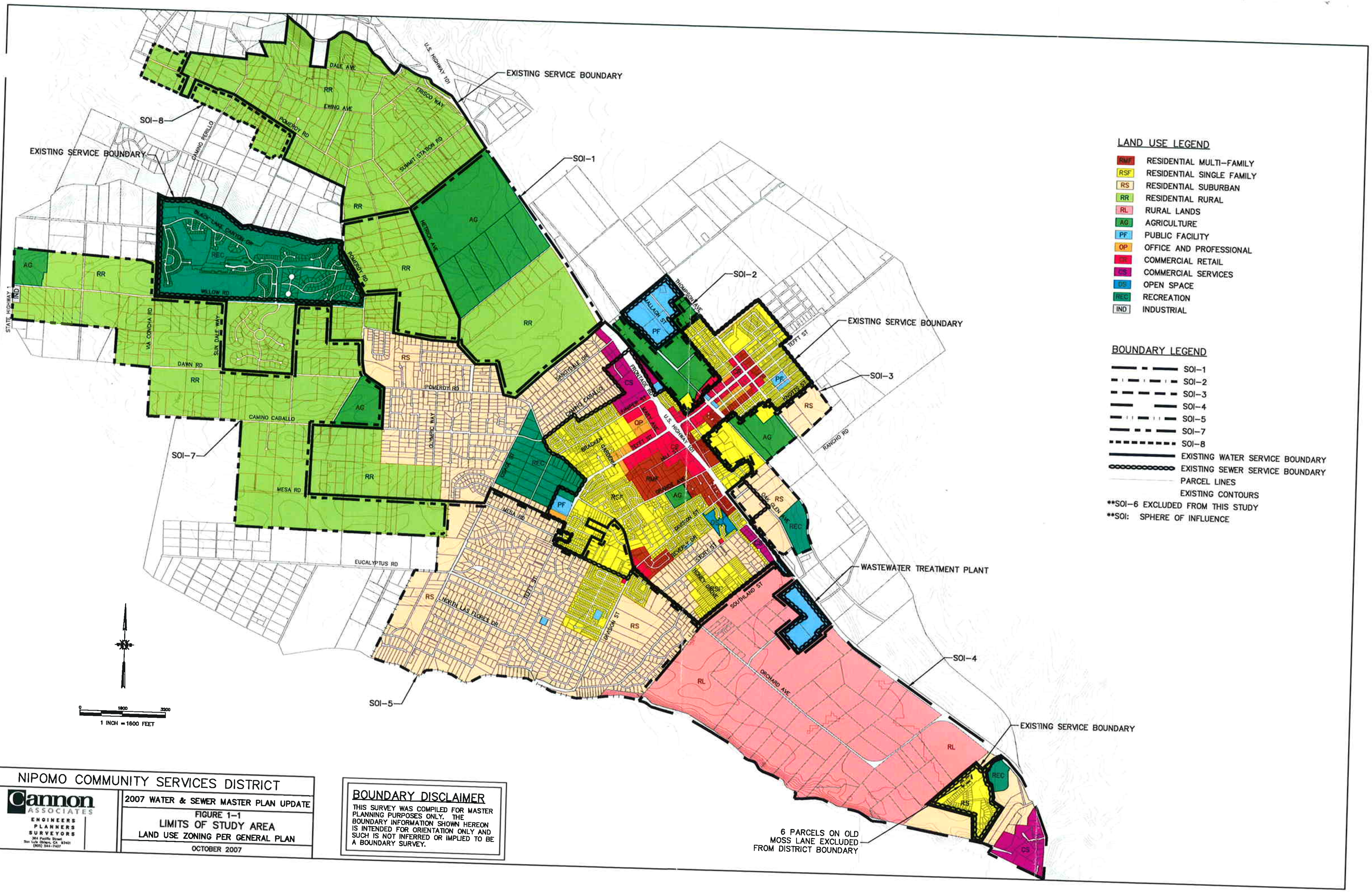

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 1-1
LIMITS OF STUDY AREA
LAND USE ZONING PER GENERAL PLAN

OCTOBER 2007

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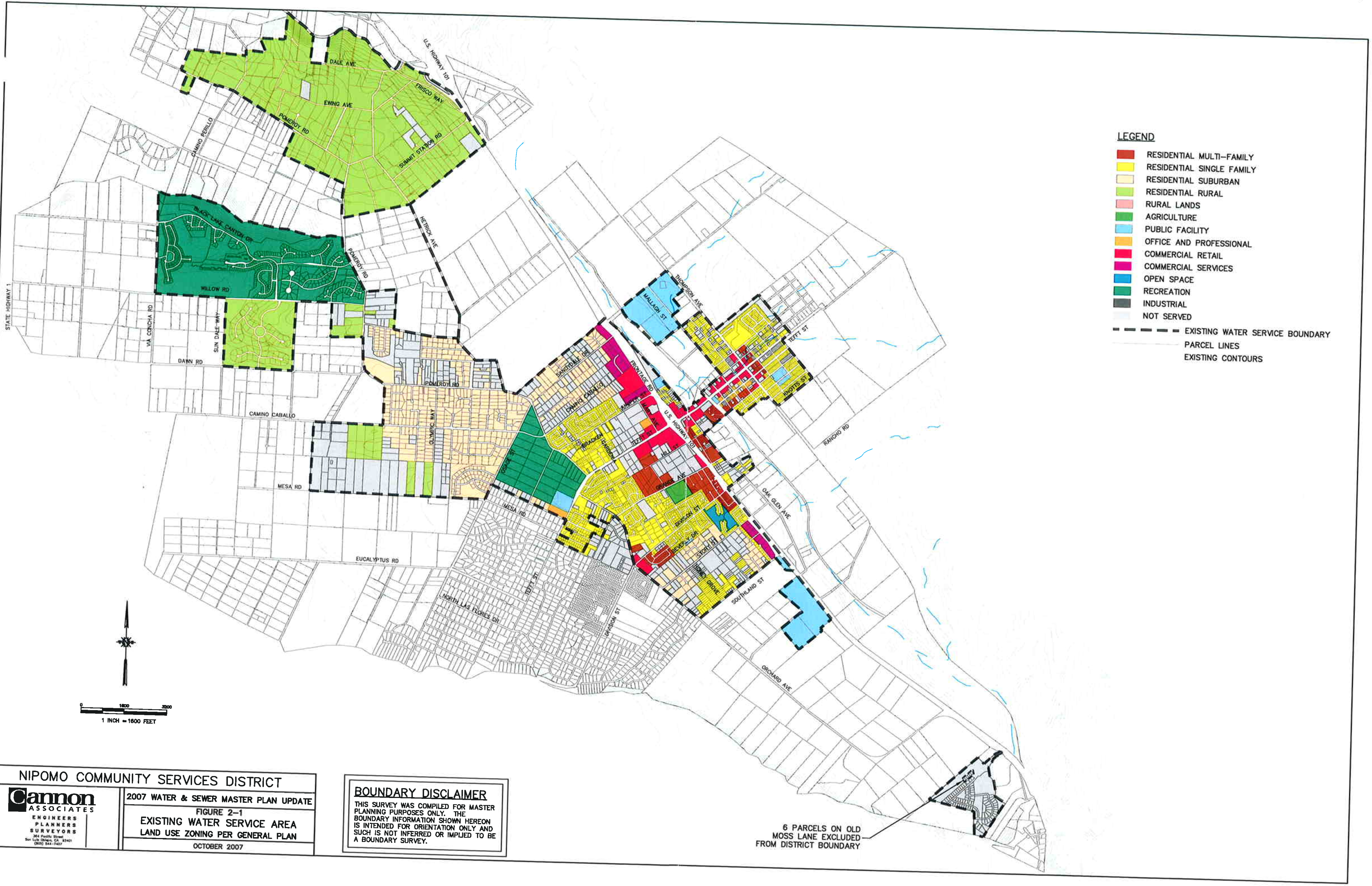

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 2-1

EXISTING WATER SERVICE AREA
LAND USE ZONING PER GENERAL PLAN

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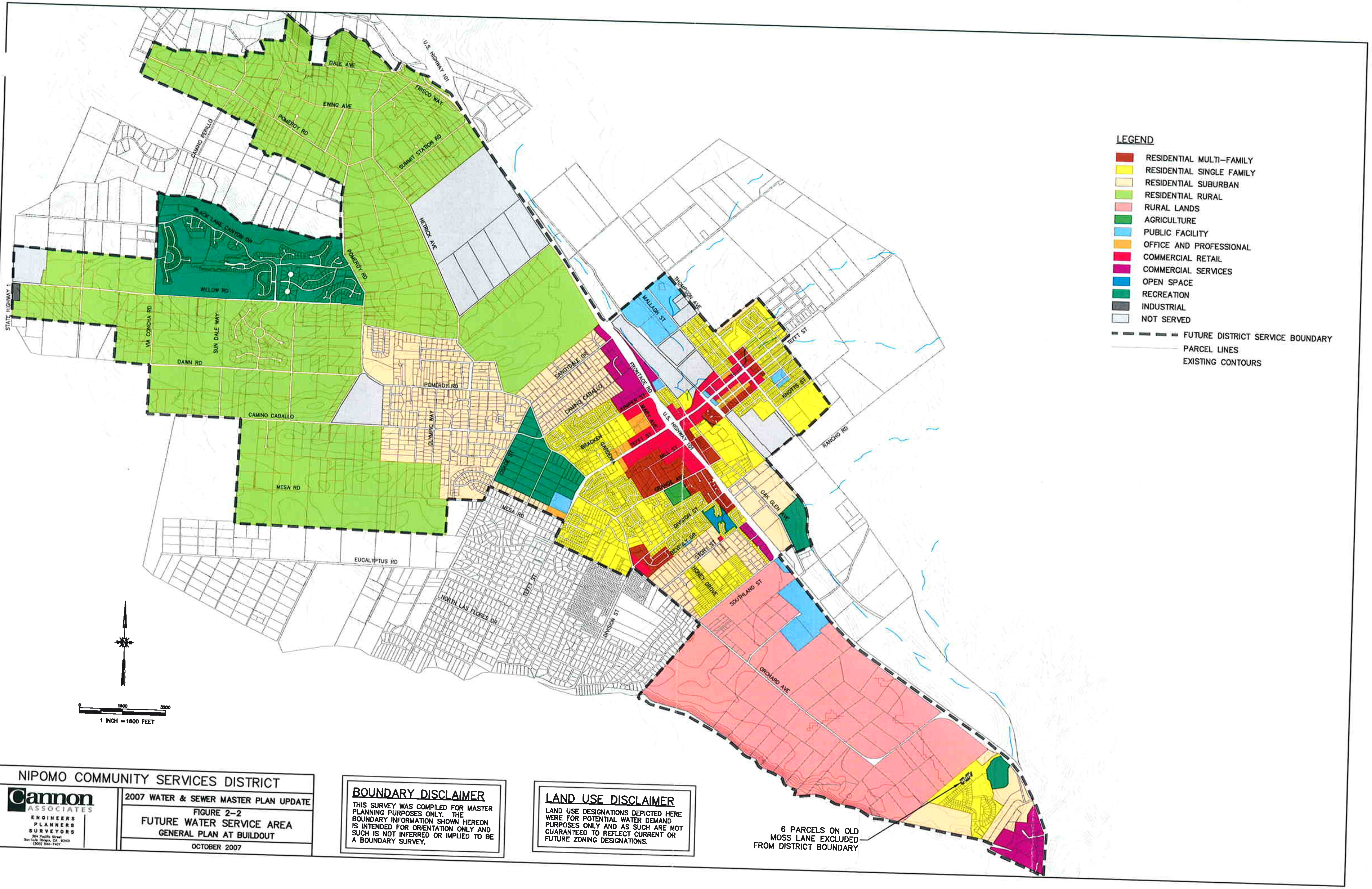

6 PARCELS ON OLD MOSS LANE EXCLUDED FROM DISTRICT BOUNDARY

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 2-2
FUTURE WATER SERVICE AREA
GENERAL PLAN AT BUILDOUT

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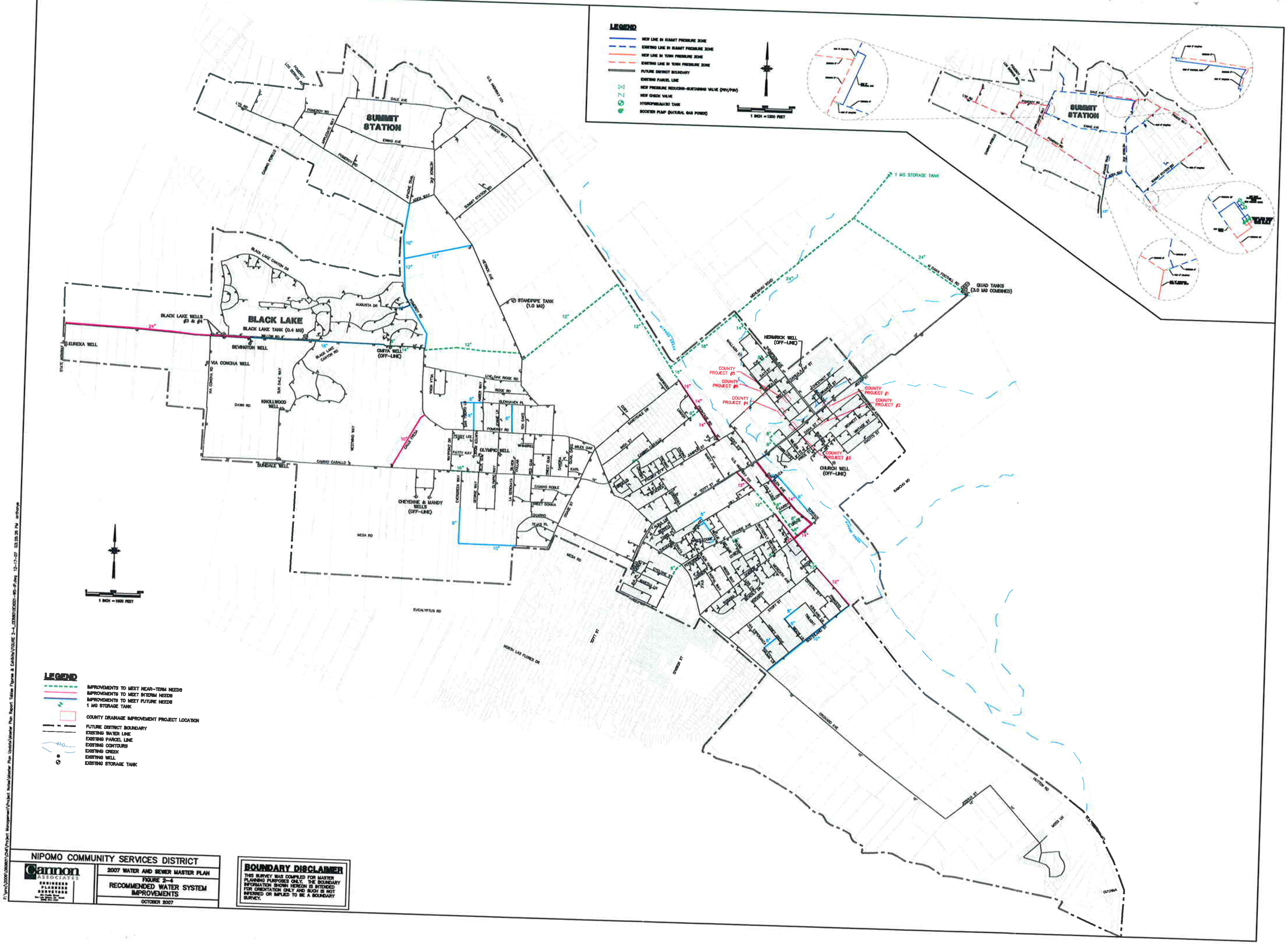

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2007 WATER AND SEWER MASTER PLAN

FIGURE 2-4
RECOMMENDED WATER SYSTEM
IMPROVEMENTS

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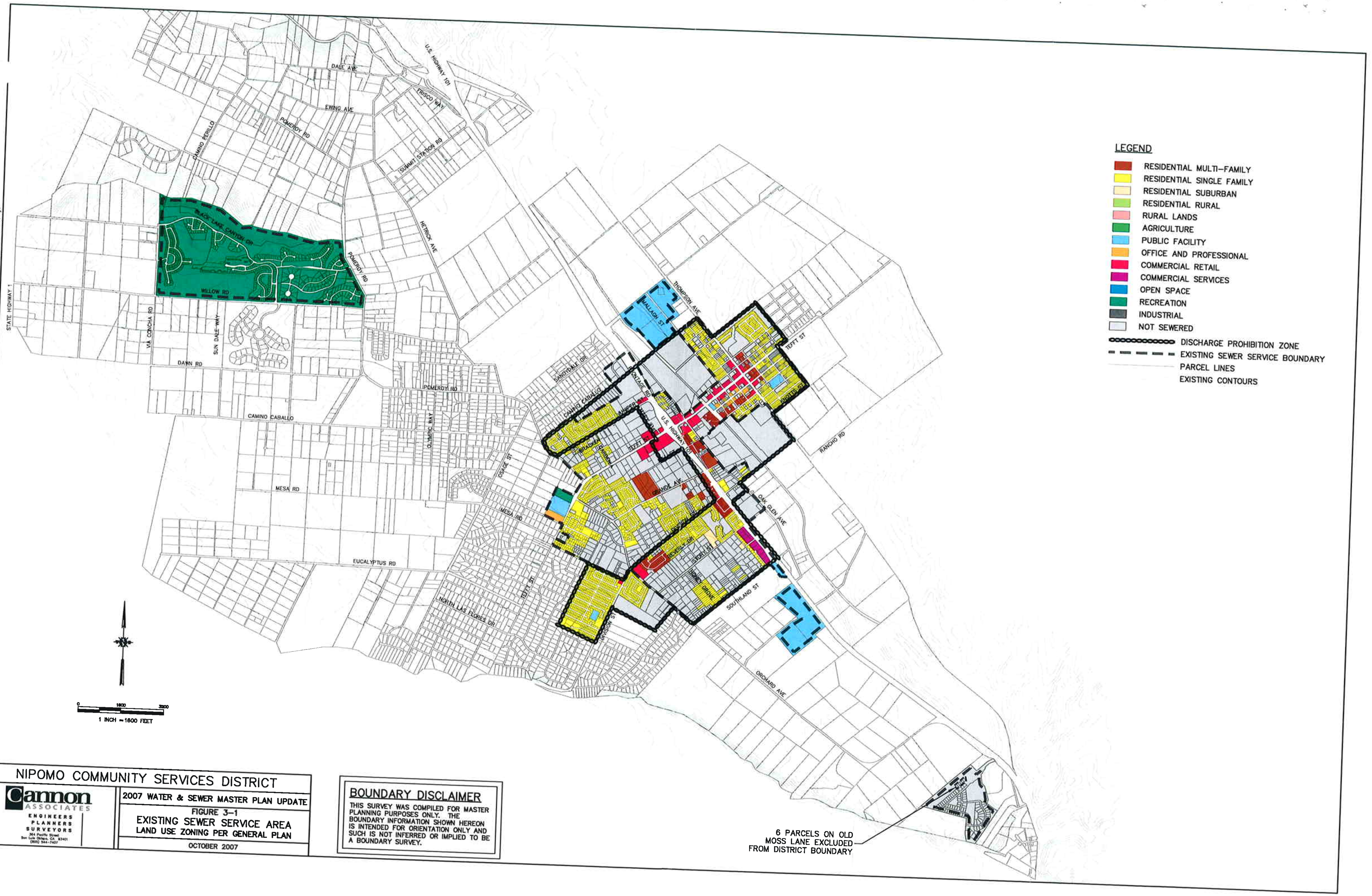

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 3-1
EXISTING SEWER SERVICE AREA
LAND USE ZONING PER GENERAL PLAN

OCTOBER 2007

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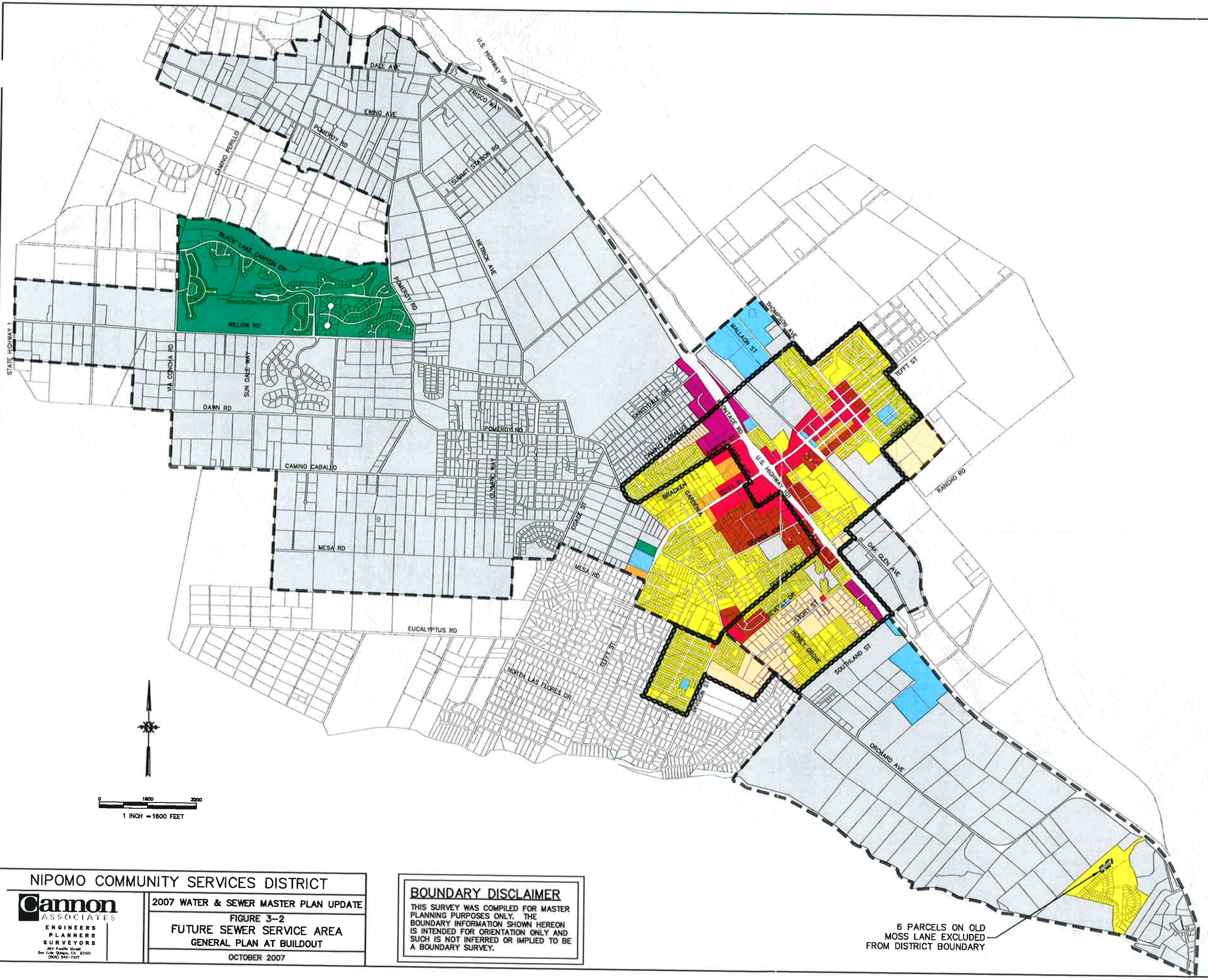

LEGEND

🟥	RESIDENTIAL MULTI-FAMILY
🟨	RESIDENTIAL SINGLE FAMILY
▨	RESIDENTIAL SUBURBAN
🟩	RESIDENTIAL RURAL
▨	RURAL LANDS
🟩	AGRICULTURE
🟦	PUBLIC FACILITY
🟧	OFFICE AND PROFESSIONAL
🟥	COMMERCIAL RETAIL
🟪	COMMERCIAL SERVICES
🟦	OPEN SPACE
🟩	RECREATION
⬛	INDUSTRIAL
☐	NOT SEWERED
○○○○	DISCHARGE PROHIBITION ZONE
— — —	FUTURE DISTRICT SERVICE BOUNDARY
——	PARCEL LINES
	EXISTING CONTOURS

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 3-2
FUTURE SEWER SERVICE AREA
GENERAL PLAN AT BUILDOUT

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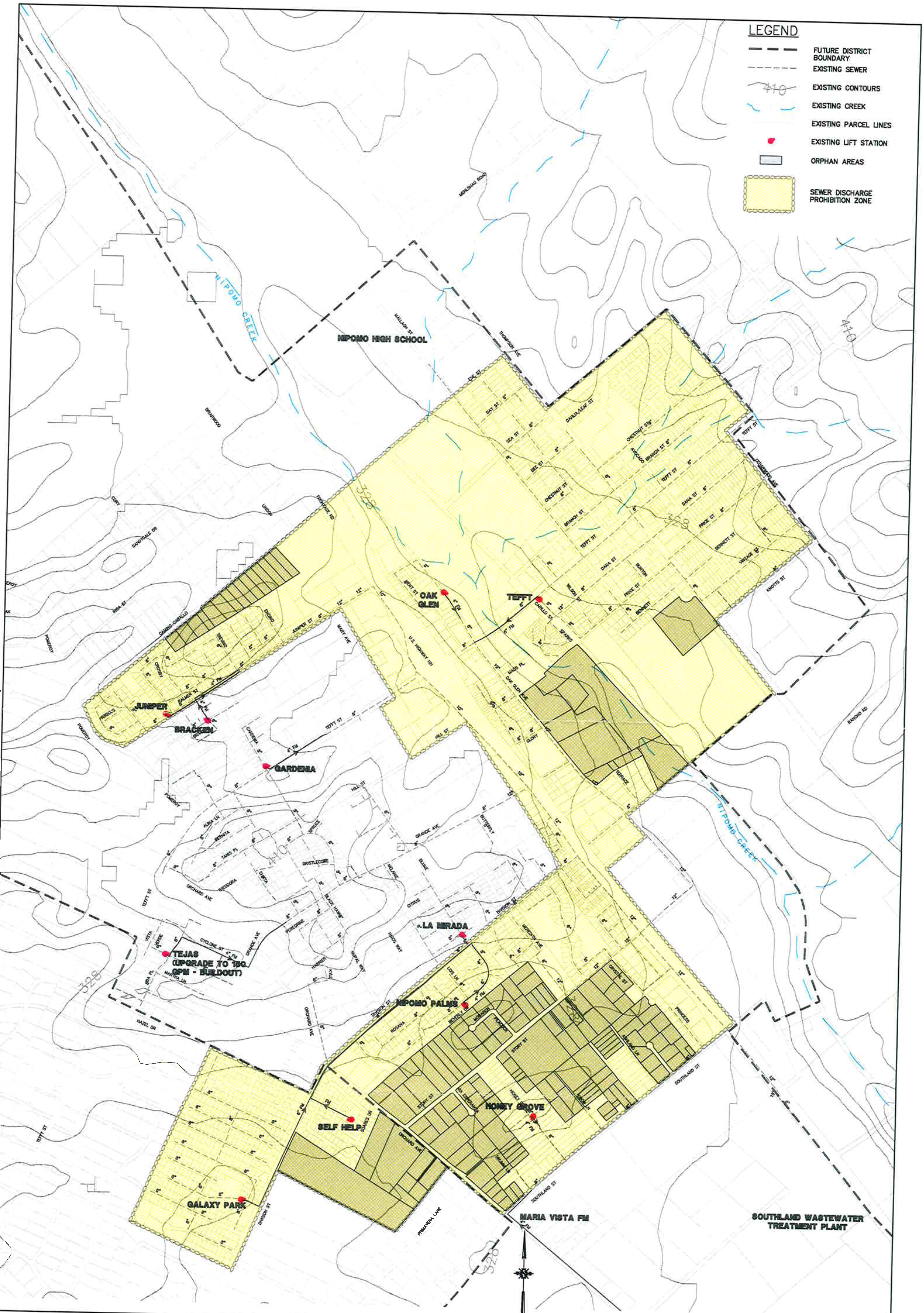

NIPOMO COMMUNITY SERVICES DISTRICT

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 3-3
EXISTING SEWER ORPHAN AREAS WITHIN PROHIBITION ZONE

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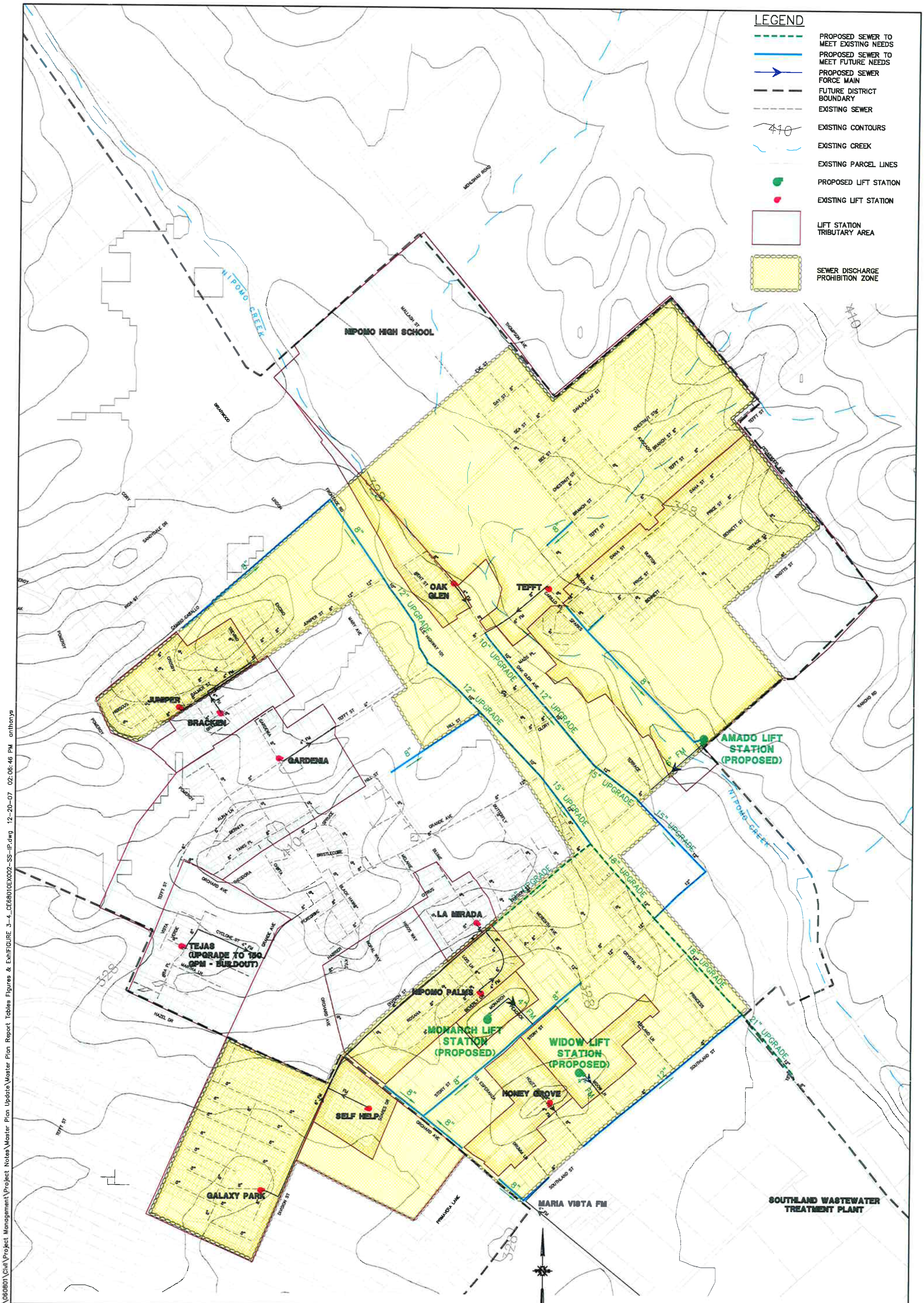

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FIGURE 3-4
RECOMMENDED SEWER SYSTEM IMPROVEMENTS

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Technical Memorandum
Phase I

Water Demand and Sewer Load Projections

Prepared for

Nipomo Community Services District

Prepared by

Garing, Taylor & Associates **141 S Elm St.** **Arroyo Grande CA 93420**	**Cannon Associates** **364 Pacific Street** **San Luis Obispo, CA 93401**

January 5, 2007

Table of Contents

Executive Summary

Purpose of Technical Memorandum, Phase I

The purpose of this technical memorandum is to develop water demand and sewer flow projections for use in the master planning process. These projections will be used in subsequent steps in the analysis to appropriately plan for the expansion and upgrade of the Nipomo Community Services District's water distribution and sewer collection systems. The study area includes: Town, Blacklake, "Orphan areas", and the un-annexed Sphere of Influence areas.

Water and sewer projections were derived primarily from two main sources: District-provided operational data and records, and the recently completed Urban Water Management Plan (UWMP) completed in 2005. The UWMP was used as the basis for land use designations and associated water duty factors for each land use category. (Duty factors are estimates of water demand or sewer flow load per acre by land use category.) Sewer duty factors were based on duty factors developed as part of the 2001 Water and Sewer System Master Plan Update, but were adjusted so that predicted wastewater flows matched observed wastewater flows under existing land use.

Per-unit water use rates are a key element used in estimating per-acre water duty factors. Initially, water and sewer duty factors were estimated using the per-unit water use rates contained in the UWMP. Subsequently, the District requested that a second set of estimates be created, using observed per-unit water use values for FY05-06. Both sets of per-unit water use rates are shown below:

Table ES-1: Water Use Rates

Land Use Code in this Report	Use Group Reported by District	UWMP Per unit Use Rate (af/du/yr)	FY05-06 Observed per unit Use Rate (af/du/yr)
RMF	Multi-Family	0.146	0.25
(not used)	Duplex		0.32
(not used)	SF (<4,500sf Lot)	0.473	0.42
RSF	SF (4,500 to 10,000sf)	0.473	0.6
RS	SF (>10,000sf)	0.619	0.98

Both sets of Use Rates were used in this analysis, as specified below.

The resulting duty factor estimates are shown below.

Table ES-2: Summary of Water Demand and Sewer Flow Duty Factors

Land Use Code	Assumed Water Duty Factor (af/yr-acre)	Assumed Sewer Flow Duty Factor (MGD/acre)	Observed[1] Water Duty Factor (af/yr-acre)	Observed[1] Sewer Flow Duty Factor (MGD/acre)
RMF	2.19	0.001758	3.75	0.002634
RSF	1.60	0.001125	2.10	0.000924
RS	0.62	0.000411	0.98	0.000330
RR	0.21	*	0.20	*
RL	0.11	*	0.101	*
AG	0.00	*	0.00	*
PF	0.59	0.000484	0.59	0.000442
OP	0.26	0.000213	0.26	0.000195
CR	1.42	0.001165	1.42	0.001064
CS	0.35	0.000287	0.35	0.000262
OS	1.18	*	1.18	*
REC	0.62	*	0.62	*
IND	0.67	*	0.67	*
Blacklake	1.04	*	1.04	*
Canada Ranch	1.18		1.96	
Southland	0.59		0.98	

* Not Applicable for this type of land use.

1: Based on observed per-unit water use rates, FY05-06

Three planning scenarios for sizing the future water and sewer systems were chosen from the UWMP: Existing Land Use Designations and a 2.3% Growth Rate; Existing Land Use Designations with Pending Land Use Amendments and a 2.3% Growth Rate; and, High Density Land Use and a 2.3% Growth Rate.

The 2.3% Growth Rate was selected based on an emergency growth ordinance for the Nipomo Mesa adopted January 2000 by the SLO County Board of Supervisors. It should be noted that the "2.3% growth rate" demand projections in the UWMP do not appear to follow a simple 2.3% annual growth rate. The UWMP 2005 Update is unclear as to the method by which residential development and its associated water demand were allocated over time. The UWMP projections for demand were used to estimate "percent built-out" in 2030, which formed part of the assumptions used to estimate water duty factors. The resulting estimated water demand and sewer flow projections in 2030 for the three scenarios are shown below.

Water

Table ES-3A: Summary of Water Demand Projections & Peaking Factors (Based on Assumed Water Use Rates)

	Annual Demand	Average Daily Demand	Maximum Daily Demand	Peak Hourly Demand
units	af/yr	MGD	MGD	MGD
Peaking Factor		*(1 MGD = 1121 AFY)*	*1.70*	*3.78*
2005 Conditions	2,989	2.67	4.50	10.08
2030 Scenario 1	4,960	4.42	7.51	16.71
2030 Scenario 2	5,170	4.61	7.84	17.43
2030 Scenario 3	5,970	5.33	9.06	20.15

Table ES-3B: Summary of Water Demand Projections & Peaking Factors (Based on Observed FY05-06 Water Use Rates)

	Annual Demand	Average Daily Demand	Maximum Daily Demand	Peak Hourly Demand
units	af/yr	MGD	MGD	MGD
Peaking Factor		*(1 MGD = 1121 AFY)*	*1.7*	*3.78*
2005 Conditions	2,989	2.67	4.53	10.09
2030 Scenario 1	6,246	5.57	9.47	21.05
2030 Scenario 2	6,542	5.84	9.92	22.08
2030 Scenario 3	7,878	7.03	11.95	26.57

Sewer

Table ES-4A: Summary of Sewer Flow Projections & Peaking Factors (Based on Assumed Water Use Rates)

Southland WWTP	Est. Average Annual Flow (AAF)	Est. Peak Dry Weather Flow (PDWF)	Est. Peak Wet Weather Flow (PWWF)
units	MGD	MGD	MGD
Peaking Factor		*1.73*	*2.17*
2005 Conditions	0.63	1.09	1.37
2030 Scenario 1	1.39	2.40	3.02
2030 Scenario 2	1.58	2.73	3.43
2030 Scenario 3	1.79	3.10	3.88

Table ES-4B: Summary of Sewer Flow Projections & Peaking Factors (Based on Observed FY05-06 Water Use Rates)

Southland WWTP	Est. Average Annual Flow (AAF)	Est. Peak Dry Weather Flow (PDWF)	Est. Peak Wet Weather Flow (PWWF)
units	MGD	MGD	MGD
Peaking Factor		*1.73*	*2.17*
2005 Conditions	0.63	1.09	1.37
2030 Scenario 1	1.28	2.21	2.78
2030 Scenario 2	1.49	2.58	3.23
2030 Scenario 3	1.67	2.89	3.62

1. Introduction

The Nipomo Community Services District (District) intends to update its 2002 Water and Sewer Master Plan to acknowledge capital improvement projects completed, to add new projects, to estimate the cost of all projects, to re-prioritize all projects, and to evaluate the District's current and future Utility Department staffing complement and organization.

The purpose of this Technical Memorandum is to develop population projections, duty factors, water demands and sewer flow and load projections for both the existing Blacklake and Town Water and Sewer service areas and for the un-annexed areas within the District's Sphere of Influence (SOI).

The information prepared in this Technical Memorandum will be used in water and sewer modeling efforts for subsequent Memoranda.

2. Background

This Section presents a discussion of population projection calculations and the three long-term land use scenarios under consideration.

Population

The 2001 Update of the Water and Sewer Master Plan estimated the population inside the District's service boundary at 10,790 people in the year 2000. Existing Nipomo-area growth management policies are assumed to restrict construction of new residential dwelling units to an annual cap of 2.3%. Based on this growth cap, this memo assumes a 2.3% population growth rate between now and the year 2030. Anticipated population projections within District's service area are shown in Table 2-1.

Table 2-1: Population Projections

Year	Population Served by District
2000	10,790
2005	12,000
2010	13,440
2015	15,060
2020	18,910
2025	18,910
2030	21,190

Land Use Scenarios

Following the approach of the Urban Water Management Plan (WMPU) 2005 Update, future water demands and wastewater flow rates are estimated under three different land use scenarios. All scenarios assume that the District will annex the areas identified for annexation in the SOI study. All scenarios also assume a "2.3% growth rate" as further clarified below.

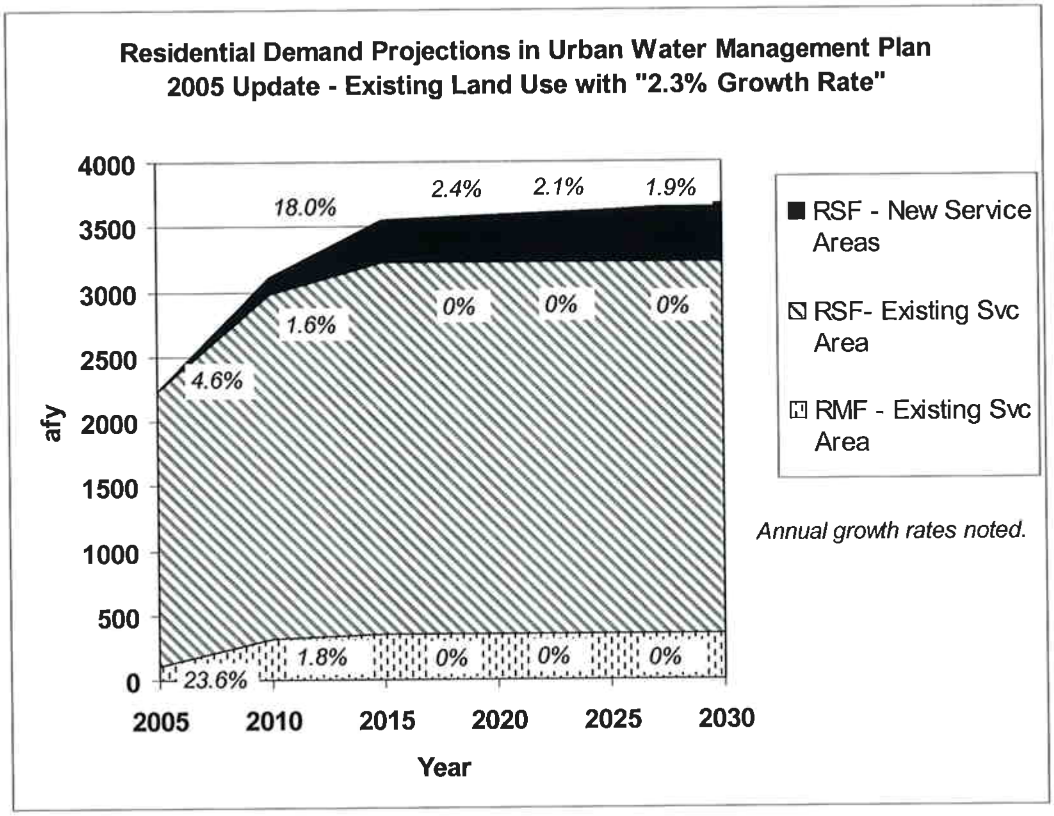
The first land use scenario, Existing Use, assumes no changes in the existing land use designations. Figure 2-1 shows the anticipated services area and land use designation in the year 2030 under the Existing Use scenario.

The second scenario, Amended Use, assumes all current proposed land-use amendments are approved. Figure 2-2 shows the anticipated services area in the year 2030 under the Amended Use scenario. (See Tables 14 and 19, UWMP 2005 Update.)

The third scenario, High Density, assumes that all proposed land-use amendments are approved and that any agricultural acreage or rural land acreage remaining would convert to a higher-density use. In SOI areas 1, 2, and 3, the use will convert to SRF. In SOI areas 4 and 8, the use will convert to RS. (See page 35 and Table 22, UWMP 2005 Update.) Figure 2-3 shows the anticipated services are in the year 2030 under the High Density scenario.

Demands Associated with "2.3% Growth Rate"

The water demand projections contained in the UWMP 2005 Update form the basis of the water and sewer demand projections contained in this memo. It should be noted that the "2.3% growth rate" demand projections in the UWMP do not appear to follow a simple 2.3% annual growth rate, as shown in the graph below.



Residential Demand Projections in Urban Water Management Plan 2005 Update - Existing Land Use with "2.3% Growth Rate"

Annual growth rates noted.

The UWMP 2005 Update is unclear as to the method by which residential development and its associated water demand were allocated over time. Perhaps the high growth rates in residential demands shown prior to 2015 are the result of exemptions from the SLO County Growth Management Ordinance and were included in the UWMP projections. These exemptions included subdivisions exempt from growth cap limitations, "pipeline projects" (i.e., projects accepted for development between 11/14/99 and 4/4/2000), exemptions for affordable housing, and exemptions for antiquated subdivisions with Certificates of Compliance.

Regardless of the underlying assumptions, for the remainder of this memo, the phrase "2.3% growth rate" shall be used as a label for a particular set of water demand and land use projections taken from the UWMP 2005 Update.

3. Water System Demand Projections

This section describes the method of analysis and assumptions used in determining water system demand projections. It presents current information regarding the water system and the analysis used to project water demand in the year 2030 under the three land use scenarios. Figures 3-8 through 3-11 at the end of this section show the existing water service area and the future water service areas for the three land use scenarios.

Estimation Method

Water demand at "build-out" and in 2030 under the three land use scenarios was estimated as follows:

1. District operating records were examined to determine annual average water demand separately for the Town Division and Blacklake Division.
2. Existing land use information and assumed water demand rates were used to predict existing annual average demand for both Divisions.
    a. One set of water and sewer duty factors was estimated using the assumed water demand rates contained in the Urban Water Management Plan 2005 Update.
    b. A second set of water and sewer duty factors was estimated using the observed FY2005-06 water use rates supplied by the District.
3. An assumed level of development was chosen so that predicted water demand closely matched existing use.
4. The assumed water demand rates were then applied to future land use scenarios, assuming 100% buildout, to estimate "build-out" demand.
5. The land development projections generated as part of the UWMP 2005 Update according to the "2.3% growth rate" were used to estimate the demand in 2030 for each scenario.

Existing Water Production

Current water production rates were examined, as shown below.

Figure 3-1: Town Production Rates – 12 month running average

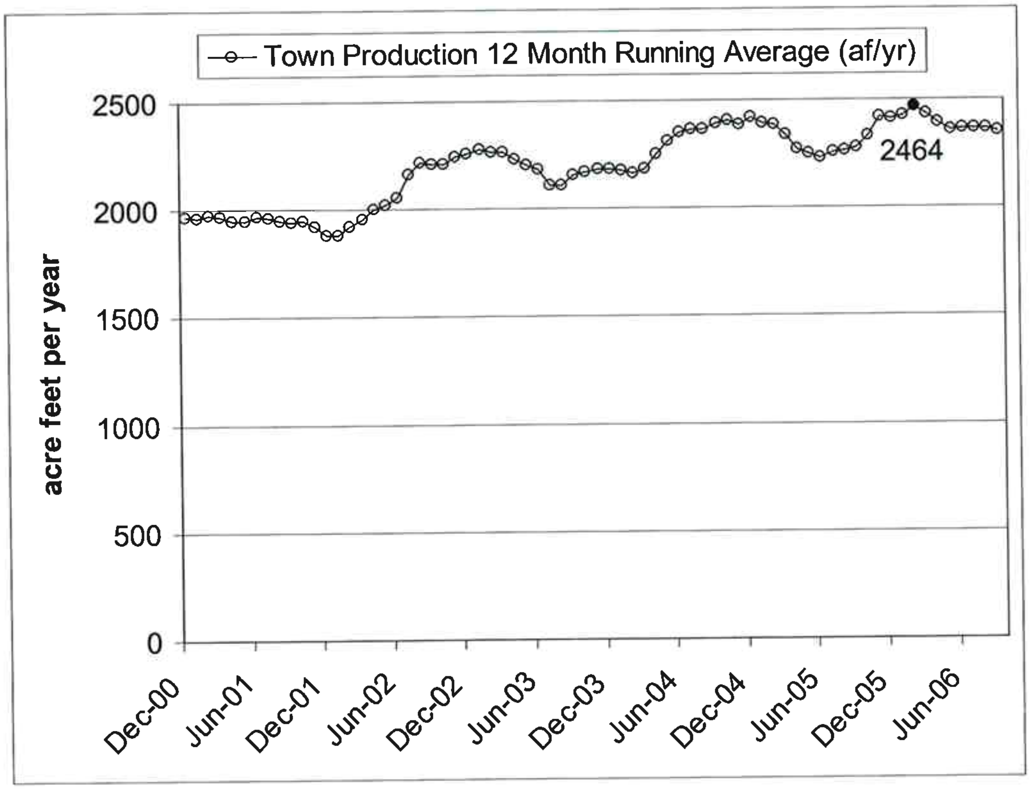


Figure 3-2: Blacklake Production Rates - 12 month running average

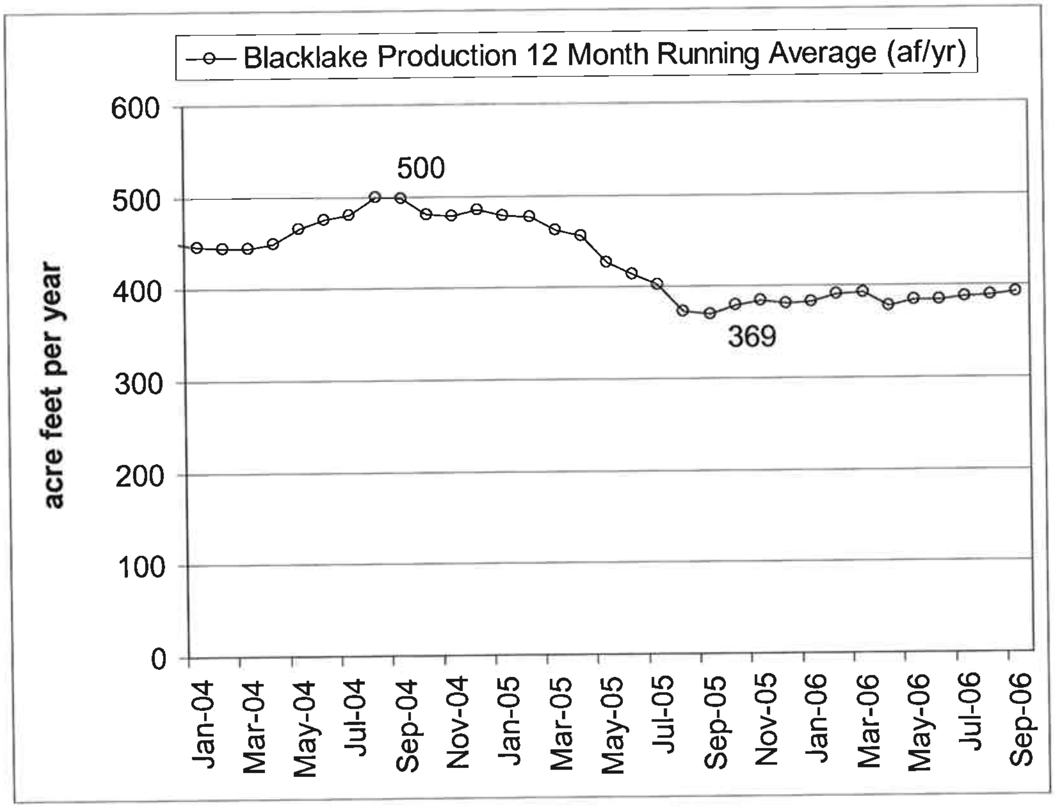
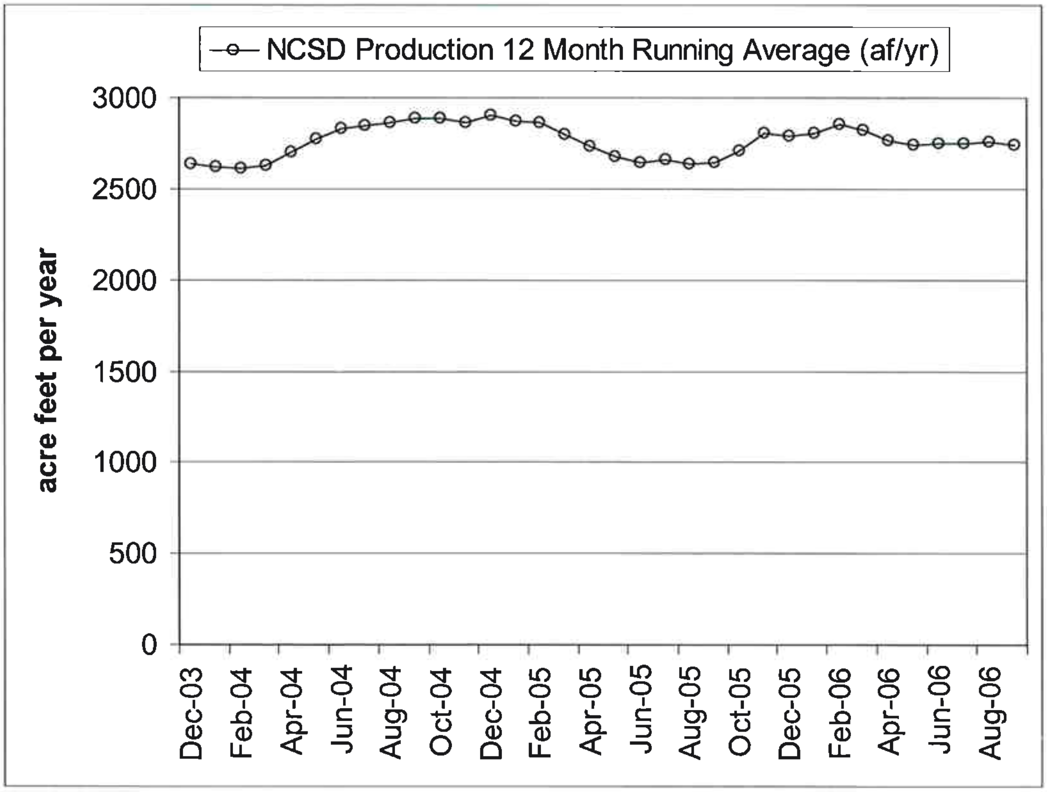


Figure 3-3: District Production Rates - 12 month running average



The current latest 12-month running average shown is 2775 acre-feet per year.

Water System Losses

The 2001 Water Master Plan Update reported system losses, or water that was produced but never metered at an end user. This unaccounted-for water (UAW) was estimated as 11% of production between 1995 and 2000. However, recent data suggest that District-wide system losses are more accurately estimated between 2% and 6%. The following figures show data from District monthly production reports.

Figure 3-4: Production vs Delivery, Town Division

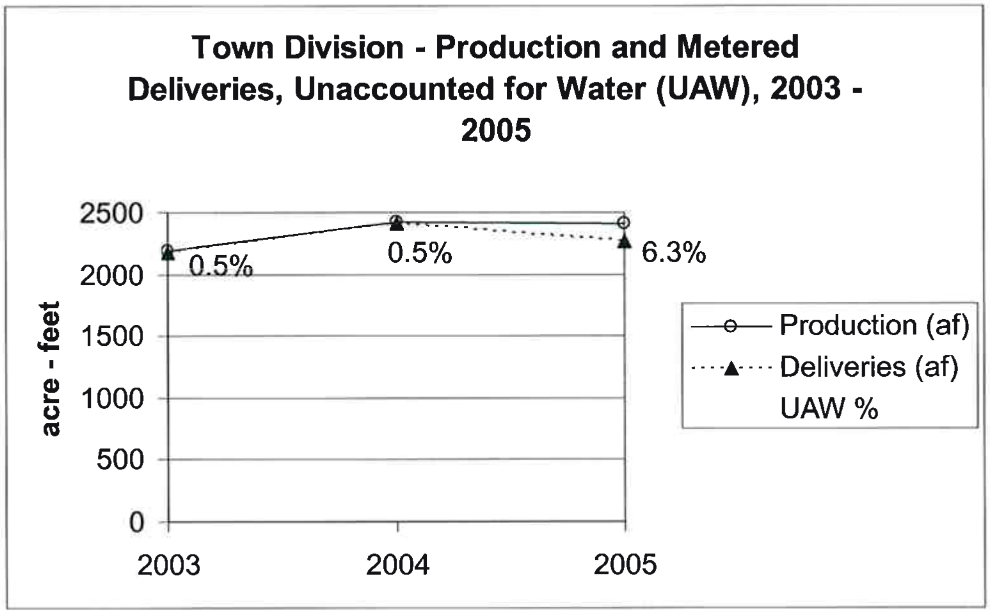


Figure 3-5: Production vs Delivery, Blacklake Division

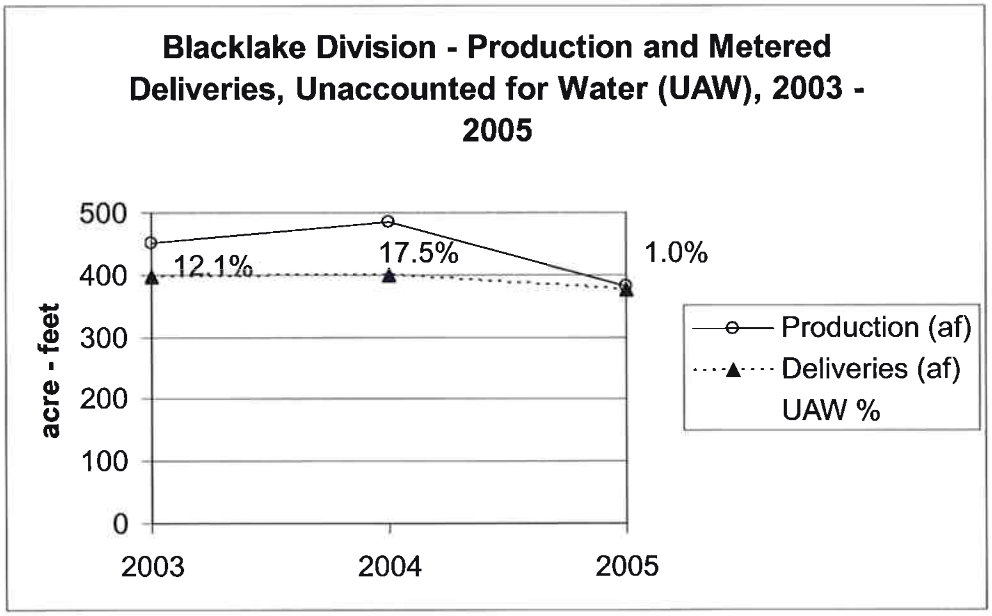
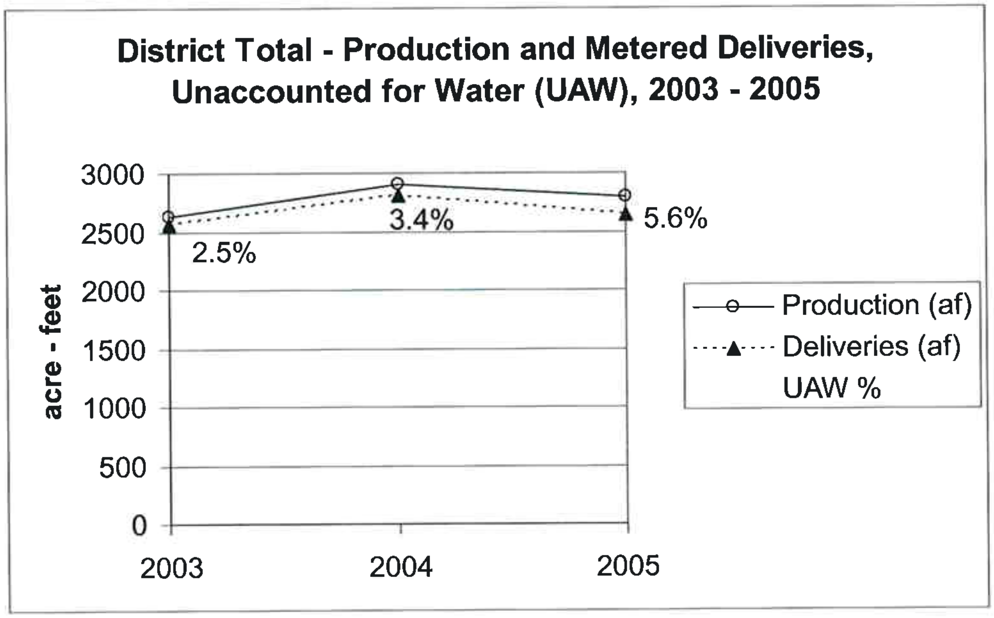


Figure 3-6: Production vs Delivery, District Total



For the purposes of this Master Plan Update, District's future system losses are conservatively assumed to be 8% of total production (UWMP 2005 Update). Using the average production value noted previously, and the system losses noted, the 12-month running average demand would be 2553 acre-feet per year.

Existing Water Duty Factors

The following water duty factors (i.e., water use rates per acre by land use) were assumed to apply to existing land use patterns within the District.

Table 3-1: Annual Water Duty Factors by Land Use

Land Use Code	Estimated Water Use per year per acre (af/yr-ac) [(1)]
RMF	2.19
RSF	1.60
RS	0.62
RR	0.21
RL	0.11
AG	0.00
PF	0.59
OP	0.26
CR	1.42
CS	0.35
OS	1.18
REC	0.62
IND	0.67
Blacklake	1.04

1: UWMPU (2005) Table 15 and Appendix E

The total amount of annual water use was estimated by multiplying the use rates by the areas under each land use type. The resulting total water use rate was then adjusted downward by applying an "occupancy rate" factor to account for the fact that not all areas within the District have been fully developed. This factor was selected so that estimated total water use matched reported values, as shown below.

Table 3-2: Estimated Average Annual Water Use under Existing Land Uses (Assumed water use rates.)

Land Use	Acres	Water Duty Factor af/yr/acre (1)	Occupancy Rate in 2005	Estimated Water Use, af/yr	Unaccounted for Water (as percent of production)	Estimated Water Production (af/yr)
Town Division						
RMF	150	2.19	79%	260	8%	282
RSF	700	1.6	79%	885	8%	962
RS	900	0.62	79%	441	8%	479
RR	1380	0.21	79%	229	8%	249
RL	3	0.11	79%	0.26	8%	0.28
AG	110	0	79%	0	8%	0
PF	37	0.59	79%	17	8%	19
OP	34	0.26	79%	7	8%	8
CR	160	1.42	79%	179	8%	195
CS	80	0.35	79%	22	8%	26
OS	11	1.18	79%	10	8%	11
REC	116	0.62	79%	57	8%	62
Subtotal	**3681**			2107		2290
Black Lake Division						
VRL	510	1.04	87%	461	8%	501
District Total						
	4191			**2568**		**2792**

1: UWMP 2005 Update, Table 15, page 36

Tables 3-3, 3-4, and 3-5 below show estimated annual water demand in the year 2030 for the three land use scenarios.

Demand at "build-out" is calculated so that water transmission facilities can be adequately sized. Demand in 2030 is calculated so that adequacy of supply and storage can be assessed, and so that the performance of the distribution system under critical demands can be evaluated.

Note also that "build-out" for the District as a whole may not occur by the year 2030 because population growth is assumed to be limited to the "2.3% growth rate" described in the UWMP. The water demand results presented below show that in 2030 water demand will be equivalent to 88%, 84%, and 76% of "build-out" demand under Scenarios 1, 2, and 3 respectively.

Table 3-3: Estimated Average Annual Water Use in Year 2030 under Existing Land Uses

			Scenario 1 - Existing Land Use (1)								
Land Use	Water Use Rate(1)	2005 Water Service Area (1)	SOI-1	SOI-2	SOI-3	SOI-4	SOI-7	SOI-8	Total Area served	Estimated Water Use at Buildout	Estimated Water Use in Year 2030 - Limited by 2.3% Growth Rate (2)
(units)	af/yr/ac	ac	ac	ac	ac	ac	ac	ac	ac	af/yr	af/yr
Residential Land Uses											
REC	0.62	631							631	391	3,320
RR	0.21	1,404	662				1,264	181	3,511	737	
RSF	1.6	686			91				777	1,243	
RS	0.62	905			84	245	28		1,262	782	
RL	0.11	4				1,073			1,077	118	
Blacklake (1)	1.04	510							510	530	
Southland Specific Plan	0.59					100			100	59	
RMF	2.19	160							160	350	350
Non-Residential Land Uses											
AG	0	12	420	132	58		83		705	0	0
OP	0.26	33							33	9	290
CR	1.42	160							160	227	
CS	0.35	94				104			198	69	
IND	0.67	0							0	0	0
OS	1.18	11							11	13	10
PF	0.59	38			5				43	25	20
MUC									0	0	
Total Use		4,648	1,082	132	238	1,522	1,375	181	9,178	4,555	3,990
In-Lieu NMMA Groundwater Recharge (3)											600
Unaccounted System Losses (3)											370
Total Demand											4,960

1: UWMP 2005 Update Appendix E

2: UWMP 2005 Update Appendix Table 16

3: UWMP 2005 Update Appendix Table 35

Table 3-4: Estimated Average Annual Water Use in Year 2030 under Pending Land Uses

			Scenario 2 - Existing Land Uses with Pending Land Use Amendments (1)								
Land Use	Water Use Rate (1)	2005 Water Service Area (1)	SOI-1	SOI-2	SOI-3	SOI-4	SOI-7	SOI-8	Total Area served	Estimated Water Use at Buildout	Estimated Water Use in Year 2030 - Limited by 2.3% Growth Rate (2)
(units)	af/yr/ac	ac	ac	ac	ac	ac	ac	ac	ac	af/yr	af/yr
Residential Land Uses											
REC	0.62	631					16		647	401	3,480
RR	0.21	1,404	484				1,262	181	3,331	700	
RSF	1.6	686			129				815	1,304	
RS	0.62	905	14		84	277	28		1,308	811	
RL	0.11	4				1,073			1,077	118	
Blacklake (1)	1.04	510							510	530	
Canada Ranch Specific Plan	1.18		288						288	340	
Southland Specific Plan	0.59								0	0	
RMF	2.19	160							160	350	350
Non-Residential Land Uses											
AG	0	12	256	132	58	28	45		531	0	0
OP	0.26	33							33	9	320
CR	1.42	160	40						200	284	
CS	0.35	94				136			230	81	
IND	0.67	0							0	0	0
OS	1.18	11			10	8			29	34	20
PF	0.59	38			5		24		67	40	20
MUC									0	0	
Total Use		4,648	1,082	132	286	1,522	1,375	181	9,226	5,001	4,190
In-Lieu NMMA Groundwater Recharge (3)											600
Unaccounted System Losses (3)											380
Total Demand											5,170

1: UWMP 2005 Update Appendix E

2: UWMP 2005 Update Appendix Table 16

3: UWMP 2005 Update Appendix Table 38

Table 3-5: Estimated Average Annual Water Use in Year 2030 under High Density Land Use

			Scenario 3 - High Density Land Use Assumption (1)								
Land Use	Water Duty Factor (1)	2005 Water Service Area (1)	SOI-1	SOI-2	SOI-3	SOI-4	SOI-7	SOI-8	Total Area served	Estimated Water Use at Buildout	Estimated Water Use in Year 2030 - Limited by 2.3% Growth Rate (2)
(units)	af/yr/ac	ac	ac	ac	ac	ac	ac	ac	ac	af/yr	af/yr
Residential Land Uses											
REC	0.62	631					16		647	401	4,220
RR	0.21	702	572				1,262	181	2,717	571	
RSF	1.6	698	256	132	187				1,273	2,037	
RS	0.62	1,611	14		84	1,378	28		3,115	1,931	
RL	0.11	0							0	0	
Blacklake (1)	1.04	510							510	530	
Canada Ranch SP	1.18		200						200	236	
Southland SP	0.59								0	0	
RMF	2.19	160							160	350	350
Non-Residential Land Uses											
AG	0	0					45		45	0	0
OP	0.26	33							33	9	320
CR	1.42	160	40						200	284	
CS	0.35	94				136			230	81	
IND	0.67	0							0	0	0
OS	1.18	11			10	8			29	34	20
PF	0.59	38			5		24		67	40	20
MUC									0	0	
Total Use		4,648	1,082	132	286	1,522	1,375	181	9,226	6,503	4,930
In-Lieu NMMA Groundwater Recharge (3)											600
Unaccounted System Losses (3)											440
Total Demand											5,970

1: UWMP 2005 Update Appendix E

2: UWMP 2005 Update Appendix Table 16

3: UWMP 2005 Update Appendix Table 41

FY05-06 Water Use Rates

Subsequent to the initial analysis presented above, the District requested that the water duty factors be re-calculated using the following information:

Table 3-6: FY05-06 Water Use Observations

Use Group	FY05-06 Observed Average Use (af/DU/yr)	Single Family Meters in Town Division
Multi-Family	0.25	
Duplex	0.32	
Single Family (<4,500 sf lot)	0.42	321
Single Family (4,500 sf < lot < 10,000 sf)	0.6	2534
Single Family (> 20,000 sf lot)	0.98	533

Based on this information, the Water Duty Factors were revised as follows:

Table 3-7: Annual Water Duty Factors by Land Use

Land Use	Units per Acre	Demand per unit (af/DU/yr)	Water Duty Factor (af/acre/yr)
Residential			
REC	1	0.980	0.98
RMF	15	0.250	3.75
RR	0.2	0.980	0.20
RSF	3.5	0.600	2.10
RS	1	0.980	0.98
RL	0.1	0.980	0.10
Canada Ranch	2	0.980	1.96
Southland	1	0.980	0.98
Blacklake			1.04
Non-Residential			
AG			0
CR			1.42
CS			0.35
IND			0.67
OP			0.26
OS			1.18
PF			0.59

Note that the 0.6 af/du/yr value was applied to all RSF uses. This value was chosen because it is the more conservative value (versus 0.42 af/du/yr), and also because it represents a larger sample size. The value 0.98 af/du/yr was applied to all residential uses with 1-acre or larger lots.

These revised water duty factors are used in the table shown below, as described above in reference to Table 3-2. Note the difference in the "occupancy rate" column for the Town Division.

Table 3-8: Estimated Average Annual Water Use under Existing Land Uses (Observed FY05-06 Water Use Rates)

Land Use	Acres	Water Duty Factor af/yr/acre[1]	Occupancy Rate in 2005	Estimated Water Use (af/yr)	Unaccounted for Water (as percent of production)	Estimated Water Production (af/yr)
Town Division						
RMF	150	3.75	59%	332	8%	361
RSF	700	2.1	59%	867	8%	943
RS	900	0.98	59%	520	8%	566
RR	1380	0.2	59%	163	8%	177
RL	3	0.1	59%	0.18	8%	0.19
AG	110	0	59%	0	8%	0
PF	37	0.59	59%	13	8%	14
OP	34	0.26	59%	5	8%	6
CR	160	1.42	59%	134	8%	146
CS	80	0.35	59%	17	8%	18
OS	11	1.18	59%	8	8%	8
REC	116	0.98	59%	67	8%	73
Subtotal	3681			2126		2312
Black Lake Division						
VRL	510	1.04	87%	461	8%	501.2
NCSD Total	4191			2587		2,813

1: Based on observed water use rates FY05-06

Total system demand under these assumptions was calculated as follows:

1. The entire study area (i.e., the existing service area plus SOIs 1-5, 7, and 8) was assumed to be completely developed. "Build Out" water demand was estimated by multiplying each area under a particular land use by the water duty factor shown above.
2. Demand in 2030 was estimated by utilizing the UWMP 2005 Update calculations to determine "occupancy rate", i.e., the percentage of each land use type predicted to be developed by 2030. (For example, under the "existing land use" scenario, the UWMP calculated that 927 acre-feet would be used by new single family housing in the SOI areas at "build-out". That report also predicted that in 2030 only 440 acre-feet would be used in these areas, implying that 47% of the area in question (440/927 = 47%) had been developed.)
3. These "occupancy rate" values were then applied to the demand associated with each land use type, and totaled. The results are shown below.

Table 3-9: Estimated Average Annual Water Use in Year 2030 under Existing Land Uses

			Scenario 1 - Existing Land Use [1]								
Land Use	Water Duty Factor[2]	2005 Water Service Area [1]	SOI-1	SOI-2	SOI-3	SOI-4	SOI-7	SOI-8	Total Area served	Estimated Water Use at Buildout	Estimated Water Use in Year 2030 - Limited by 2.3% Growth Rate
(units)	af/yr/ac	ac	ac	ac	ac	ac	ac	ac	ac	af/yr	af/yr
Residential Land Uses											
REC	0.98	631							631	618	4,300
RR	0.20	1,404	662				1,264	181	3,511	688	
RSF	2.10	686			91				777	1,632	
RS	0.98	905			84	245	28		1,262	1,237	
RL	0.10	4				1,073			1,077	106	
Blacklake [1]	1.04	510							510	530	
Southland Specific Plan	0.98					100			100	98	
RMF	3.75	160							160	600	600
Non-Residential Land Uses											
AG	0	12	420	132	58		83		705	0	0
OP	0.26	33							33	9	289
CR	1.42	160							160	227	
CS	0.35	94				104			198	69	
IND	0.67	0							0	0	0
OS	1.18	11							11	13	13
PF	0.59	38			5				43	25	24
MUC									0	0	
Total Use		4,648	1,082	132	238	1,522	1,375	181	9,178	5,852	5,226
In-Lieu NMMA Groundwater Recharge [3]											600
Unaccounted System Losses (8%)											420
Total Demand											6,246

1: UWMP 2005 Update Appendix E

2: Residential Rates Observed FY05-06, Non-residential rates UWMP Table 15

3: UWMP 2005 Update Appendix Table 35

Table 3-10: Estimated Average Annual Water Use in Year 2030 under Pending Land Uses

			Scenario 2 - Existing Land Uses with Pending Land Use Amendments (1)								
Land Use	**Water Duty Factor (2)**	**2005 Water Service Area (1)**	**SOI-1**	**SOI-2**	**SOI-3**	**SOI-4**	**SOI-7**	**SOI-8**	**Total Area served**	**Estimated Water Use at Buildout**	**Estimated Water Use in Year 2030 - Limited by 2.3% Growth Rate**
(units)	**af/yr/ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**af/yr**	**af/yr**
Residential Land Uses											
REC	0.98	631					16		647	634	4,530
RR	0.20	1,404	484				1,262	181	3,331	653	
RSF	2.10	686			129				815	1,712	
RS	0.98	905	14		84	277	28		1,308	1,282	
RL	0.10	4				1,073			1,077	106	
Blacklake (1)	1.04	510							510	530	
Canada Ranch Specific Plan	1.96		288						288	564	
Southland Specific Plan	0.98								0	0	
RMF	3.75	160							160	600	600
Non-Residential Land Uses											
AG	0	12	256	132	58	28	45		531	0	0
OP	0.26	33							33	9	319
CR	1.42	160	40						200	284	
CS	0.35	94				136			230	81	
IND	0.67	0							0	0	0
OS	1.18	11			10	8			29	34	23
PF	0.59	38			5		24		67	40	30
MUC									0	0	
Total Use		4,648	1,082	132	286	1,522	1,375	181	9,226	6,527	5,502
In-Lieu NMMA Groundwater Recharge (3)											600
Unaccounted System Losses (8%)											440
Total Demand											6,542

1: UWMP 2005 Update Appendix E
2: Residential Rates Observed FY05-06, Non-residential rates UWMP Table 15
3: UWMP 2005 Update Appendix Table 38

Table 3-11: Estimated Average Annual Water Use in Year 2030 under High Density Land Use

			Scenario 3 - High Density Land Use Assumption (1)								
Land Use	**Water Duty Factor (1)**	**2005 Water Service Area (1)**	**SOI-1**	**SOI-2**	**SOI-3**	**SOI-4**	**SOI-7**	**SOI-8**	**Total Area served**	**Estimated Water Use at Buildout**	**Estimated Water Use in Year 2030 - Limited by 2.3% Growth Rate (2)**
(units)	**af/yr/ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**ac**	**af/yr**	**af/yr**
Residential Land Uses											
REC	0.98	631					16		647	634	
RR	0.20	702	572				1,262	181	2,717	533	
RSF	2.10	698	256	132	187				1,273	2,673	
RS	0.98	1,611	14		84	1,378	28		3,115	3,053	
RL	0.10	0							0	0	
Blacklake (1)	1.04	510							510	530	
Canada Ranch SP	1.96		200						200	392	
Southland SP	0.98								0	0	5,766
RMF	3.75	160							160	600	600
Non-Residential Land Uses											
AG	0	0					45		45	0	0
OP	0.26	33							33	9	
CR	1.42	160	40						200	284	
CS	0.35	94				136			230	81	319
IND	0.67	0							0	0	0
OS	1.18	11			10	8			29	34	23
PF	0.59	38			5		24		67	40	30
MUC									0	0	
Total Use		4,648	1,082	132	286	1,522	1,375	181	9,226	8,861	6,738
In-Lieu NMMA Groundwater Recharge (3)											600
Unaccounted System Losses (8%)											540
Total Demand											7,878

1: UWMP 2005 Update Appendix E

2: Residential Rates Observed FY05-06, Non-residential rates UWMP Table 15

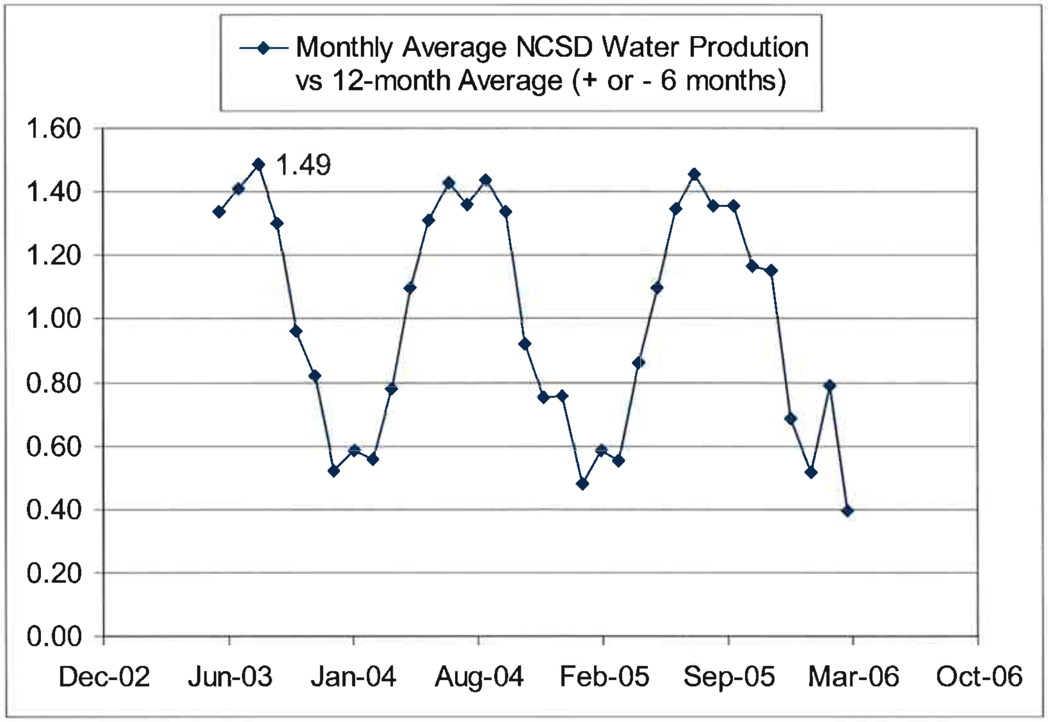
3: UWMP 2005 Update Appendix Table 41

Peaking Factor Analysis

Peaking factors can be used to estimate peak water demands of particular durations (such as peak daily demand, or peak hourly demand) based on longer-term use rates (such as annual demand or daily demand).

The following figure shows that water use within District is highly seasonal, with monthly peaking factors approaching 1.5.

Figure 3-7: Ratio of Monthly Average Production vs Annual Average Production



To calculate peak demand, well production and tank level data were collected from the District telemetry system. Daily pumping records were provided by the District for the Olympic well. Monthly summaries of well production and bypass flows to Blacklake were also provided.

Well production, net tank flow, and bypass flows were calculated on an hourly basis from the available data. These values were used to estimate average daily, peak daily, and peak hourly demands between August 1, 2005 and July 31, 2006 for the Town Division and the Blacklake Division separately.

Town Division

Total well production delivered to the town division between August 1, 2005 and July 31, 2006 was 770,034,389 gallons, equal to 2,363 acre-feet per year, 2.11 MGD, or 1,465 gpm.

Peak 24-hour average flow occurred on 7/28/2006 at a rate of 2,497 gpm. Peak hourly flow in Town Division occurred on 7/17/2006 at a rate of 5,542 gpm. Using these values, the following peaking factors are calculated:

Town Division Peaking Factors:

Period	Flow (gpm)	Peaking Factor
ADD	1465	1.00
MDD	2497	1.70
PHD	5542	3.78

Blacklake Division

The total of well production and bypass flows delivered to Blacklake division between August 1, 2005 and July 31, 2006 was reported as 126,440,691 gallons, equal to 388 acre-feet per year, 0.35 MGD, or 241 gpm.

Peak 24-hour average flow occurred on 6/7/2006 at a rate of 451 gpm. Peak hourly flow in Blacklake Division was recorded on 6/9/2006 at a rate of 1435 gpm. Using these values, the following peaking factors are calculated:

Blacklake Division Peaking Factors:

Period	Flow (gpm)	Peaking Factor
ADD	241	1.00
MDD	451	1.87
PHD	1435	5.95

Because of the larger area involved, the peaking factors determined for the Town Division are more representative of the water distribution system as a whole, and are therefore used below.

Based on the average daily demand (ADD) values noted above, maximum daily demand (MDD) and peak hourly demands (PHD) under the three land use scenarios examined can be projected as shown below.

Table 3-12: Estimated Peak Water Demands – Assumed Water Use Rates

	Annual Demand	**Average Daily Demand**	**Maximum Daily Demand**	**Peak Hourly Demand**
units	af/yr	MGD	MGD	MGD
Peaking Factor		*(1 MGD = 1121 AFY)*	*1.70*	*3.78*
2005 Conditions	2,989	2.67	4.53	10.08
2030 Scenario 1	4,960	4.42	7.51	16.71
2030 Scenario 2	5,170	4.61	7.84	17.43
2030 Scenario 3	5,970	5.33	9.06	20.15

Using the FY2005-06 observed water use rates, peak water demand projections are as shown below.

Table 3-13: Estimated Peak Water Demands – Observed Water Use Rates

	Annual Demand	Average Daily Demand	Maximum Daily Demand	Peak Hourly Demand
	af/yr	MGD	MGD	MGD
Peaking Factor		*(1 MGD = 1121 AFY)*	*1.7*	*3.78*
2005 Conditions	2,989	2.67	4.53	10.09
2030 Scenario 1	6,246	5.57	9.47	21.05
2030 Scenario 2	6,542	5.84	9.92	22.08
2030 Scenario 3	7,878	7.03	11.95	26.57

Water Demand for Fire Suppression Analysis

Another factor which must be considered in determination of appropriate figures for use in system modeling is water demand for fire suppression. While fire suppression demand does not enter into usage projections, it must be accounted for in system pressure and sizing requirements. For each land use in the District's SOI, the following water use rates for fire suppression are applied:

Table 3-14: Recommended Fire Suppression Water Demand by Land Use

Land Use Code	Minimum Flow rate (gpm) (1)	Recommended Flow rate (gpm) (2)	Duration (hours) (1)
RMF	1,000	1,500	2
RSF	1,000	1,500	2
RS	1,000	1,500	2
RR	1,000	1,500	2
RL	1,000	1,500	2
AG	1,000	1,500	2
PF	1,500	2,500 (3)	3
OP	1,500	2,500 (3)	3
CR	1,500	2,500 (3)	3
CS	1,500	2,500 (3)	3
OS	1,000	1,500	2
REC	1,000	1,500	2
Summit Station	500 (4)	1,500	2

1: Minimum acceptable flow rate in developed areas, and minimum flow rates when buildings are sprinklered.
2: Recommended flow rates for Master Planning purposes.
3: Increased flows and durations may be required, depending on building size, building materials and use of sprinklers.
4: Minimal fire flows were allowed in the development of the Summit Station area. Improvement of available fire flows to this area is one of the goals of this master planning effort.

4. Sewer System Load Projections

This section describes the method of analysis and assumptions used in determining sewer system load projections. It presents current information regarding the sewer system and the analysis of projected annual average sewer load in the year 2030 under the three land use scenarios. Figures 4-1 through 4-4 at the end of this section show the existing sewer service area and the future sewer service areas for the three land use scenarios.

The sewer system consists of a network of gravity mains, lift stations, and force mains. The Blacklake Division is served independently of the remainder of the District and has its own wastewater treatment plant. Approximately 1100 acres within the Town Division receive sewer service, the remainder operating on private septic systems. Town Division wastewater is conveyed to the Southland Wastewater Treatment Plant (WWTP). In addition, wastewater discharging from the Galaxy Park lift station is carried in District sewers to the Southland WWTP.

Methodology and Assumptions

Wastewater duty factors (i.e., wastewater production rates by land use) were estimated as follows:

1. Land use within the existing sewer service area was quantified (e.g., 126 acres within the existing sewer service area is zoned Residential Multi-Family).
2. The District GIS data was used to estimate the fraction of each land use area that is connected to the wastewater collection system in 2005 (e.g., 58 acres of Residential Multi-Family area appears to be connected to the collection system).
3. Both water use analyses presented above (i.e., based on assumed use rates and based on observed rates) were used to estimate water use within the areas connected to the collection system.
4. For each type of land use, a fraction of the delivered water was assumed to flow to the sewer. The fractions used were taken from the 2001 Water and Sewer Master Plan Update, adjusted so that the total wastewater flow matched the reported average flow rate in 2005 (0.626 MGD).
5. A wastewater duty factor was calculated for each land use by dividing the wastewater flow by the contributing area connected to the collection system.

The results of this analysis are presented below:

Table 4.1A: Wastewater Duty Factors for Existing Wastewater Production under Existing Land Use – Assumed Water Duty Factors

Land Use	Acres with Sewer Service	Water Duty Factor from UWMP assump-tions (af/yr/acre)	Estimated percent of area connected to sewer in 2005	Estimated Water Use, af/yr	Fraction of Delivered Water going to Sewer (1)	Estimated Sewage Production (MGD)	Wastewater Production Rate (MGD/acre)
Town Division							
RMF	126	2.19	46%	126	90%	0.101	0.001758
RSF	604	1.60	51%	491	79%	0.345	0.001125
RS	139	0.62	4%	3	74%	0.002	0.000411
RR	0	0.21	0%	0	0%		
RL	0	0.11	0%	0	0%		
AG	11	0.00	0%	0	0%		
PF	19	0.59	81%	9	92%	0.007	0.000484
OP	31	0.26	28%	2	92%	0.002	0.000213
CR	121	1.42	38%	65	92%	0.053	0.001165
CS	47	0.35	51%	8	92%	0.007	0.000287
OS	11	1.18	0%	0	0%		
REC	5	0.62	100%	3	0%		
Subtotal	1116			708		0.518	
Galaxy Park and People's Self-Help Housing							
RSF	85	1.60	100%	136	90%	0.109	0.001285
High School							
PF	76	0.59	100%	45	90%	0.036	0.000474
Southland WWTP							
Total	1277			889		0.627	

1: Boyle 2002, Table 2 estimates, adjusted upward by 60% of the difference between the Boyle estimate and 100%. (e.g., Boyle estimate of 75% for RMF becomes 90% (75% + (0.60)(25%) = 75% + 15% = 90%)

Table 4.1B: Wastewater Duty Factors for Existing Wastewater Production under Existing Land Use – Observed FY05-06 Water Duty Factors

Land Use	Acres with Sewer Service	Water Duty Factor, Observed FY05-06 Uses (af/yr/acre)	Estimated percent of area connected to sewer in 2005	Estimated Water Use (af/yr)	Fraction of Delivered Water going to Sewer (1)	Estimated Sewage Production (MGD)	Wastewater Production Rate (MGD/acre)
Town Division							
RMF	126	3.75	46%	216	79%	0.152	0.002634
RSF	604	2.10	51%	644	49%	0.283	0.000924
RS	139	0.98	4%	5	38%	0.002	0.000330
RR	0	0.20	0%	0	0%		
RL	0	0.10	0%	0	0%		
AG	11	0.00	0%	0	0%		
PF	19	0.59	81%	9	84%	0.007	0.000442
OP	31	0.26	28%	2	84%	0.002	0.000195
CR	121	1.42	38%	65	84%	0.049	0.001064
CS	47	0.35	51%	8	84%	0.006	0.000262
OS	11	1.18	0%	0	0%		
REC	5	0.62	100%	3	0%		
Subtotal	1116					0.500	
Galaxy Park and People's Self-Help Housing							
RSF	85	2.10	100%	179	79%	0.125	0.001475
High School (2)							
PF	76	0.12	100%	9	79%	0.006	0.000083
Southland WWTP							
Total	1277			188		0.626	

1: Boyle 2002, Table 2 estimates, adjusted by 5%
2: Domestic water use as reported by NCSD

Average annual wastewater flow rates to the Southland WWTP under the three land use scenarios were estimated as follows:

1. Land use within the future sewer service area was quantified.
2. The wastewater production rates noted above were used to estimate average flow rates under full build-out conditions. Note that some land uses are assumed to generate no wastewater.
3. The water demand analysis presented above showed that in 2030 water demand will be equivalent to 88%, 84%, and 76% of "build out" demand under Scenarios 1, 2, and 3, respectively. These fractions were used to estimate wastewater production in 2030 as a fraction of "build out" wastewater production.

The results are shown below:

Table 4.2: Scenario 1 - Future Wastewater Production under Existing Land Use (based on Assumed Water Use Rates)

Land Use	Total Area Served	Wastewater Production Rate	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	ac	MGD/ac	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	86%	0.000
RR	0	0	0.000	86%	0.000
RSF	888	0.001125	0.999	86%	0.859
RS	270	0.000411	0.111	86%	0.095
RL	0	0	0.000	86%	0.000
RMF	126	0.001758	0.222	100%	0.222
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000213	0.007	95%	0.006
CR	128	0.001165	0.149	95%	0.142
CS	67	0.000287	0.019	95%	0.018
IND (1)	4	0.000484	0.002	95%	0.002
OS	0	0	0.000	100%	0.000
PF	22	0.000484	0.011	95%	0.010
High School	76	0.000474	0.036	100%	0.036
Total Use	1,617		1.555		1.390

1: Wastewater production rate assumed equal to PF

Table 4.3: Scenario 2 - Future Wastewater Production under Proposed Land Use Amendments (based on Assumed Water Use Rates)

Land Use	Total Area Served	Wastewater Production Rate	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	ac	MGD/ac	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	81%	0.000
RR	0	0	0.000	81%	0.000
RSF	914	0.001125	1.028	81%	0.833
RS	455	0.000411	0.187	81%	0.151
RL	0	0	0.000	81%	0.000
RMF	166	0.001758	0.292	100%	0.292
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000213	0.007	86%	0.006
CR	212	0.001165	0.247	86%	0.212
CS	141	0.000287	0.040	86%	0.035
IND (1)	12	0.000484	0.006	76%	0.004
OS	61	0	0.000	100%	0.000
PF	22	0.000484	0.011	76%	0.008
High School	76	0.000474	0.036	100%	0.036
Total Use	2,095		1.854		1.578

1: Wastewater production rate assumed equal to PF

Table 4.4: Scenario 3 - Future Wastewater Production under High Density Land Use Assumption (based on Assumed Water Use Rates)

Land Use	Total Area Served	Wastewater Production Rate	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	ac	MGD/ac	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	72%	0.000
RR	0	0	0.000	72%	0.000
RSF	1,310	0.001125	1.474	72%	1.061
RS	455	0.000411	0.187	72%	0.135
RL	0	0	0.000	72%	0.000
RMF	166	0.001758	0.292	100%	0.292
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000213	0.007	86%	0.006
CR	212	0.001165	0.247	86%	0.212
CS	141	0.000287	0.040	86%	0.035
IND (1)	12	0.000484	0.006	76%	0.004
OS	61	0	0.000	100%	0.000
PF	22	0.000484	0.011	76%	0.008
High School	76	0.000474	0.036	100%	0.036
Total Use	2,491		2.299		1.789

1: Wastewater production rate assumed equal to PF

Table 4.5: Scenario 1 - Future Wastewater Production under Existing Land Use (based on Observed FY05-06 Water Use Rates)

Land Use	Total Area Served	Wastewater Duty Factor	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	ac	MGD/ac	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	86%	0.000
RR	0	0	0.000	86%	0.000
RSF	888	0.000924	0.821	86%	0.706
RS	270	0.00033	0.089	86%	0.077
RL	0	0	0.000	86%	0.000
RMF	126	0.002634	0.332	100%	0.332
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000195	0.006	95%	0.006
CR	128	0.001064	0.136	95%	0.129
CS	67	0.000262	0.018	95%	0.017
IND (1)	4	0.000442	0.002	95%	0.002
OS	0	0	0.000	100%	0.000
PF	22	0.000442	0.010	95%	0.009
High School	76	0.000083	0.006	100%	0.006
Total Use	1,617		1.419		1.283

1: Wastewater production rate assumed equal to PF

Table 4.6: Scenario 2 - Future Wastewater Production under Proposed Land Use Amendments (based on Observed FY05-06 Water Use Rates)

Land Use	Total Area Served	Wastewater Production Rate	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	ac	MGD/ac	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	81%	0.000
RR	0	0	0.000	81%	0.000
RSF	914	0.000924	0.845	81%	0.684
RS	455	0.00033	0.150	81%	0.122
RL	0	0	0.000	81%	0.000
RMF	166	0.002634	0.437	100%	0.437
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000195	0.006	86%	0.005
CR	212	0.001064	0.226	86%	0.194
CS	141	0.000262	0.037	86%	0.032
IND (1)	12	0.000442	0.005	76%	0.004
OS	61	0	0.000	100%	0.000
PF	22	0.000442	0.010	76%	0.007
High School	76	0.000083	0.006	100%	0.006
Total Use	2,095		1.722		1.492

1: Wastewater production rate assumed equal to PF

Table 4.7: Scenario 3 - Future Wastewater Production under High Density Land Use Assumption (based on Observed FY05-06 Water Use Rates)

Land Use	Total Area Served	Wastewater Production Rate	Estimated Wastewater Produced at Buildout	percent built-out	Estimated Wastewater Production in Year 2030 -
(units)	ac	MGD/ac	MGD		MGD
Residential Land Uses					
REC	5	0	0.000	72%	0.000
RR	0	0	0.000	72%	0.000
RSF	1,310	0.000924	1.210	72%	0.872
RS	455	0.00033	0.150	72%	0.108
RL	0	0	0.000	72%	0.000
RMF	166	0.002634	0.437	100%	0.437
Non-Residential Land Uses					
AG	0	0	0.000	100%	0.000
OP	31	0.000195	0.006	86%	0.005
CR	212	0.001064	0.226	86%	0.194
CS	141	0.000262	0.037	86%	0.032
IND (1)	12	0.000442	0.005	76%	0.004
OS	61	0	0.000	100%	0.000
PF	22	0.000442	0.010	76%	0.007
High School	76	0.000083	0.006	100%	0.006
Total Use	2,491		2.088		1.666

1: Wastewater production rate assumed equal to PF

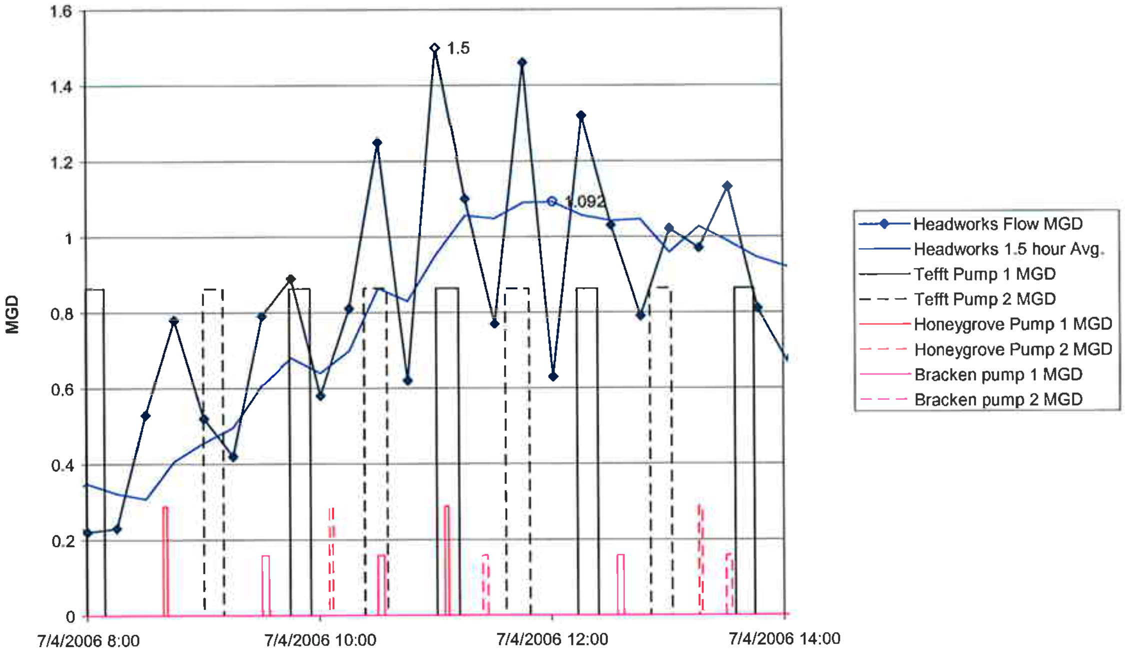
Lift Station Effects

The impacts of existing lift stations were examined by plotting Southland WWTP influent flow rates and lift station pumping rates during a day when peak influent flows were recorded.

Pumping rates for lift stations were taken from the previous Water and Sewer Master Plan (Boyle, 2001) or from as-built plans and specifications in cases where pump sizes had been changed since 2001. On/Off pumping records for the lift stations were collected from the District telemetry system.

The chart below shows that the Tefft Street Lift Station has a significant effect on the influent flow rate. While a peak flow rate of 1.5 MGD was reported at the influent meter, a more appropriate value would be 1.09 MGD, which corresponds to the 1.5-hour averaged influent flow rate.

July 4, 2006, 3AM - 3PM
Flow to Southland WWTP and Contributions of Selected Lift Stations

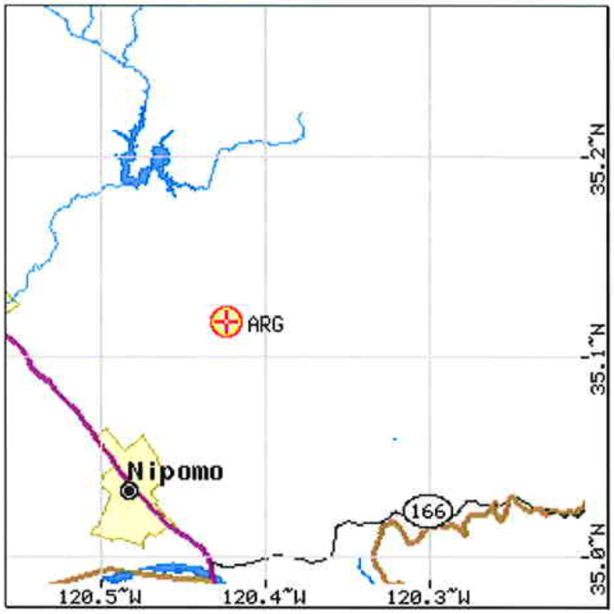


For the remainder of this sewer peaking factor analysis, an averaging period of 1.25 hours is used. This averaging period was found to be sufficient in most cases for estimating wastewater flow rates with lift station effects suppressed.

Inflow and Infiltration

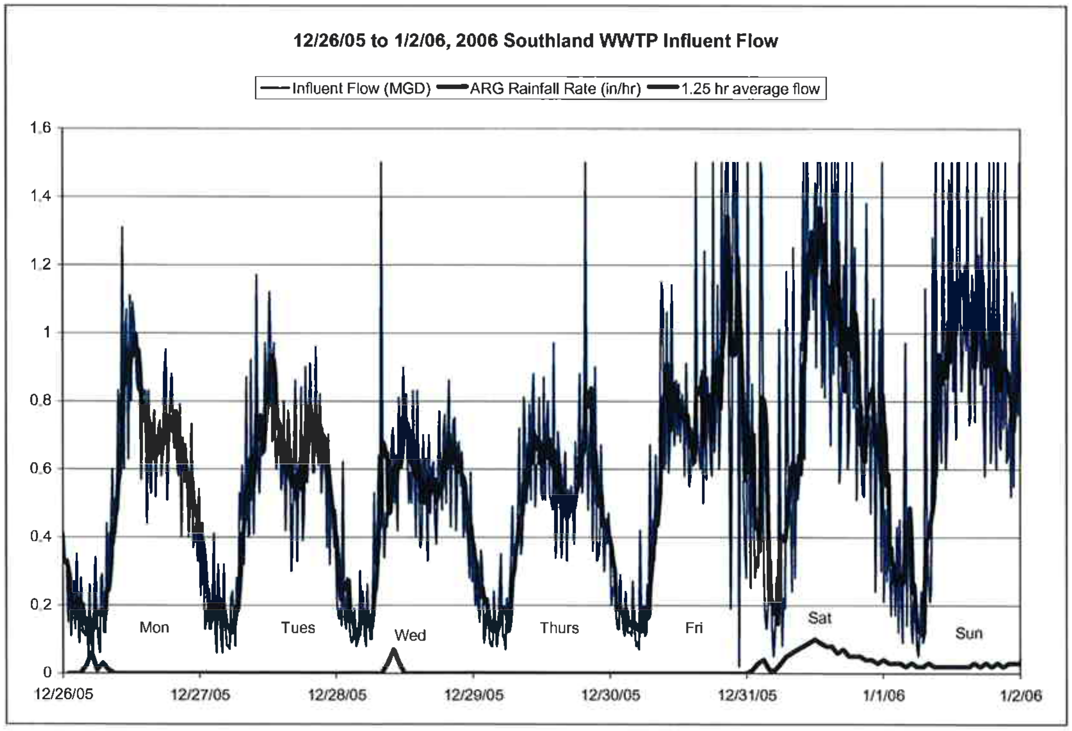
The impact of inflow and infiltration (I/I) on flow rates was examined by comparing flows to the Southland WWTP during dry weather and wet weather periods, as shown below. Influent flow data were collected from the District telemetry system. Also collected were "high level" alarm data which signal when elevated levels occur in the wet well.

Rainfall data from the ARG weather station was collected from California Department of Water Resources. This station is located at an elevation of 600 feet, approximately 7 miles northeast of Nipomo. The approximate location of the ARG rain gage is shown below.

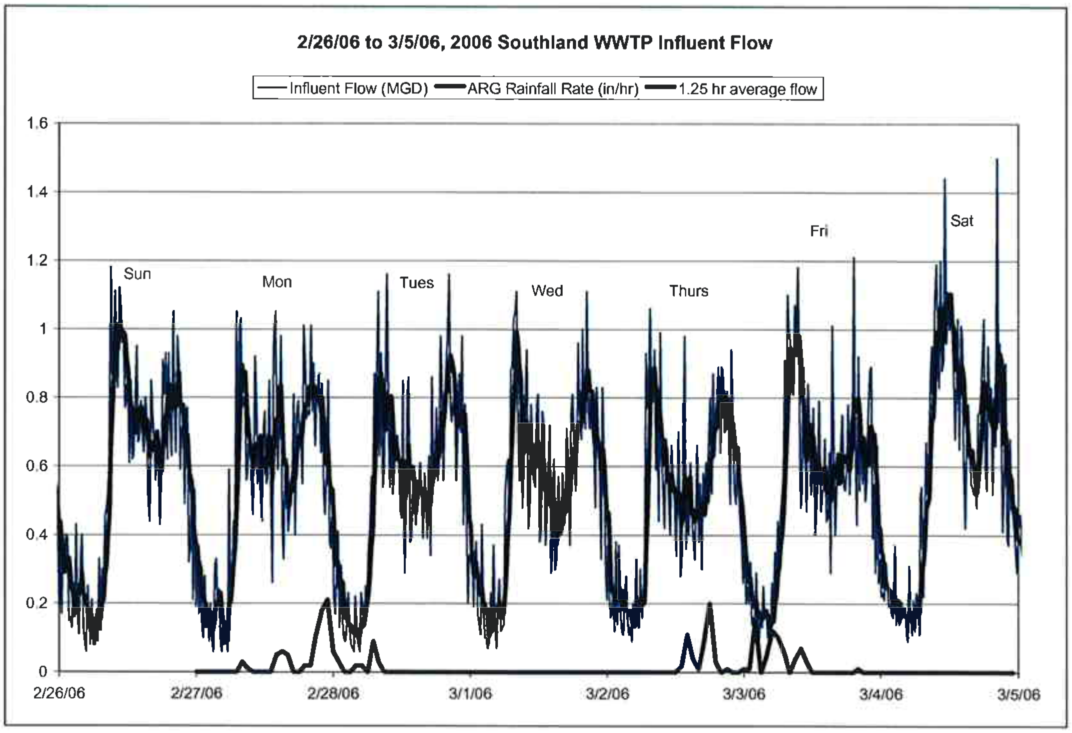


The following charts show reported influent flow rate, 1.25-hour average influent flow rate, and rainfall rate at the ARG gage. The following observations can be made:

Some data suggests that I/I may be a problem. A brief, fairly intense storm on 12/28/05, which dropped 0.13" at the ARG gage, coincided in a sharp peak in flow to the WWTP headworks. The large storm of 12/31/2005, which delivered 2.22" to the ARG gage during that 24-hour period, coincided with periods of peak flow, and greater than average flow rates at the WWTP.

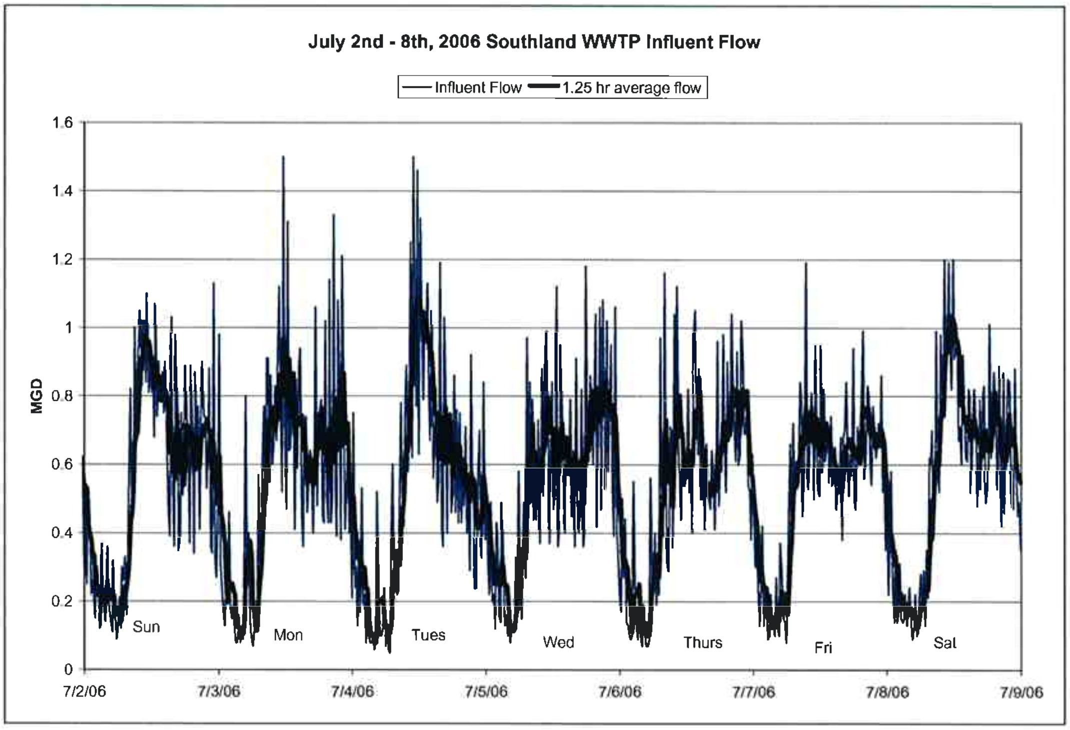


However, other data show that the collection system experiences very little I/I. The storms of 2/27-2/28/06 and 3/2-3/3/06, which dropped 0.99" and 1.16" respectively on the ARG gage, did not coincide with an increase in flow rates to the plant.



These results tend to indicate that the high flows experienced on 12/31/2005 and 1/1/2006 may be caused primarily by holiday usage patterns.

Observations recorded around the July 4th holiday support the conclusion that holiday usage may be the controlling factor in determining peak flow rates, as shown below. Peak flow rates and peak average flow rates are recorded on 7/4/06. Rates then return to more normalized patterns later in the week.



Estimated Peaking Factors

Average annual flows to the plant were reported in 2005 to be 0.63 MGD.

Average flows to the plant between 5/15/2006 and 9/15/2006 were 0.57 MGD.

A peak influent flow rate of 1.09 MGD was reported on July 4, 2006.

A peak 1.25-hour average flow rate of 1.37 MGD was reported on 12/31/2005 at a time when rainfall from a significant storm was peaking at the ARG rain gage.

Based on the values noted above, peaking factors for the Southland WWTP can be estimated as follows:

Table 4.8: Southland WWTP Peaking Factors

Period	Flow (MGD)	Factor
Annual Average Flow	0.63	1.00
Average Dry Weather Flow	0.57	0.90
Peak Dry Weather Flow	1.09	1.73
Peak Wet Weather Flow	1.37	2.17

Note that no influent flow data is available for the Blacklake Wastewater Treatment Plant. Therefore, no peaking analysis was performed.

Based on the values noted above, projected wastewater flows to the Southland WWTP can be estimated as follows:

Table 4.9: Projected Wastewater Flows to Southland WWTP (based on Assumed Water Use Rates)

Southland WWTP	Est. Average Annual Flow (AAF)	Est. Peak Dry Weather Flow (PDWF)	Est. Peak Wet Weather Flow (PWWF)
units	MGD	MGD	MGD
Peaking Factor		*1.73*	*2.17*
2005 Conditions	0.63	1.09	1.37
2030 Scenario 1	1.39	2.40	3.02
2030 Scenario 2	1.58	2.73	3.43
2030 Scenario 3	1.79	3.10	3.88

Table 4.10: Projected Wastewater Flows to Southland WWTP (based on Observed FY05-06 Water Use Rates)

Southland WWTP	Est. Average Annual Flow (AAF)	Est. Peak Dry Weather Flow (PDWF)	Est. Peak Wet Weather Flow (PWWF)
units	MGD	MGD	MGD
Peaking Factor		*1.73*	*2.17*
2005 Conditions	0.63	1.09	1.37
2030 Scenario 1	1.28	2.21	2.78
2030 Scenario 2	1.49	2.58	3.23
2030 Scenario 3	1.67	2.89	3.62

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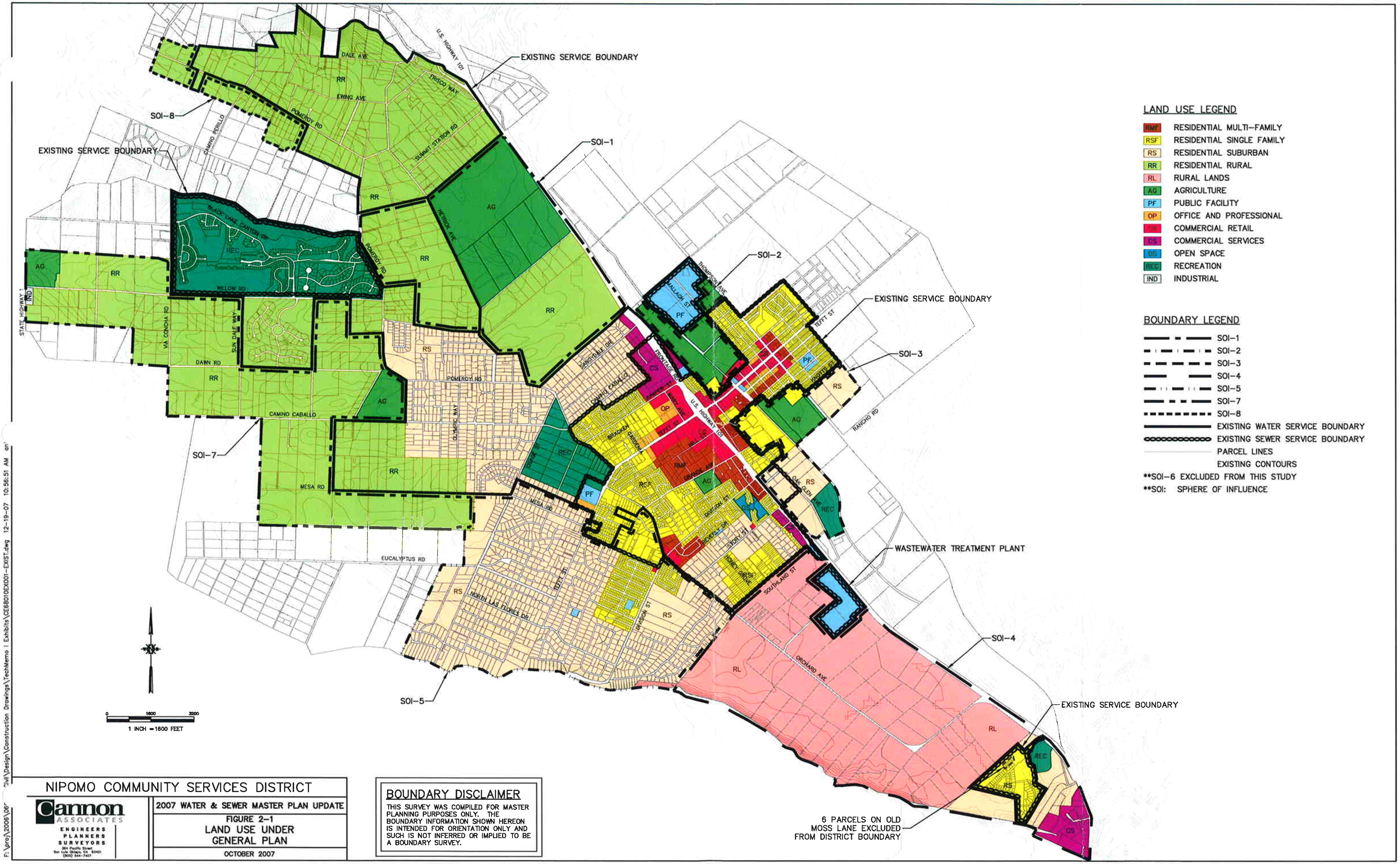

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 2-1
LAND USE UNDER
GENERAL PLAN

OCTOBER 2007

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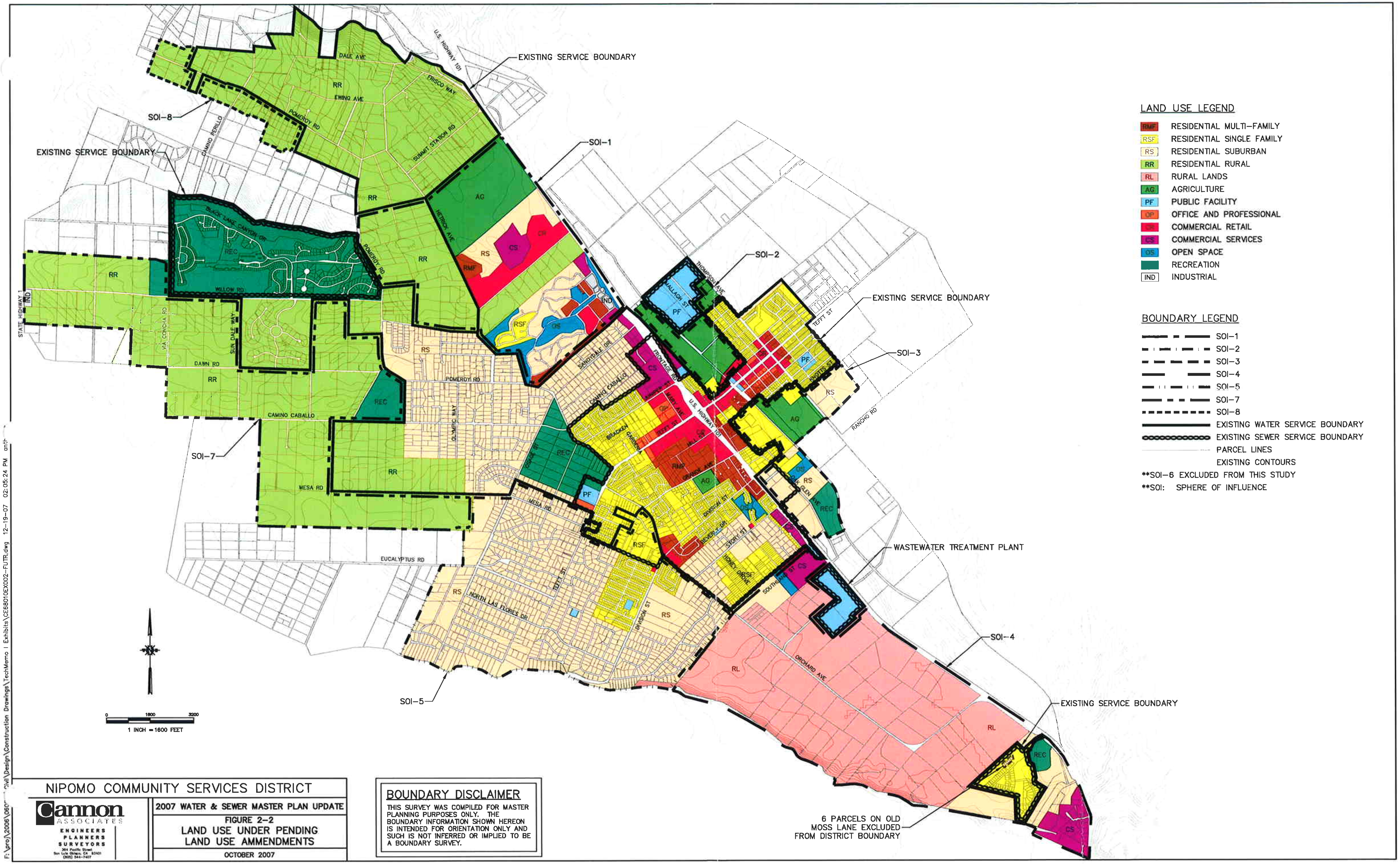

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FIGURE 2-2
LAND USE UNDER PENDING
LAND USE AMMENDMENTS

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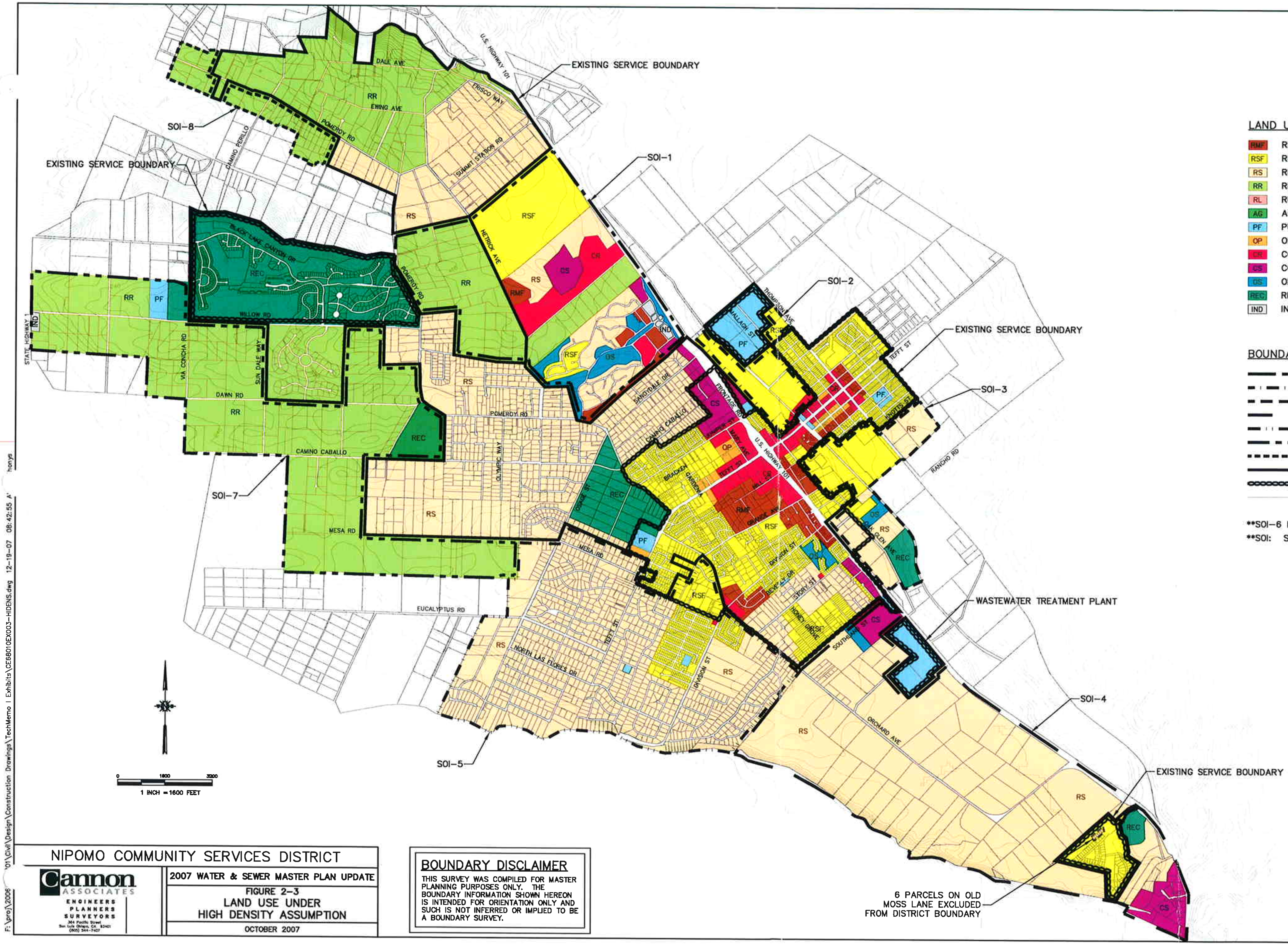

LAND USE LEGEND

RMF RESIDENTIAL MULTI-FAMILY
RSF RESIDENTIAL SINGLE FAMILY
RS RESIDENTIAL SUBURBAN
RR RESIDENTIAL RURAL
RL RURAL LANDS
AG AGRICULTURE
PF PUBLIC FACILITY
OP OFFICE AND PROFESSIONAL
CR COMMERCIAL RETAIL
CS COMMERCIAL SERVICES
OS OPEN SPACE
REC RECREATION
IND INDUSTRIAL

BOUNDARY LEGEND

SOI-1
SOI-2
SOI-3
SOI-4
SOI-5
SOI-7
SOI-8
EXISTING WATER SERVICE BOUNDARY
EXISTING SEWER SERVICE BOUNDARY
PARCEL LINES
EXISTING CONTOURS
**SOI-6 EXCLUDED FROM THIS STUDY
**SOI: SPHERE OF INFLUENCE

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FIGURE 2-3
LAND USE UNDER
HIGH DENSITY ASSUMPTION

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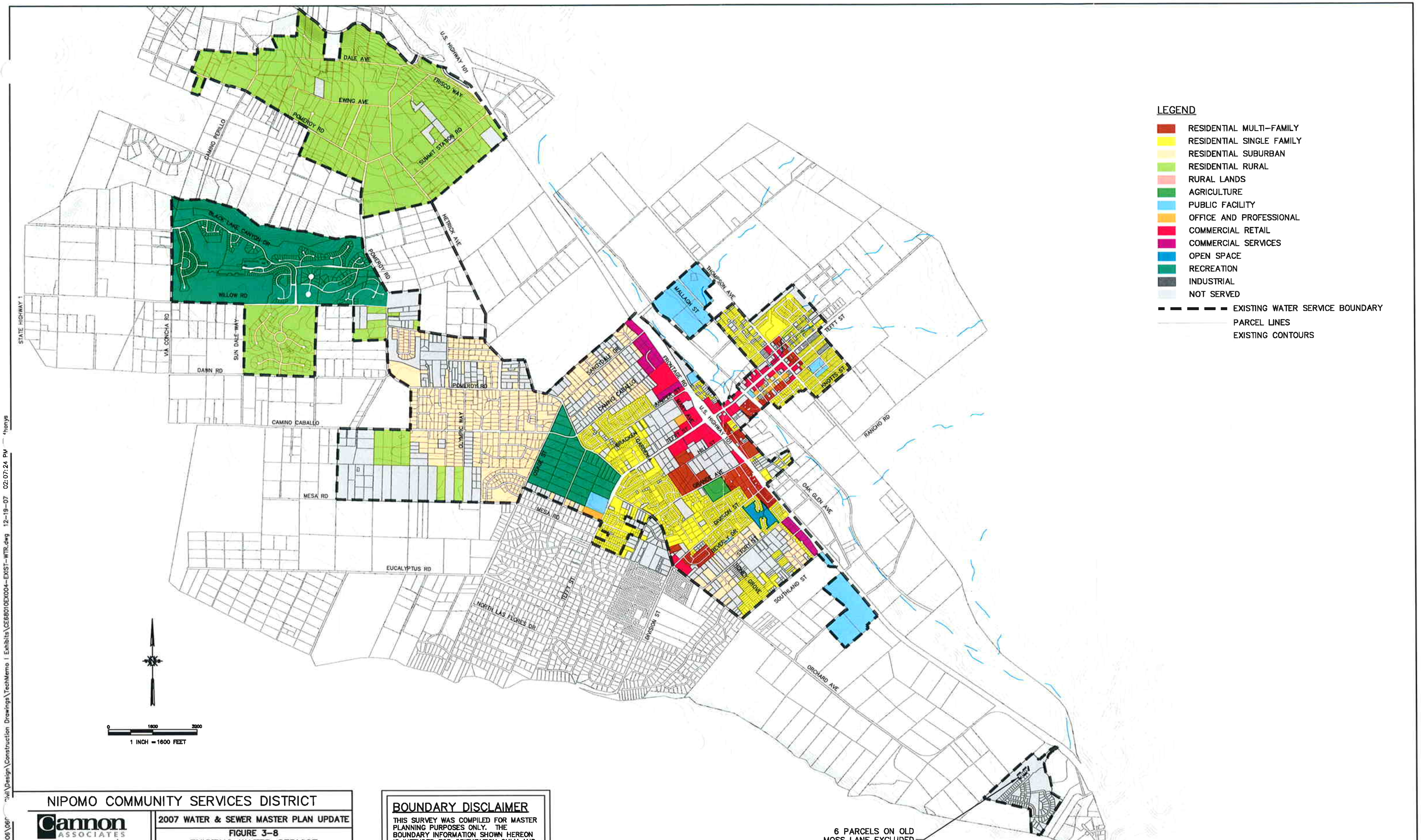

6 PARCELS ON OLD MOSS LANE EXCLUDED FROM DISTRICT BOUNDARY

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FIGURE 3-8
EXISTING WATER SERVICE

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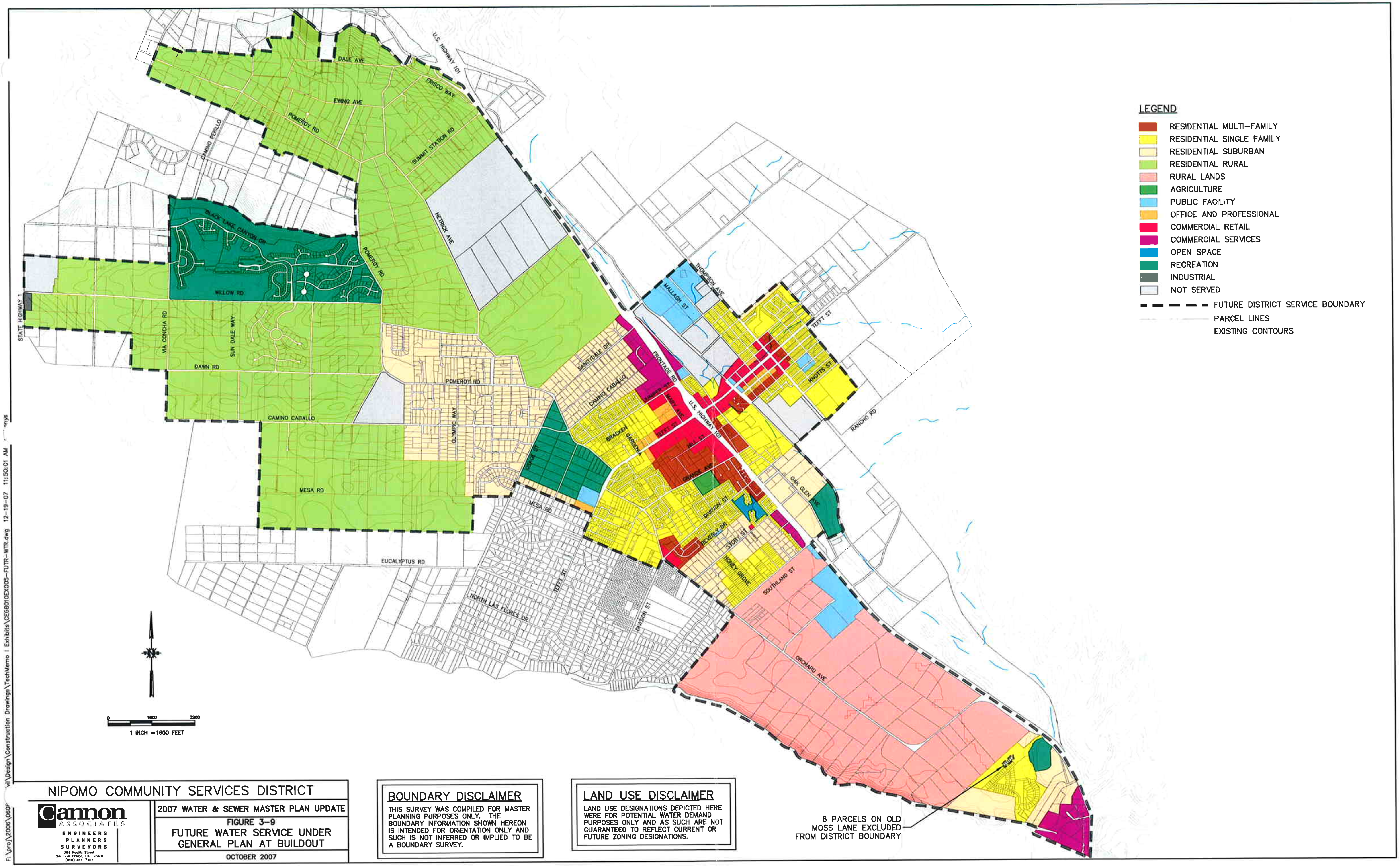

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FIGURE 3-9
FUTURE WATER SERVICE UNDER GENERAL PLAN AT BUILDOUT

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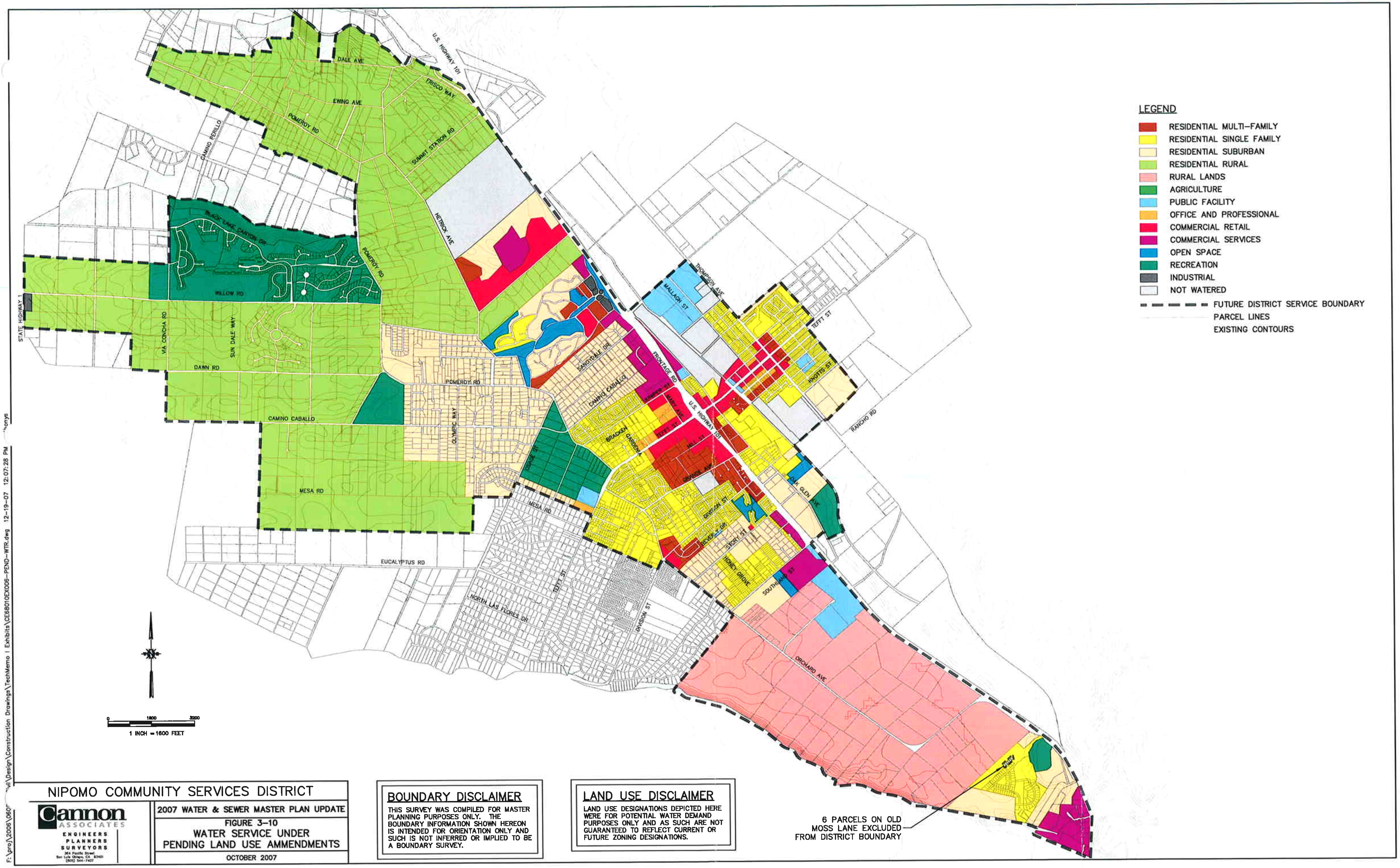

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FIGURE 3-10
WATER SERVICE UNDER
PENDING LAND USE AMMENDMENTS

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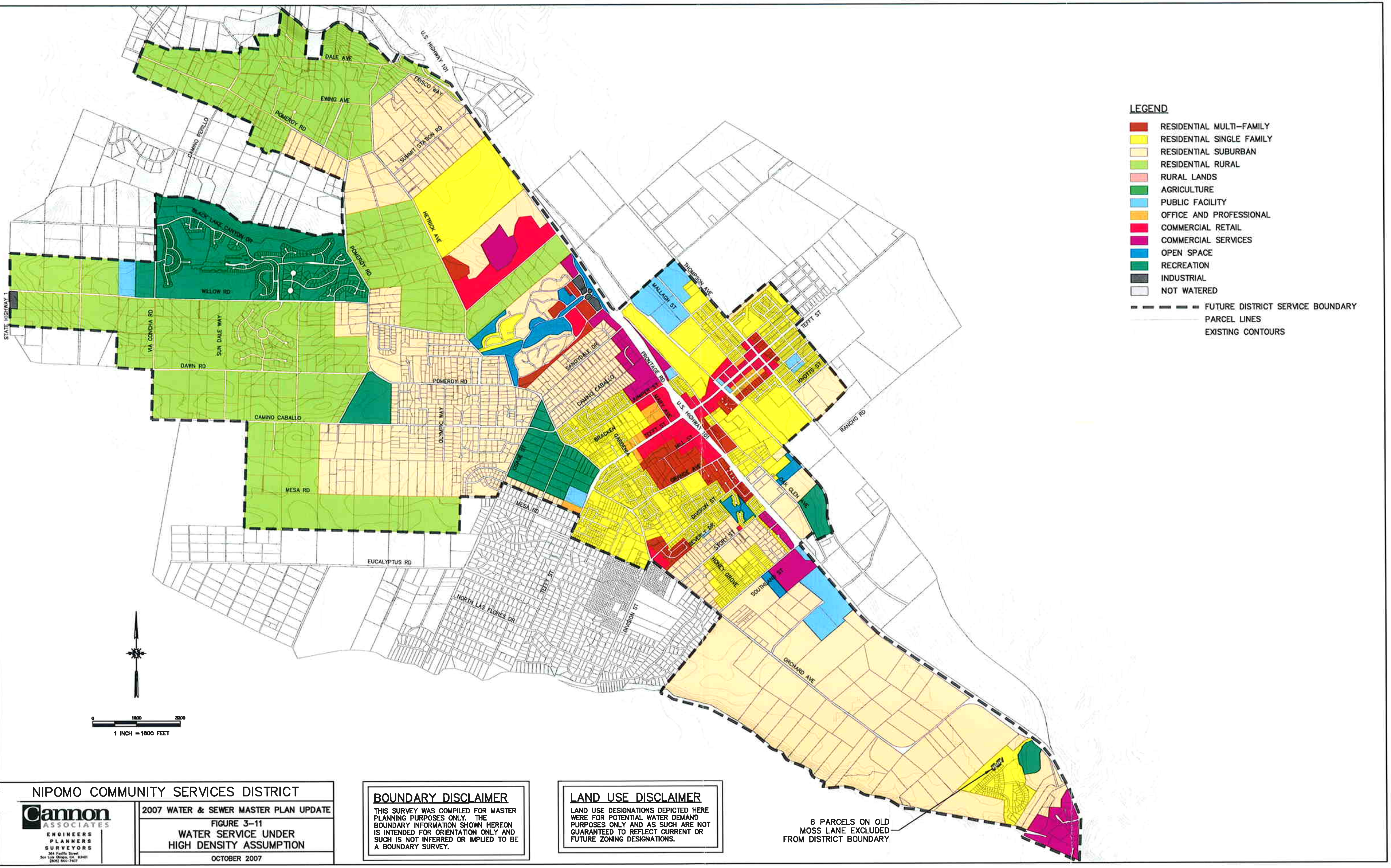

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FIGURE 3-11
WATER SERVICE UNDER
HIGH DENSITY ASSUMPTION

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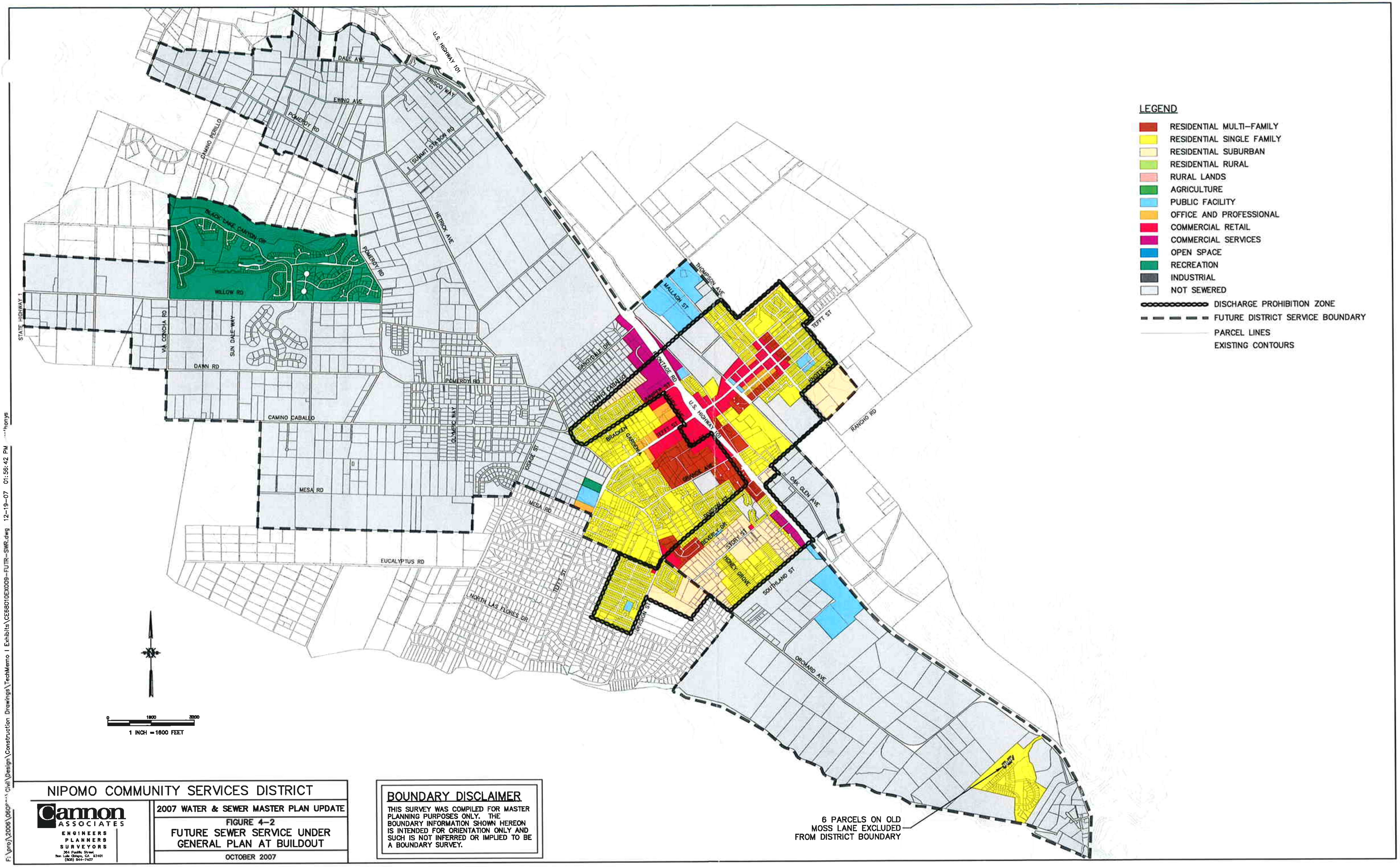

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FIGURE 4-2
FUTURE SEWER SERVICE UNDER
GENERAL PLAN AT BUILDOUT

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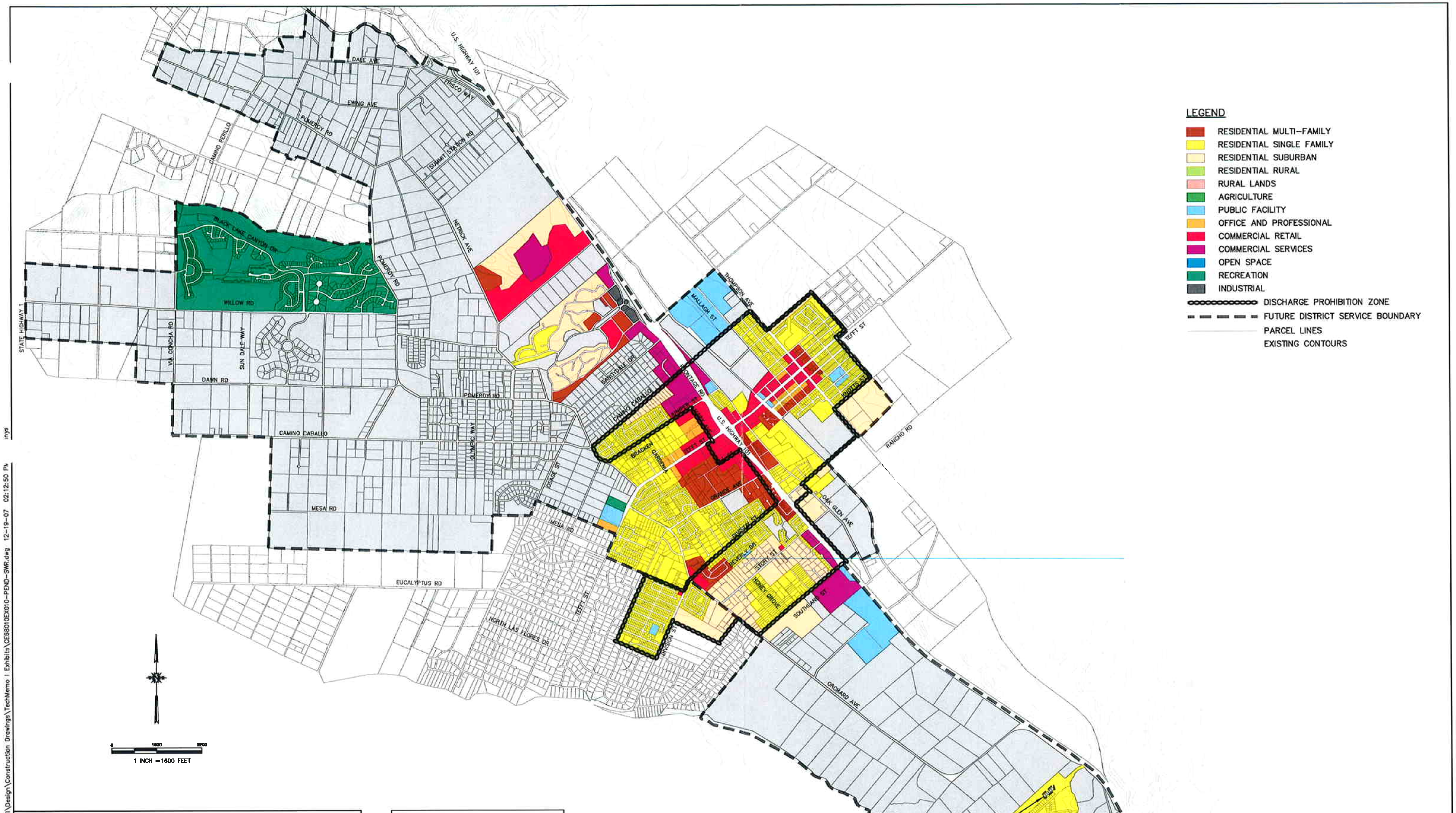

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FIGURE 4–3
SEWER SERVICE UNDER
PENDING LAND USE AMMENDMENTS

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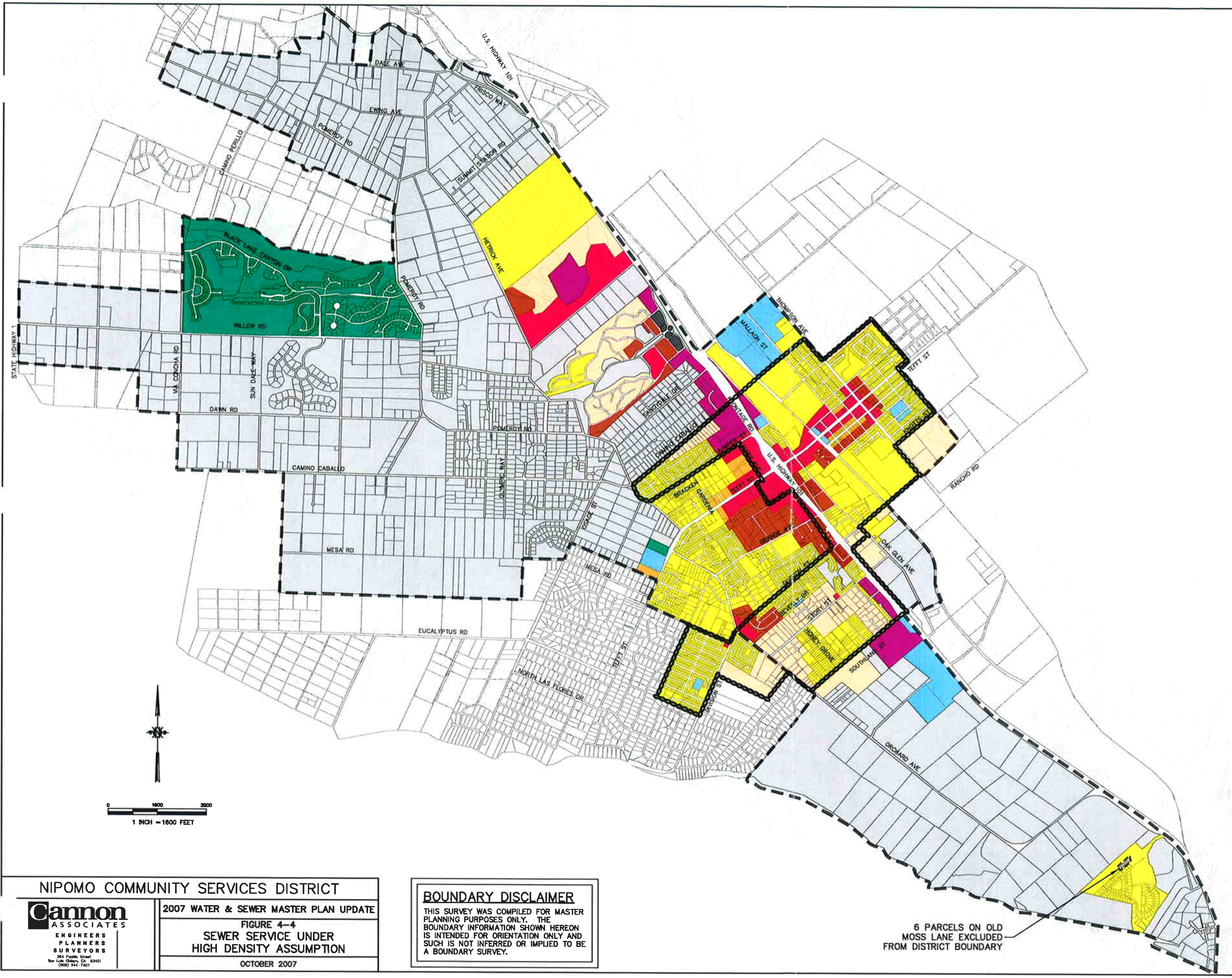

LEGEND

🟥	RESIDENTIAL MULTI-FAMILY
🟨	RESIDENTIAL SINGLE FAMILY
▨	RESIDENTIAL SUBURBAN
🟩	RESIDENTIAL RURAL
▨	RURAL LANDS
🟩	AGRICULTURE
🟦	PUBLIC FACILITY
🟧	OFFICE AND PROFESSIONAL
🟥	COMMERCIAL RETAIL
🟪	COMMERCIAL SERVICES
🟦	OPEN SPACE
🟩	RECREATION
⬛	INDUSTRIAL
☐	NOT SEWERED
○○○○	DISCHARGE PROHIBITION ZONE
— — —	FUTURE DISTRICT SERVICE BOUNDARY
- - -	PARCEL LINES
	EXISTING CONTOURS

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FIGURE 4-4
SEWER SERVICE UNDER
HIGH DENSITY ASSUMPTION

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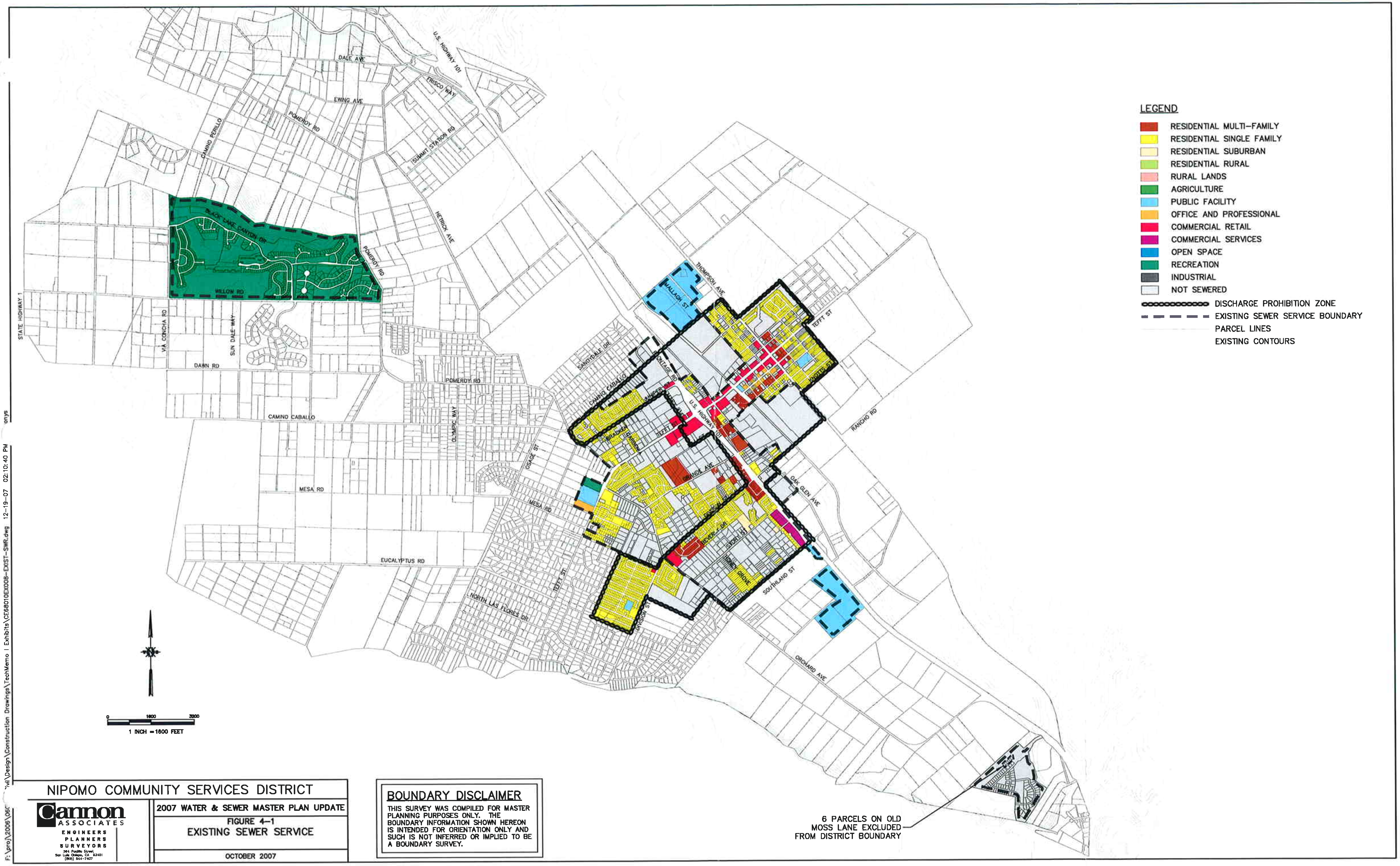

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2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 4-1
EXISTING SEWER SERVICE

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Appendix B: Technical Memorandum 2:

Hydrant Flow Color Coding

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Technical Memorandum

August 8, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: **Technical Memorandum 2: Hydrant Flow Color Coding**

This technical memorandum describes the procedures and classification scheme for color coding of fire hydrants in the NCSD system.

The National Fire Protection Association (NFPA) has established a color code system for fire hydrants to allow quick determination of available flow and pressure at each hydrant. The color classification system is defined in the table below.

Classification and Color Markings

Class	Capacity (GPM)	Color
AA	P1500	Light Blue
A	1000-1499	Green
B	500-999	Orange
C	Less than 500	Red

(NFPA, 2007)

Using the calibrated WaterGEMS model of the current water system, steady-state model runs were performed to simulate fire flow conditions at hydraulic nodes adjacent to each of the existing hydrants. The following assumptions or requirements were incorporated into the simulations:

- Recommended Master Plan distribution system improvements to relieve bottlenecks in the existing system were incorporated into the model;
- Fire flows were assumed to occur during the maximum day demand, existing conditions;
- A minimum residual system pressure of at least 20 psi was maintained;
- Only a single fire incident occurred at a time.
- Pressure losses due to friction and elevation in the pipe between the hydraulic node and the fire hydrant were considered negligible.

Based on the results of these simulations, all hydrants were categorized according to the classification system shown in the table above. The attached table shows the number of hydrants within each of NCSD's GIS grid numbering system by color coding. The table below summarizes the total number of hydrants by their color code designation. These tables were prepared from data contained in a excel database file, so it can be re-sorted according to District needs. The database file contains the exact location of each hydrant. Hydrants that have been abandoned or are outside of District boundaries are noted as well.

Classification and Color Markings Results

Class	Capacity (GPM)	Color	Number of NCSD Hydrants
AA	P1500	Light Blue	544
A	1000-1499	Green	12
B	500-999	Orange	59
C	Less than 500	Red	1
Abandoned			35
Outside District			9

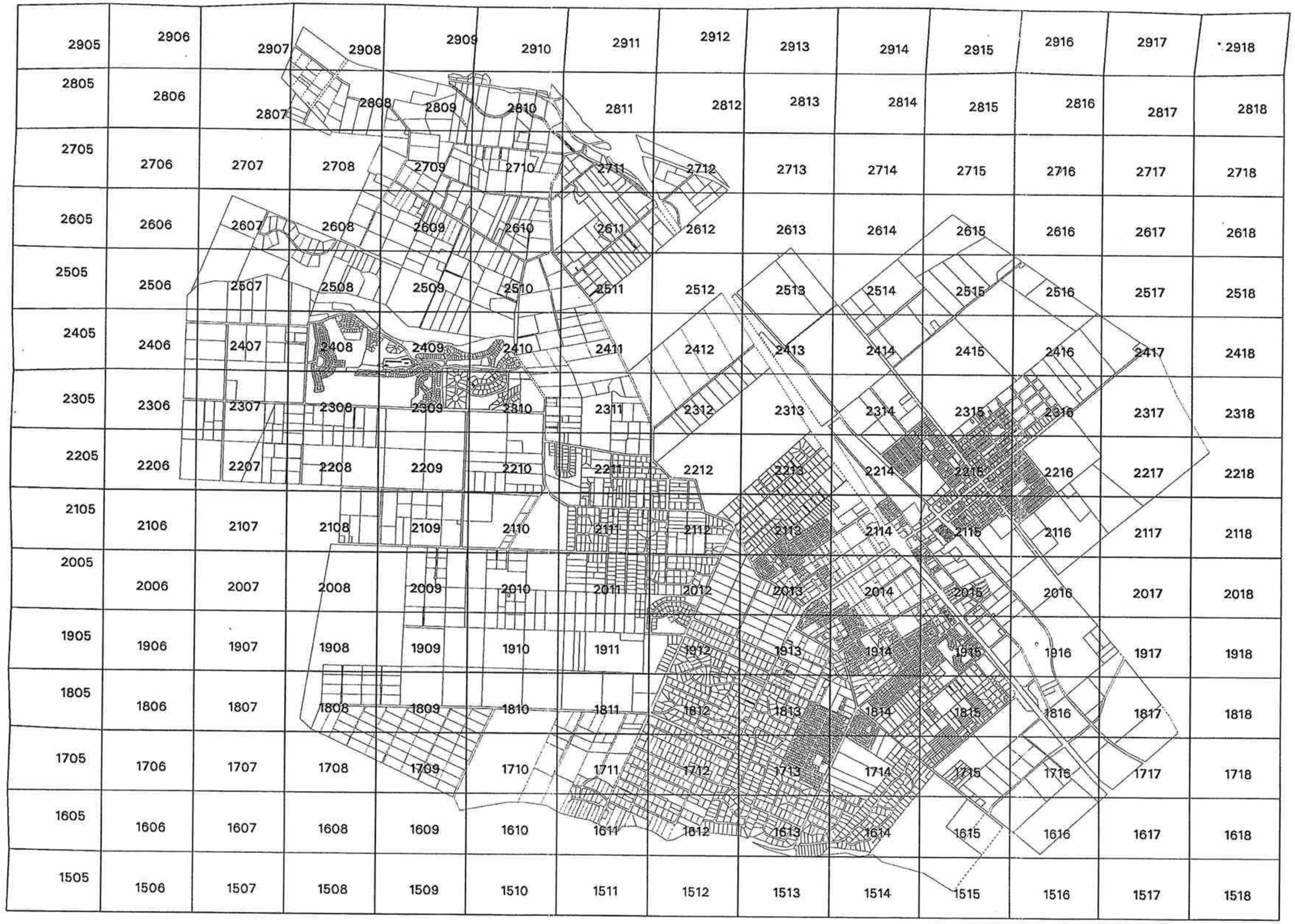
As the vast majority of hydrants are Class AA (light blue), it is recommended that the District begin color coding the remaining 72 hydrants first, with the understanding that un-coded hydrants are Class AA.

References

Designing Water & Hydrant Systems website:
www.firehydrant.org

NCSD Fire Hydrant Color Coding Results

Count of WHY	HYDRANT_COLOR_FLOW_CODE						
GRID_NO	Abandoned	Green	Light Blue	N/A (Outside Dist	Orange	Red	Grand Total
1713				2			2
1714			1	1			2
1715			7				7
1813			5	4			9
1814			22	1			23
1815	1		11				12
1816	1		2				3
1912			8				8
1913			23				23
1914	4		42				46
1915	2		40				42
2010			2				2
2011			10				10
2012			14				14
2013	1		31				32
2014		1	21				22
2015			12				12
2110	3						3
2111	5		21				26
2112	3		17				20
2113	1		21				22
2114			26				26
2115	6		29				35
2116			7				7
2206				1			1
2208			1				1
2209			13				13
2210			4				4
2211	3		10				13
2212	1		5				6
2213	1		11				12
2214	1		8				9
2215	1		24				25
2216			13				13
2308			6				6
2309			15				15
2310	1		13				14
2311			4				4
2312			1				1
2314			3				3
2315			2				2
2408			22				22
2409			11				11
2410			6				6
2417						1	1
2510		3					3
2511		4			3		7
2609					6		6
2610		4			9		13
2611					4		4
2612					1		1
2708					6		6
2709					11		11
2710					7		7
2711					10		10
2809					2		2
Grand Total	35	12	544	9	59	1	660



GRID INDEX	SCALE: 1" = 200' NOT FOR CONSTRUCTION USE		WATER BOOK		REV. DATE: JAN 2002	GRID INDEX

Appendix C: Technical Memorandum 3:

Electric to Natural Gas Conversion

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SURVEYORS

Technical Memorandum

July 30, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813
Rebekah Oulton, RME 30480

Subject: Technical Memorandum 3: Electric to Natural Gas Conversion

NCSD is interested in looking at the cost effectiveness of converting the Eureka Well from electric to natural gas. This memo examines the usage requirements for that well and associated operations and maintenance costs for both electric- and natural gas-driven pumps.

The Eureka well is located near Highway 1 and Willow Road. The pump is driven by a 200 HP motor, which ran approximately 1030 hours in 2006 according to SCADA data and PG&E usage records. The table below shows a monthly usage and cost breakdown.

Month/Year	KWH	Electric Costs ($)
November 2005	59,560	6,131.79
December 2005	40,800	4,782.83
January 2006	34,960	4,235.81
February 2006	2,240	1,658.53
March 2006	2,160	1,662.83
April 2006	200	1,540.53
May 2006	240	701.05
June 2006	7,160	1,608.70
July 2006	58,440	10,128.40
August 2006	37,640	8,055.22
September 2006	27,960	6,091.54
October 2006	54,040	8,964.38
Annual Total	325,400	$55,561.61

The table shows an average cost of $0.1707 per kwh. Given an average pumping rate of 900 gpm, the Eureka well produced approximately 170 acre-feet of water in 2006. Neglecting maintenance and staffing costs, this is a cost of approximately $325/acre-foot.

Natural gas engines can offer several advantages over electric motors for water pumping. One primary advantage is the reliability of the power source. Natural gas supply lines are typically less prone to failures than electrical supply. For a municipal water supplier, reliability is an essential consideration. Having some wells on natural gas provides a system safeguard in the event of an electrical blackout.

Natural gas engines can also offer financial advantages in terms of decreased fuel costs. Disadvantages of natural gas engines typically include increased upfront costs and additional maintenance requirements. These costs can offset some of the fuel cost advantage.

364 Pacific Street
San Luis Obispo, CA 93401
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Another potential advantage of natural gas engines is flexibility of operation. The electric motor is on a time-of-use meter, making it more expensive to operate during certain times of the day. There is no time-of-use charge for natural gas. NCSD operations staff has expressed a preference to operate the Eureka well full time (24 hours per day, seven days per week) from May through October, parallel with the Sundale well. Under this scenario, approximately 720 AFY would be produced. Note that increased operation of the Eureka well on natural gas would also allow decreased usage of other electric wells in the system.

The table below shows a comparison of costs for production of 720 AFY. The table shows three costs for production of 720 AFY: the current scenario (electric-only), a hybrid scenario where the Eureka well is operated under the current hours on gas only to produce 170 AFY, while the remaining 550 AFY are still pumped via existing electric motors, and the proposed scenario (gas-only). Electric costs for other motors in the system are assumed to be comparable to those of the current Eureka well.

Typical costs for installing a 225-HP engine are approximately $70,000, including an enclosure and hospital muffler for noise abatement, in consideration of the surrounding residential neighborhoods. An additional contingency of 50% is included for budgeting purposes, bringing the approximate cost for the project to $105,000.

	Electric			Natural Gas			Total			Savings	Pay-back (yrs)
	AFY	Cost	$/AF	AFY	Cost	$/AF	AFY	Cost	$/AF		
Scenario 1 (elec. only)	720	96,120	133	0	0	0	720	96,120	133	--	--
Scenario 2 (hybrid)	550	73,150	133	170	19550	115	720	92,700	129	$3420	30.7
Scenario 3 (gas only)	0	0	0	720	82,000	115	720	82,000	115	$14,120	7.4

Natural gas costs were provided by The Gas Company. The size and preferred operating usage data for the Eureka well was provided to The Gas Company for use in preparing a preliminary cost analysis. A cost analysis was prepared to compare a gas engine to an electric motor also operating under the preferred operating scenario, and these values were used in the calculations above. Note that gas costs may be highly volatile, following fluctuations in the overall energy market. Costs shown above should be considered an estimate, not a guarantee of savings.

Except in the case of a pump overhaul, electric motors rarely require maintenance, so these costs are considered negligible for purposes of this analysis. The natural gas costs above include $0.02/hphr for maintenance costs for the gas engine. This is a typical estimate for maintenance costs for this size engine.

With this upfront cost and annual cost savings, an anticipated simple payback period for replacement of the Eureka well electric motor with a natural gas engine is approximately 7.4 years.

Appendix D: Technical Memorandum 4:

Water System Storage, Tank Mixing and Standpipe Tank Modifications

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Technical Memorandum

July 24, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: **Technical Memorandum 4: Water System Storage, Tank Mixing and Standpipe Tank Modifications**

NCSD utilizes six storage tanks to store approximately 3.7 million gallons (MG) of potable water throughout its distribution system: four tanks (3 MG total) at the N. Dana Foothill Road site (the Quad Tanks), one tank (0.4 MG) at the Blacklake site, and one tank (0.3 MG usable) at the Standpipe location (the Standpipe Tank).

The majority of these storage tanks operate with a single pipeline location at the base of the tank for both filling and emptying, limiting opportunities for mixing within the tank. Maintaining proper mixing in tanks is important to minimize: thermal stratification within the tank, taste and odor problems, loss of chlorine residuals due to long detention times, and nitirification.

NCSD operations staff has identified the Standpipe Tank as having the greatest potential for mixing problems. Due to the elevation of the Standpipe Tank relative to the Quad Tanks and the single inflow/outflow piping configuration, there is minimal opportunity for mixing within the tank, potentially leaving approximately 60 feet of stagnant water within the tank (see Exhibit 4-A). In regard to the other tanks, NCSD operations staff has indicated that stratification and other problems related to inadequate mixing are not currently problems, mainly because of the manner in which the system is operated.

At the District's request, three tank mixing systems were reviewed for possible use at the Standpipe Tank (as discussed below) and in the remaining tanks in the future (if deemed necessary): the Solar Bee, the Tank Shark, and piping modifications.

- The Solar Bee is a solar-powered, self-contained floating unit which draws water up and releases it across the top surface of the water, allowing for mixing from bottom to top. (See attached brochure for more information.)
- The Tank Shark utilizes an external pumping mechanism to sample water and adjust treatment levels as necessary. The sampling/return/treatment process simultaneously accomplishes mixing. (See attached brochure for more information.)
- The proposed piping modifications consist of rerouting the existing inflow line so that it discharges into the top of the tank rather than the bottom. The resulting top-in/bottom-out design encourages mixing within the tank by creating a slight rotation in the water.

A comparison of these systems, along with summary of installed costs, is attached.

Per discussion with NCSD, both the Solar Bee and Tank Shark mixing systems were deemed too maintenance intensive to employ at this time. Should the District convert its disinfection system to chloramination (to be compatible with supplemental water from the State or the City of Santa Maria), use of one of these mixing systems may become necessary in several to all of the tanks, to minimize the development of disinfection byproducts associated with chloramination.

However, piping modifications to the Standpipe Tank should suffice to address current concerns regarding stagnant water in the tank. The proposed project modifications to the inflow line are shown on Exhibit 4-B.

Costs for the proposed Standpipe Tank modifications are estimated at $25,000 for Analysis and Design, $75,000 for Construction, and $50,000 for Contingencies, for a total of $150,000. The reason for the high estimates is the result of the uncertainties about whether or not the proposed inflow pipe can be mounted to the outside of the Standpipe Tank without affecting the tanks structural integrity. An independent support structure may need to be constructed, which is why the costs are high. The design costs include a structural analysis and determination about the tank's capabilities. The project costs will be significantly lower if the Standpipe Tank is deemed adequate to support the inflow pipeline.

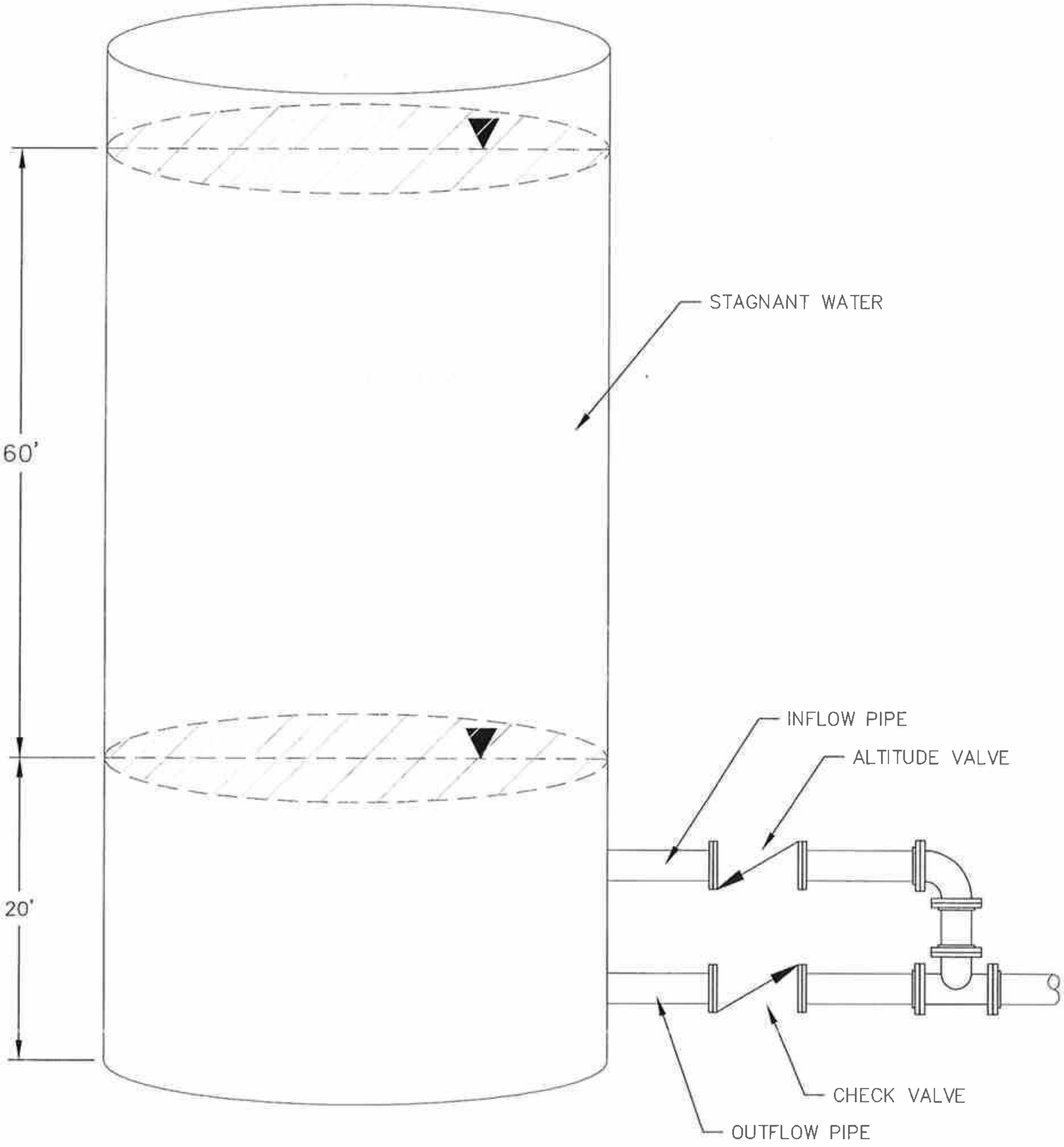

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FIGURE 4–A
EXISTING STANDPIPE TANK DESIGN

NIPOMO COMMUNITY SERVICES DISTRICT

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CHECKED BY JJS	SCALE N.T.S.	SHEET 1 OF 1

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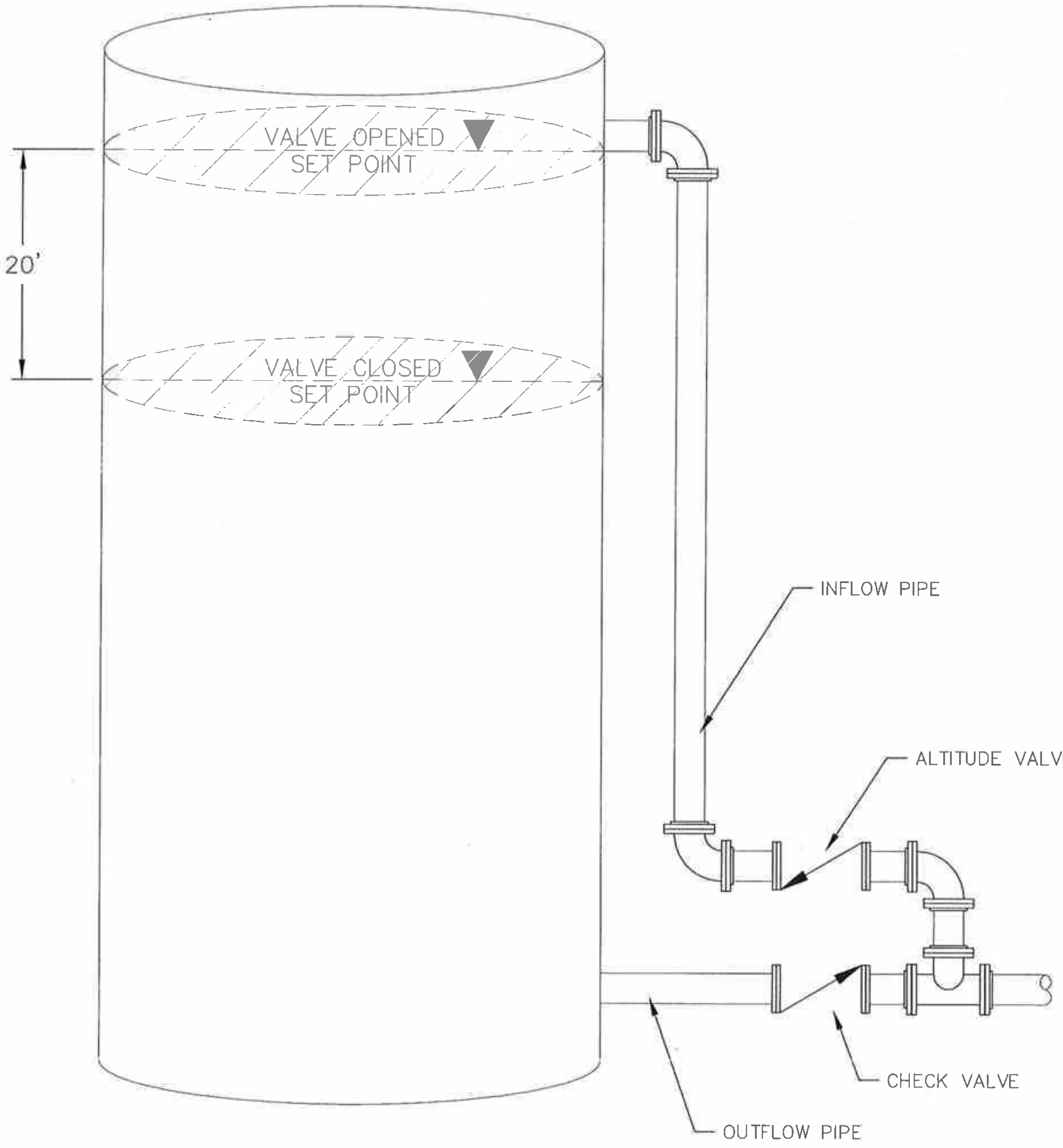

FIGURE 4–B
PROPOSED STANDPIPE INTAKE MIX DESIGN

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DRAWN BY JEJ	DATE MAY 2007	CA JOB NO. 060801
CHECKED BY JJS	SCALE N.T.S.	SHEET 1 OF 1

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Tank Mixing Syst… Comparison

	Solar Bee	Tank Shark	Piping Modifications
Cost Installed per Unit	$40,000	$25,000	$50,000 to $150,000
Installation Includes	Solar Bee System (optional chlorine injection system not included)	sample pump, PLC controller, Tank Shark and chlorine analyzer	Extension of existing inflow line to new discharge location at top of tank
Operating Cost	Solar Power therefore no energy costs.	Minimal depending on use of 1 hp pump for sample analysis and whether booster pump is onsite or not	None
Flow Rate	14.4 mgd or 10,000gpm (3,000gpm direct flow and 7,000 gpm induced flow).	15 gpm converted to 75 gpm upward flow	Same as current
Water Turnover Rate	1.8 mgd	Information not available from Supplier	Depends on flow in system
Life Expectancy	25 year life with no regularly scheduled maintenance.	7-10 years for pump, 25 year life for Tank Shark with annual nozzle inspection	Life of the Standpipe Tank
Staff Requirement	Installation - 2 Divers (or boat operators), 1 Engineer	Information not available from Supplier	Negligible
Warranty	Limited 2 year	3 year warranty, 6 mo guarantee	N/A
Pros	Non-Corrosive & Non-Contaminating (316 stainless steel and plastic parts)	NSF approved materials	No moving parts
	Thorough mixing of entire tank	Thorough mixing of entire tank	Thorough mixing of entire tank
	Brushless motor, no gearbox or motor oils	No moving parts	Least maintenance intensive option
	Self adjusts with water depth	Submersible or Suspension system	Requires no changes to current operation
	Still functions if reservoir is taken offline	Still functions if reservoir is taken offline if using own pump	
	Can be equipped with Chlorine injection and analysis system	Can be equipped with Chlorine injection and analysis system	
	Energy Efficient	Less expensive alternative	
Cons	Moving Parts	Low flow leads to poor mixing	Most exensive upfront cost, although costs may be substantially lower than estimate
	Requires more maintenance	Requires more maintenance	
	Solar Panels failure could be costly	High energy loss due increase pumping pressure	
	More expensive alternative	Can affect flow patterns throughout distribution system	

SolarBee®
Solar-Powered Reservoir Circulator
"Quality Water, Naturally"

Call 866-437-8076 for information on improving the water quality in your pond, lake, or reservoir.

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- Photos
- Installation / Service / Testing
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- Submit Information

Stagnation in Potable Water Storage Reservoirs Can Cause:

- Loss of residual chlorine leading to excess chlorine usage and disinfection by-products.
- Thermal stratification, which reduces the mixing effect of normal inflow and outflow.
- Nitrification associated with chloramine.
- Excessive ice buildup in cold climates.

View our 3 minute video on using SolarBees in potable water reservoirs.

San Francisco Public Utilities Commission (SFPUC) - 2002-2004 SolarBee Mixer Study (Evaluation of the SolarBee for use in potable water reservoirs). Summary, Full PDF (2.3 MB) **Appendix** PDF (16.7 MB)

Breakpoint Chlorination Information PDF (2 MB)

Lowering SB1250v12PW into reservoir

Installation of SB1250v12PW into a potable water tank

- for Quotation (English/French)
- Contact Us

SolarBee, Inc.
PO Box 1930
530 25th Ave E
Dickinson, ND 58601

+1 866 437 8076
+1 701 225 4495
Fax +1 701 225 0002

In business since 1978

International Locations

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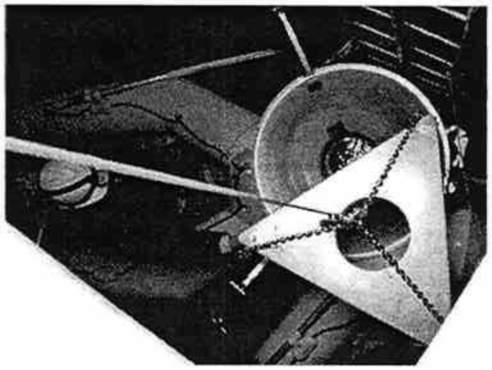
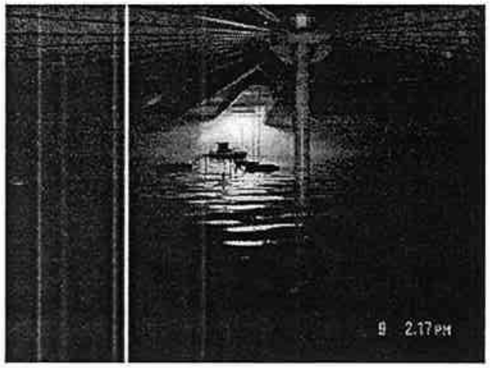
Europe - London
8 The Square
Stockley Park
Uxbridge Middlesex
UB11 1FW
Phone +44 208 610 6036

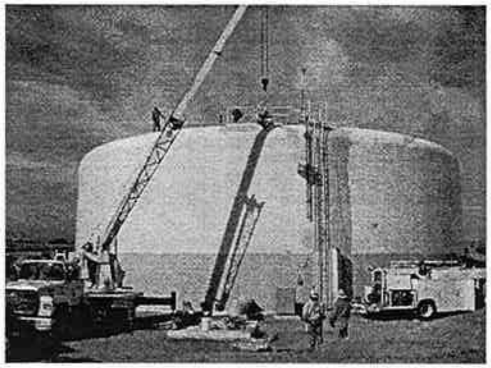
SB1250v12PW machine inside a 2 MG tank.



Crane, raising installation equipment to top of tank



Remote solar panel configuration for the SB1250v12-PW unit on a potable water reservoir



One of six installation crews

Fax +44 208 610 6057

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+61 4 1913 6853
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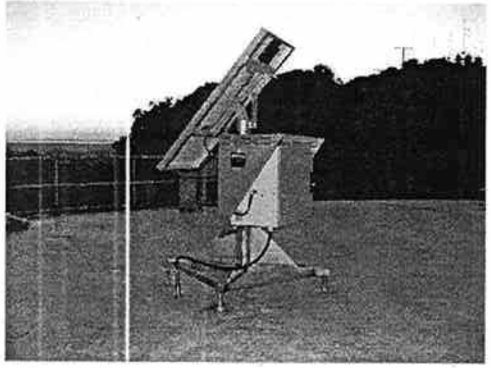
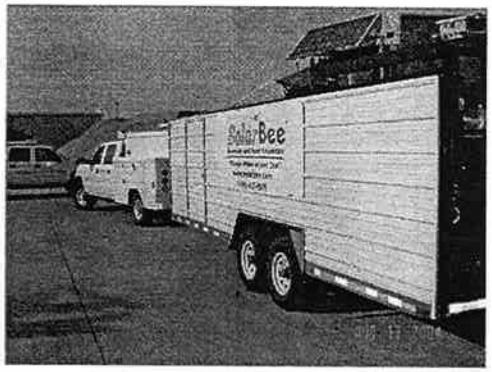
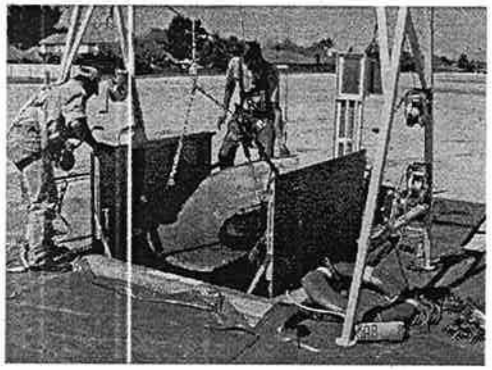
Fax: +86 25 83534339

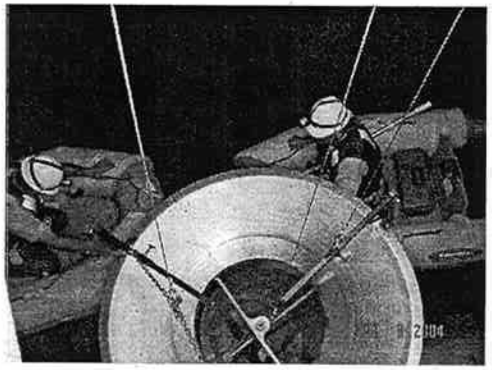




Lowering SB100002PW dish half through hatch of a 27MG underground reservoir with A-frame and winch system

SB10000PW dish halves lowered in place and assembled, hose assembled to dish, ready for final assembly and unit placement





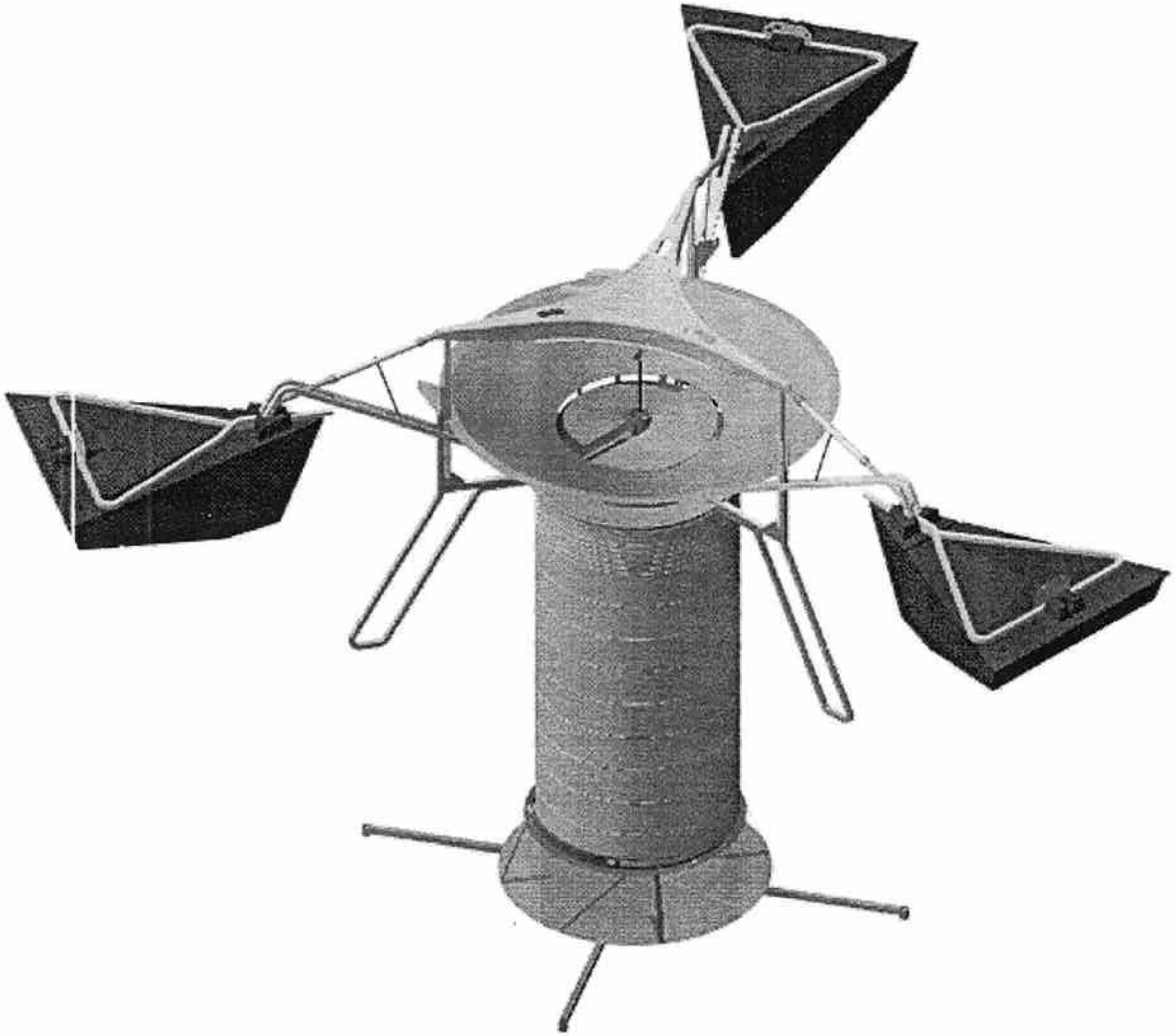
SolarBee Benefits in Potable Water Reservoirs:

Various SolarBee Models Available	Models are available for **reservoir volumes of 0.04 to 40 million** gallons per SolarBee. This flexibility allows us to select the best equipment for your reservoir.
Near-Laminar Flow Pattern	The SolarBee thoroughly mixes the >> entire reservoir, reaching all the dead spots, even in large reservoirs with >> hundreds of support

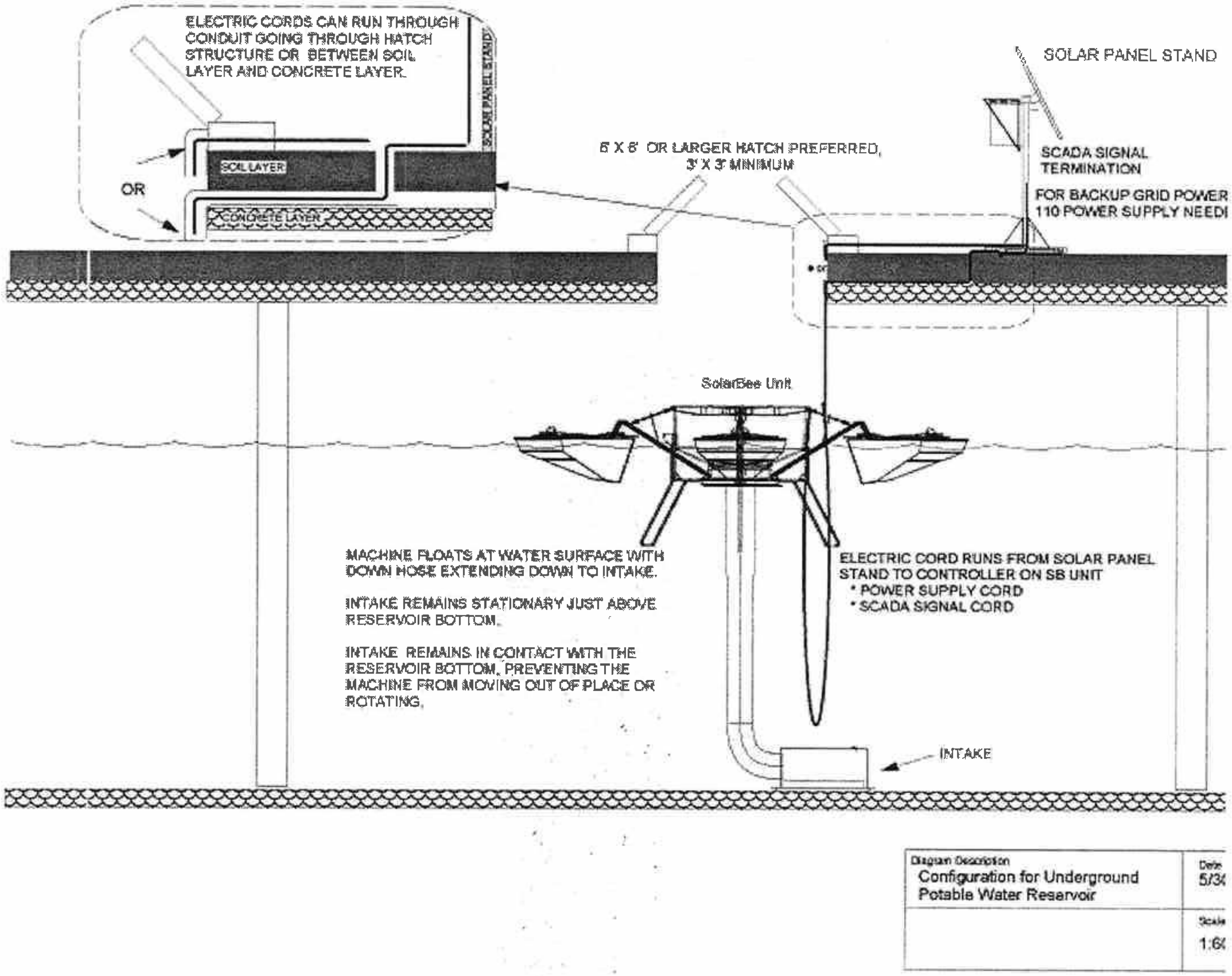
	columns. Breakpoint chlorination can be accomplished by >> injecting chlorine into the SolarBee intake area.
Inexpensive to Operate	The SolarBee has **little or no energy cost**, a **25 year expected life**, and **virtually no maintenance**. It comes with a **two year parts and labor warranty**.
Self Adjusting for Reservoir Level	The SolarBee flotation system, together with the variable length intake hose, **self adjusts at all times for peak performance regardless of water depth** in the reservoir. No other mixing system does this.
Little or No Infrastructure Expense	Although the various models range from 10 to 16 ft in diameter when fully assembled, the SolarBee's design allows it to be disassembled and brought into the reservoir through a 2 ft x 2 ft opening. Trained factory technicians perform installations. Installation is typically within 4-6 weeks of the order date.
Materials of Construction	SolarBee circulation equipment are constructed of materials that meet NSF/ANSI Standard 61 for materials in contact with drinking water. NSF/ANSI Standard 61 certification is pending.
Compared to Nozzle Systems	**Unlike nozzle devices** applied to the inflow-outflow piping, the SolarBee causes **no detrimental effect on system flow rate** capability, **no loss of energy at the nozzle**, **no losses in pump efficiency**, and **no changes to other distribution system characteristics**. Also, by definition, when extra mixing is needed the most is when there is very little flow available to make the nozzle system perform at all.
Compared to Turbulent Mixers	**High speed turbulent mixers** have a very short distance of influence unlike the SolarBee which **mixes the entire reservoir**. The SolarBee has **far less electrical and maintenance costs**, and there is **no high voltage** in the reservoir. Also, the SolarBee has **stainless steel construction** instead of cast iron, and the SolarBee is **not subject to problems of cavitation or being run dry**.
Options	The SolarBee can be equipped with **SCADA** output signals, a **chlorine**

Available	**injection** system, and with **various solar and 24-hour power kits** as needed depending on reservoir characteristics.

SB10000v12PW



SB5000v12PW - SB1250v12PW



Tank Water Quality Management System

The Tank Shark

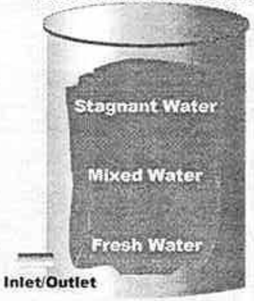
The Tank Shark optimizes water chemistry and quality within large bodies of potable or reuse water such as municipal water reservoirs.

Large water reservoirs are prone to water quality problems as they are typically stagnant with as little as one to two percent turnover per day. This lack of turnover allows for biological re-growth, nitrification, and temperature stratification. These factors can all compound to produce a poor or even unhealthy water quality leading to consumer complaints and related water quality issues within the distribution system.

The Tank Shark process has four major functions within a large body of water:

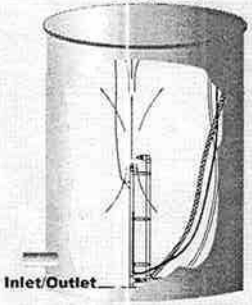
1. **Mixing in order to achieve a homogenous solution.**
2. **Mixing to eliminate temperature stratification.**
3. **Sampling of mixed water and chlorine residual analysis.**
4. **Chemical injection directly within the flowing mixed water to allow for re-chlorination and improved water quality.**

Before The Tank Shark



Stratification

After The Tank Shark



Mixed Water

The Tank Shark apparatus utilizes one or more 15 GPM multiplicative eductor nozzles placed within three to five feet of the base of the tank causing an upward flow of water equal to approximately five times the nozzle flow.

This upward flow of water causes mixing of the water volume in three distinct ways:

1. Direct addition of motive energy at the 15 GPM nozzle utilizing a 50 PSI pressure differential. This nozzle energy is converted into a 75 GPM upward flow.
2. This upward flow of water not only provides axial thrust, but also provides a rotational characteristic to the upward flowing stream.
3. The nozzle motive energy functions to move colder water from the base of the reservoir up to and on top of the warmer stratified layers. This thermal disruption causes additional mixing beyond the energy associated with the nozzle itself.

If the residual analysis determines deficiency in chlorine or ammonia either or both chemicals are then injected into the 75 GPM upward flowing stream of water for dilution and mixing within the tank volume.

A sample line is connected from the submerged apparatus to a rotary gear pump located outside of the tank capable of drawing 0.25-0.75 GPM of representative water from the tank. The sample is then driven to a chlorine residual analyzer where a determination of water quality is made on a continuous basis

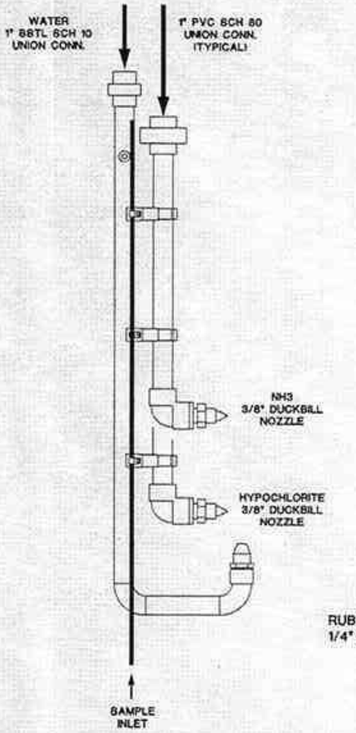
The Tank Shark process is completely compatible with bulk and onsite generated hypochlorite. When chloramine delivery is a requirement, aqueous ammonia with PSI's proprietary chiller apparatus is the feed stock of choice.

psi process solutions, inc.

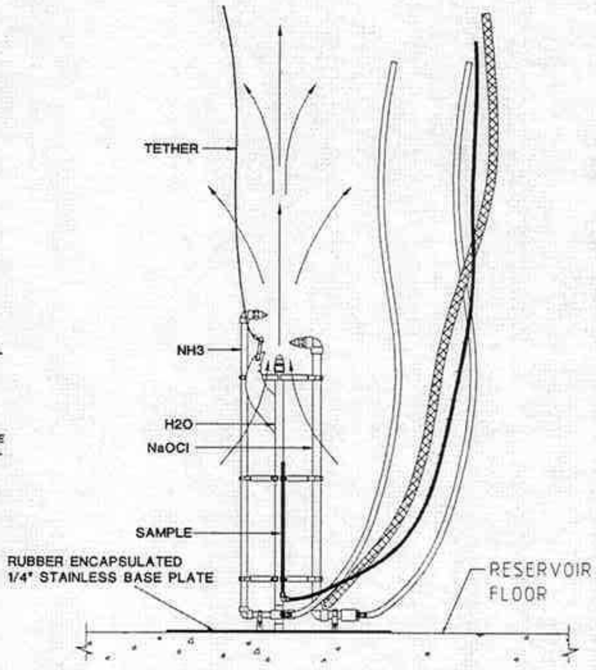
The two primary application scenarios for **The Tank Shark** are:

1. **Suspension of the nozzle assembly from the reservoir roof near an access hatch.**
2. **Direct submersion of the weighted Tank Shark frame into the reservoir, which also allows for remote placement and retrieval.**

Suspension Tank Shark



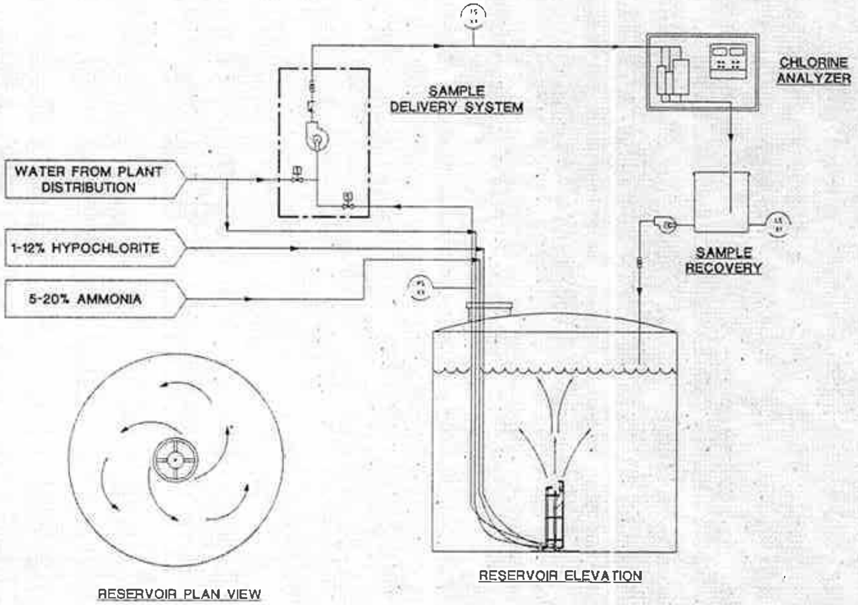
Submersible Tank Shark



Each application scenario will provide all of the intended benefits while the submersible model allows for remote positioning of The Tank Shark via pre-positioned anchors and stainless steel guide cables.

The Tank Shark
Tank Water Quality Management System

The Tank Shark mixing apparatus can be utilized in several different formats consisting of one or more nozzles located at strategic locations within the reservoir.



Unlike competitive processes, **The Tank Shark** requires no pumps, motors, or electrical supply within the reservoir itself. In addition, all submerged or wetted components are NSF approved.

Represented by:

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WATER AND WASTEWATER TREATMENT TECHNOLOGIES
560 Division Street, Campbell, CA 95008
Telephone: (408) 370-6540 Fax (408) 866-4660
Email: mail@4psi.net www.4psi.net

The Tank Shark
Tank Water Quality Management System
For Potable & Reclaimed Water

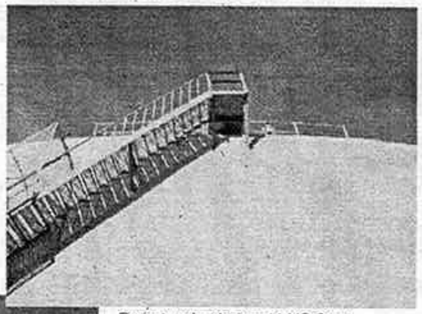
Eliminates

- Thermal Stratification
- Nitrification
- Low Residual
- Pumps within the Reservoir
- Electrical within the Reservoir
- Tank Penetrations
- Moving Parts
- Downtime

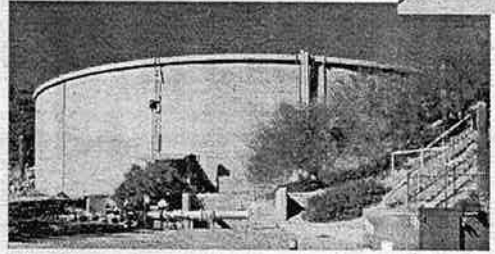
Benefits

- Realtime Residual Information
- Rechlorination Capability
- All NSF Approved Materials
- Constant Residual
- Guaranteed Performance

Many water storage facilities struggle with maintaining water quality within the storage vessel. Varying flow rates, stagnant zones and inconsistent chemical feed lead to poor water quality. Problems include temperature stratification, stagnation, and blending of different water qualities. **The Tank Shark** solves all of these problems with the simplest, most reliable and efficient process available.



Project under design: 11 MG Steel



Project under design: 1.5 MG Reclaim - Concrete

The Tank Shark maintains complete mixing of the tank while generating realtime water samples and automatic chlorine or chloramine injection to the desired levels. **The Tank Shark** accomplishes all of this without placing any mechanical or electrical equipment inside your water storage vessel. This allows for easy installation, operation and maintenance. With the exception of the chemicals to be injected, there are minimal operational costs associated with **The Tank Shark** operation.

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Appendix E: Technical Memorandum 5:

Summit Station Booster Pump

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Technical Memorandum

July 30, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: **Technical Memorandum 5: Summit Station Booster Pump**

The Summit Station area in the northern western portion of the NCSD currently experiences reduced water pressure due to its high elevation. This technical memorandum examines a proposed project to add a booster pump to the NCSD system, with the goal of increasing water pressure in the Summit Station area.

The Summit Station area is currently connected to the NCSD via a single 10" arterial water line that runs along Hetrick Avenue. Portions of the Summit Station area are higher in elevation than a majority of the NCSD system; consequently, residents in the higher elevation areas experience reduced water pressure, typically between 30 and 50 psi.

It is proposed to add a booster station to the system, located along Hetrick Ave. between the Standpipe tank and Summit Station Road, to raise the system pressure in the Summit Station area by up to 30 psi. This pressure increase would bring system pressures in the area to between 60 and 80 psi.

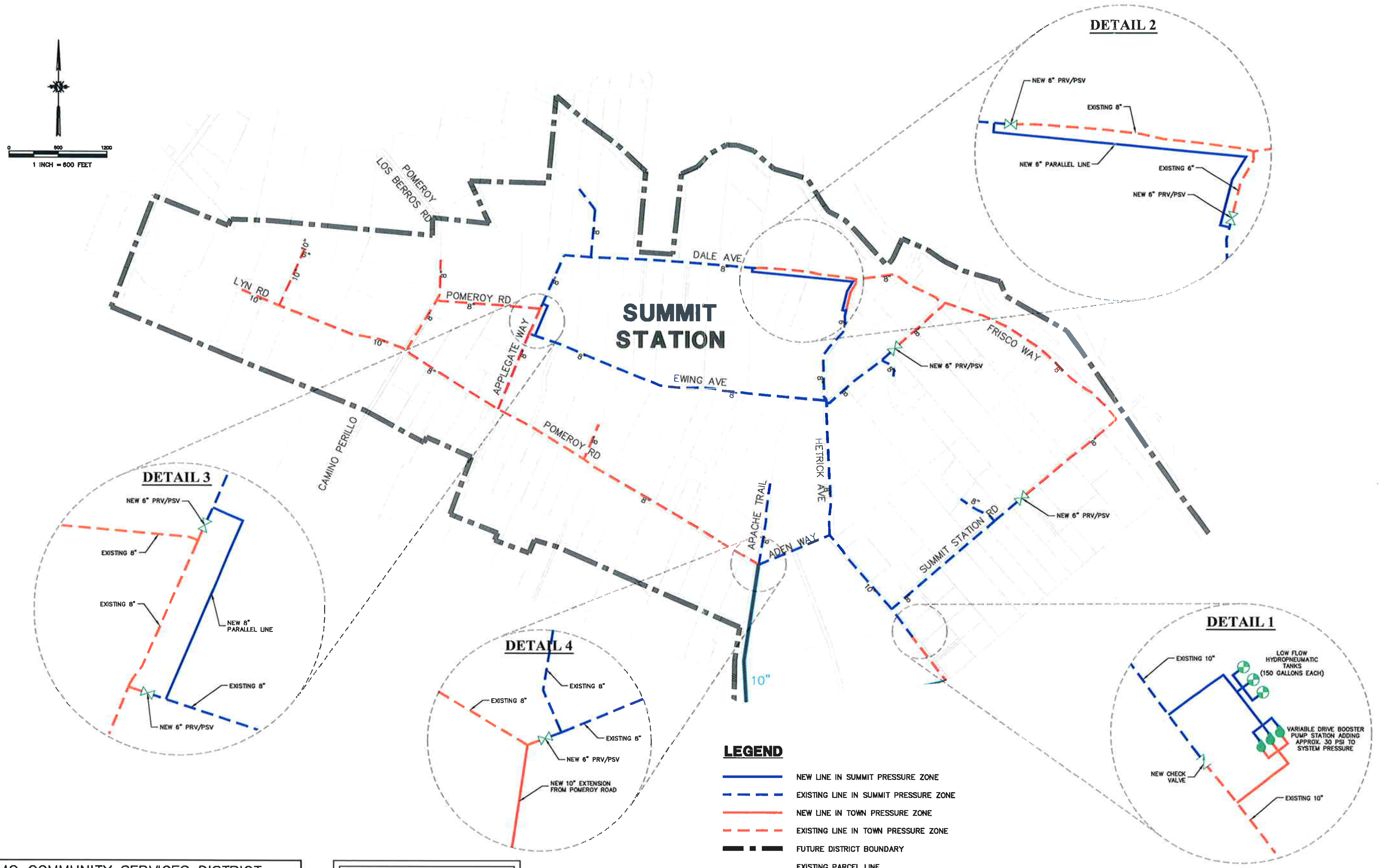
As shown on the attached exhibit, Figure TM5-1, the proposed project includes a tie-in to the existing system to redirect water to the new booster station (See Detail 1). The booster station itself includes redundant booster pumps to allow for maintenance, and low flow hydropneumatic tanks to maintain system pressures during low flow periods without the need to run the pumps. The project includes the addition of a check valve in the current 10" line so that, in the unlikely event of booster station failure, water continues to flow under current pressure conditions.

Note that this project also includes a total of seven pressure reducing valves within the Summit Station area distribution system (See Details 2, 3, and 4). Lower-elevation areas in Summit Station do not have pressure problems, so pressure reducing valves are required to maintain pressure in these areas below 80 psi. In the future, two additional lines are planned to connect these lower-level elevation areas to the main NCSD distribution system. Upon construction of these new connector lines, the pressure reducing valves would no longer be required.

Additionally, the proposed project includes two areas of parallel pipelines (See Details 2 and 3). These parallel lines are included to eliminate dead ends when the new connector lines are constructed.

The estimated cost for installation of the booster station and additional valves within the Summit Station distribution system is approximately $500,000. The table below provides a cost breakdown. Note that these costs do not include land acquisition.

Item	Description	Quantity	Unit	Unit Cost	Total Cost
1	10” PVC C900 Water Main	335	LF	$160	$53,600
2	8” PVC C900 Water Main	470	LF	$140	$65,800
3	6” PVC C900 Water Main	1785	LF	$120	$214,200
4	6” PRV/PSV Valve Assemply	7	Ea	$10,000	$70,000
5	10” Check Valve Assembly	1	Ea	$10,000	$10,000
6	Variable Feed Booster Pump Station and Hydropneumatic Tanks	1	LS		$85,000
			Budget Estimate		$500,000



LEGEND

- NEW LINE IN SUMMIT PRESSURE ZONE
- EXISTING LINE IN SUMMIT PRESSURE ZONE
- NEW LINE IN TOWN PRESSURE ZONE
- EXISTING LINE IN TOWN PRESSURE ZONE
- FUTURE DISTRICT BOUNDARY
- EXISTING PARCEL LINE
- ⋈ NEW PRESSURE REDUCING–SUSTAINING VALVE (PRV/PSV)
- NEW CHECK VALVE
- ◐ HYDROPNEUMATIC TANK
- ● BOOSTER PUMP (NATURAL GAS POWER)

NIPOMO COMMUNITY SERVICES DISTRICT

Cannon
ASSOCIATES
ENGINEERS
PLANNERS
SURVEYORS
364 Pacific Street
San Luis Obispo, CA 93401
(805) 544-7407

2007 WATER & SEWER MASTER PLAN UPDATE

FIGURE 5–1
SUMMIT STATION RECOMMENDED IMPROVEMENTS

OCTOBER 2007

BOUNDARY DISCLAIMER

THIS SURVEY WAS COMPILED FOR MASTER PLANNING PURPOSES ONLY. THE BOUNDARY INFORMATION SHOWN HEREON IS INTENDED FOR ORIENTATION ONLY AND SUCH IS NOT INFERRED OR IMPLIED TO BE A BOUNDARY SURVEY.

\\bender\public\prc • \060801\Civil\Design\Construction Drawings\CE68010EX004–WS–Summit.dwg 12–19–07 05:38:06 PM antho

Appendix F: Technical Memorandum 6:

County Drainage Projects, Impacts to NCSD Water System

Cannon
ASSOCIATES

ENGINEERS
PLANNERS
SURVEYORS

Technical Memorandum

July 30, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: **Technical Memorandum 6: Water System Impacts Due to County Drainage Projects**

San Luis Obispo County intends to complete six drainage system improvement projects within the next three years. Some of these projects will affect the NCSD water system by requiring either permanent pipeline relocation or a temporary system modification during construction.

This memo examines the planned County drainage projects, identifies potential impacts to the water system, and evaluates an estimated cost for each relocation or temporary modification.

The six County drainage system projects are described below and shown on the attached drawing sheets.

- **Project 1**, Tefft Street Box Culvert Improvements: Existing box culvert to be removed and replaced with double 5' high by 12' wide box culverts; existing grade & flowline to be maintained.
- **Project 2**, Thompson Avenue Arch Culvert Improvements: Existing box culvert to be removed and replaced with Contech arch culvert.
- **Project 3**, Mallagh Street Arch Culvert Improvements: Existing CMP pipe culvert to be replaced with Contech arch culvert. New structure will require additional depth beneath that of existing structure. Flow line to be maintained, but the footing for the arch culvert will be buried deeper.
- **Project 4**, Mallagh Street Box Culvert Improvements: Remove and replace existing dbl 36" rcp culvert with dbl 4' high by 3' wide box culvert. Also, abandon portion of existing 24" cmp and construct 24" HDPE culvert. New culvert will be buried 4" to 6" lower than current.
- **Project 5**, Burton Street Box Culvert Improvements: Remove and replace existing 48" CMP culvert with double 4' high by 5' wide box culvert.
- **Project 6**, Mallagh & Sea Street Pipe Culvert Improvements: Existing double 24" CMP culvert to be replaced with new triple 24" HDPE culvert. No changes to grade or depth of structure planned. *This project has been completed.*

As shown in the figures, the majority of projects have water lines within the immediate vicinity of the construction. However, in some cases those water lines are located at a height such that they are above or below the direct construction area, so permanent relocation may not be required.

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www.cannonassoc.com

Proposed projects were reviewed with Steve Jones of San Luis Obispo County staff and NCSD operations staff. The following potential impacts were identified.

Water System Impacts

Drainage Project	Water System Impact
1. Tefft St. Box Culvert Improvements	Existing 10" and 12" water mains to be relocated
2. Thompson Ave. Arch Culvert Improvements	Existing 6" water main to be relocated, currently hanging within planned culvert structure
3. Mallagh St. Arch Culvert Improvements	Existing water line in project area; will need to be relocated to accommodate new arch culvert
4. Mallagh St. Box Culvert Improvements	Existing 6" water line in project area will need to be relocated to accommodate new box culvert. No impacts anticipated for pipe culvert replacement.
5. Burton St. Box Culvert Improvements	Existing 6" water line in project area; will need to be relocated to accommodate new box culvert.

The District has retained Cannon Associates to prepare design plans for each of the locations requiring relocation. Working with NCSD staff, likely alternate permanent locations or temporary modifications for each project were identified. These proposed solutions were developed sufficient for estimating project costs for each project. Cost estimates are shown in the table below.

Project Location	Dia.	Unit	Quant.	$/Unit	Cost Estimate
Tefft St. Box Culvert	10	LF	150	$160	$24,000
Thompson Ave. Arch Culvert	8	LF	150	$140	$21,000
Mallagh Arch Culvert	8	LF	150	$140	$21,000
Mallagh Box Culvert	8	LF	150	$140	$21,000
Burton St. Box Culvert	8	LF	150	$140	$21,000
				Subtotal	*$108,000*

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1018,1055,1516,1057	300340	1	X

COUNTY OF SAN LUIS OBISPO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
DESIGN DIVISION

PLANS FOR THE IMPROVEMENT OF
STORM DRAIN CULVERTS
NIPOMO, CA
CONTRACT NO. 300340

To Be Supplemented By State Standard Plans Dated July, 1992.

APPROVED: xx ,20 xx

DEPUTY DIRECTOR OF PUBLIC WORKS – ENGINEERING SERVICES
R.C.E. 30789 (Exp. 3–31–2008)

COUNTY SURVEYOR'S STATEMENT

This map has been examined in accordance with Section 8766 of the Land Surveyor's Act this xth day of xxxx ,20 xx

L.S. 5171 (Exp. 6–30–2007)

SURVEYOR'S STATEMENT

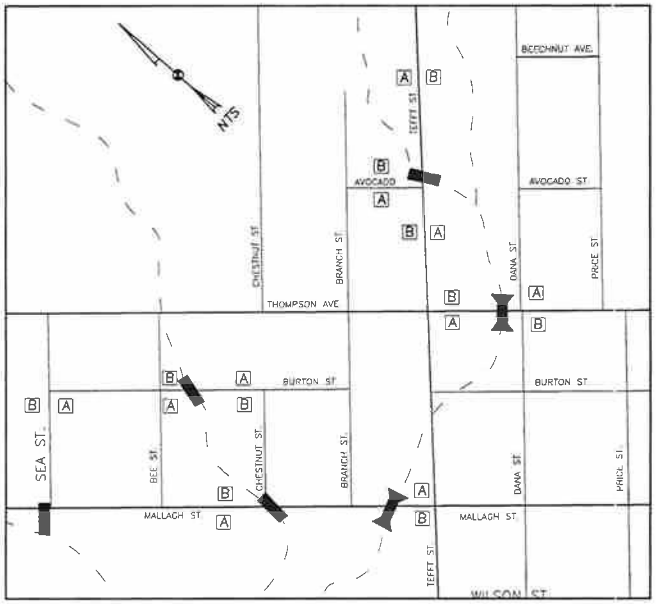
This map correctly represents a survey made by me or under my direction in conformance with the requirements of the Land Surveyor's Act at the request of COUNTY OF SAN LUIS OBISPO, in xxxxxxxxxx , 20 xx

L.S. 5171 (Exp. 6–30–2007)

LICENSE REQUIREMENTS

The successful bidder shall possess a Class A general engineering contractor's license at the time this contract is awarded. In the alternative, the successful bidder shall possess a specialty contractor's license at the time this contract is awarded that permits the successful bidder to perform with his or her own organization contract work amounting to not less than 50% of the original total contract price and to subcontract the remaining work in accordance with Section 8–1.01, "Subcontracting," of the Standard Specifications.

INDEX OF SHEETS



CONSTRUCTION AREA SIGNS PLAN

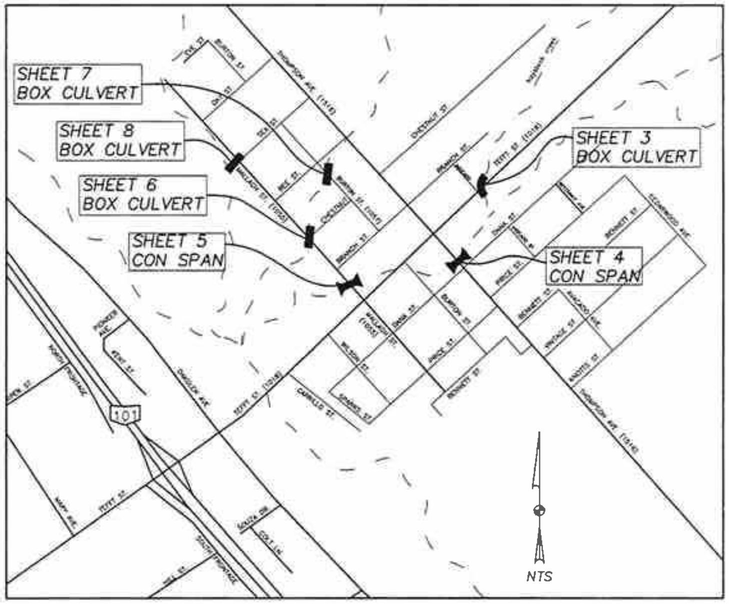
NO SCALE

CONSTRUCTION AREA SIGNS LEGEND

No.	Type	Size	Message	Quantity
A	C18	36"x36"	"ROAD CONSTRUCTION AHEAD"	10
B	C13	48"x18"	"END CONSTRUCTION"	10

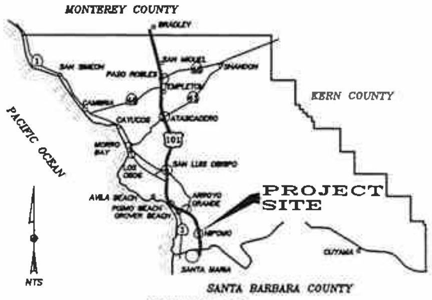
1.) ALL SIGNS SHALL BE STATIONARY MOUNTED ON 4x4 WOOD POSTS. UNLESS NOTED OTHERWISE

2.) ALL CONSTRUCTION SIGNS SHALL BE PLACED APPROXIMATELY 4' OFF THE EDGE OF ROADWAY, 7' MIN. HEIGHT, THE EXACT LOCATION AND POSITION OF SIGNS SHALL BE DETERMINED BY THE ENGINEER.



LOCATION MAP

NO SCALE



VICINITY MAP

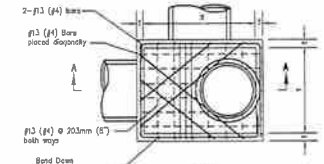
No Scale

STORM DRAIN CULVERT IMPROVEMENTS
TITLE SHEET
OLDE TOWNE NIPOMO

Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	10/2006	S. JONES	10/2006	L. GIBSON	10/2006

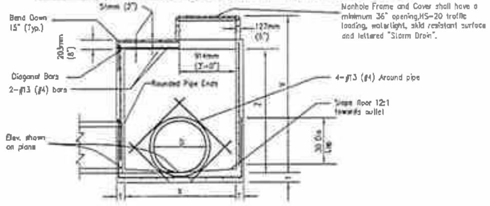
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1018,1055,1516,1057	300340	2	X



PLAN

TYPE	PIPE DIA	X	Y	Z
A 4	up to 991mm (39")	1.22m (4')	1.22m (4')	1.83m (6')
A 5	1.1m (42" to 1.22m (48")	1.52m (5')	1.22m (4')	1.83m (6')
A 6	1.30m (51") to 1.50m (60")	1.83m (6')	1.22m (4')	1.83m (6')
A 7	1.60m (63") to 1.80m (72")	2.13m (7')	1.22m (4')	2.13m (7')
A 8	1.90m (75") to 2.13m (84"	2.44m (8')	1.22m (4')	2.44m (8')



SECTION A-A

NOTES

1. See Section 10.____ of the Standard Specifications, Section 10 for additional notes and details
2. Concrete base shall be 332kg/M3-C-22Mpa (560-C-3250)
3. All precast components shall be reinforced with 6.35mm (1/4") diameter steel, wound spirally on 102mm (4") centers.
4. All joints shalle be set in Class C mortar
5. Maintain 38mm (1 1/2") clear spacing between reinforcing and surface unless otherwise noted.
6.Exposed edges of concrete shall be rounded with a radius of 13mm (1/2")
7. Pinkerton A-640 with skid resistand surce, side pry hole, and HS-20 traffic loading, or approved equal, marked "Storm Drain".

STORM DRAIN CLEANOUT

NO SCALE

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

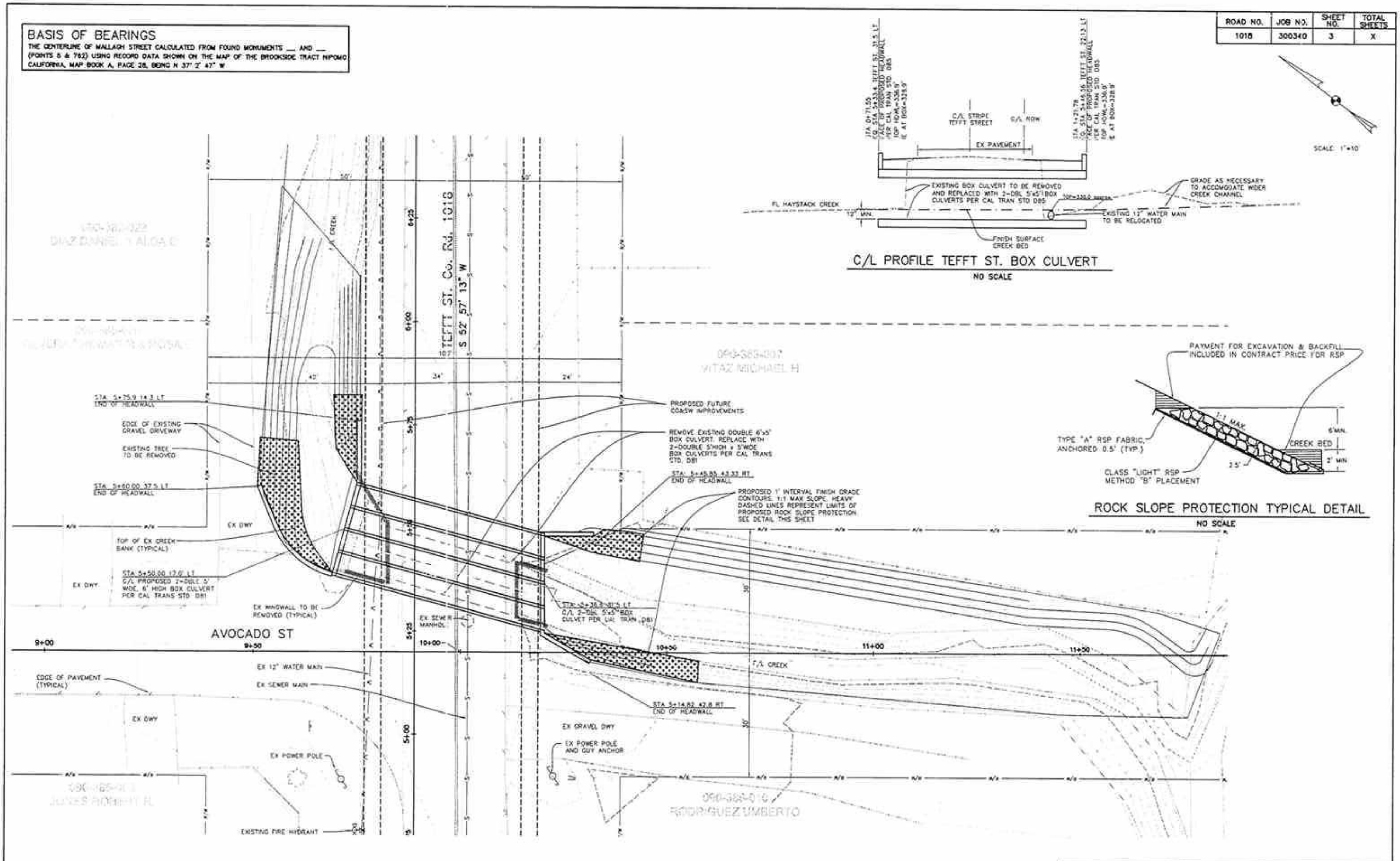
STORM DRAIN CULVERT IMPROVEMENTS
TYPICAL ROAD SECTIONS AND DETAILS
OLDE TOWNE NIPOMO

Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1018	300340	3	X

BASIS OF BEARINGS

THE CENTERLINE OF MALLAGH STREET CALCULATED FROM FOUND MONUMENTS __ AND __ (POINTS 5 & 762) USING RECORD DATA SHOWN ON THE MAP OF THE BROOKSIDE TRACT NIPOMO CALIFORNIA, MAP BOOK A, PAGE 28, BEING N 37° 2' 47" W



C/L PROFILE TEFFT ST. BOX CULVERT

NO SCALE

ROCK SLOPE PROTECTION TYPICAL DETAIL

NO SCALE

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

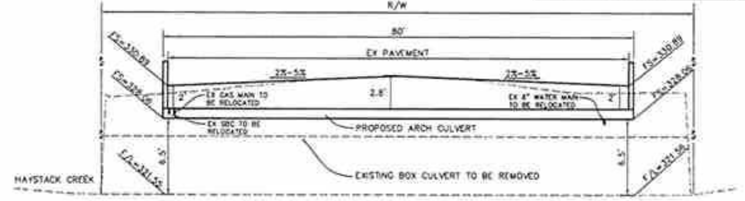
TEFFT STREET BOX CULVERT IMPROVEMENTS
PLAN AND PROFILE
OLDE TOWNE NIPOMO

Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1516	300340	4	X

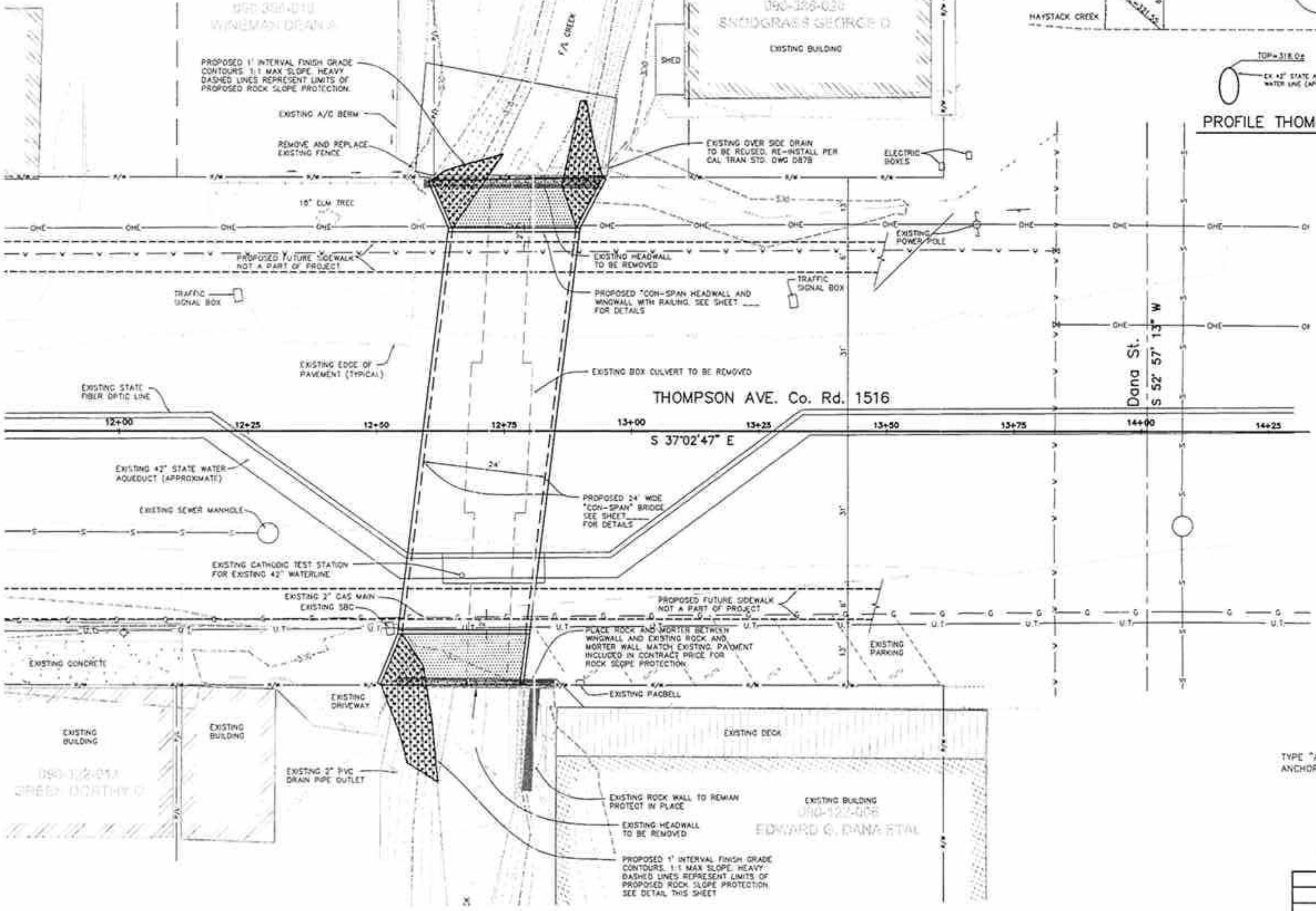
BASIS OF BEARINGS

THE CENTERLINE OF MALLAGH STREET CALCULATED FROM FOUND MONUMENTS __ AND __ (POINTS 5 & 762) USING RECORD DATA SHOWN ON THE MAP OF THE BROOKSIDE TRACT NIPOMO CALIFORNIA, MAP BOOK A, PAGE 28, BEING N 37° 2' 47" W.

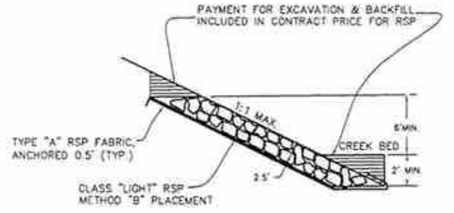


PROFILE THOMPSON AVE. ARCH CULVERT

NO SCALE



SCALE: 1"=10'



ROCK SLOPE PROTECTION TYPICAL DETAIL

NO SCALE

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

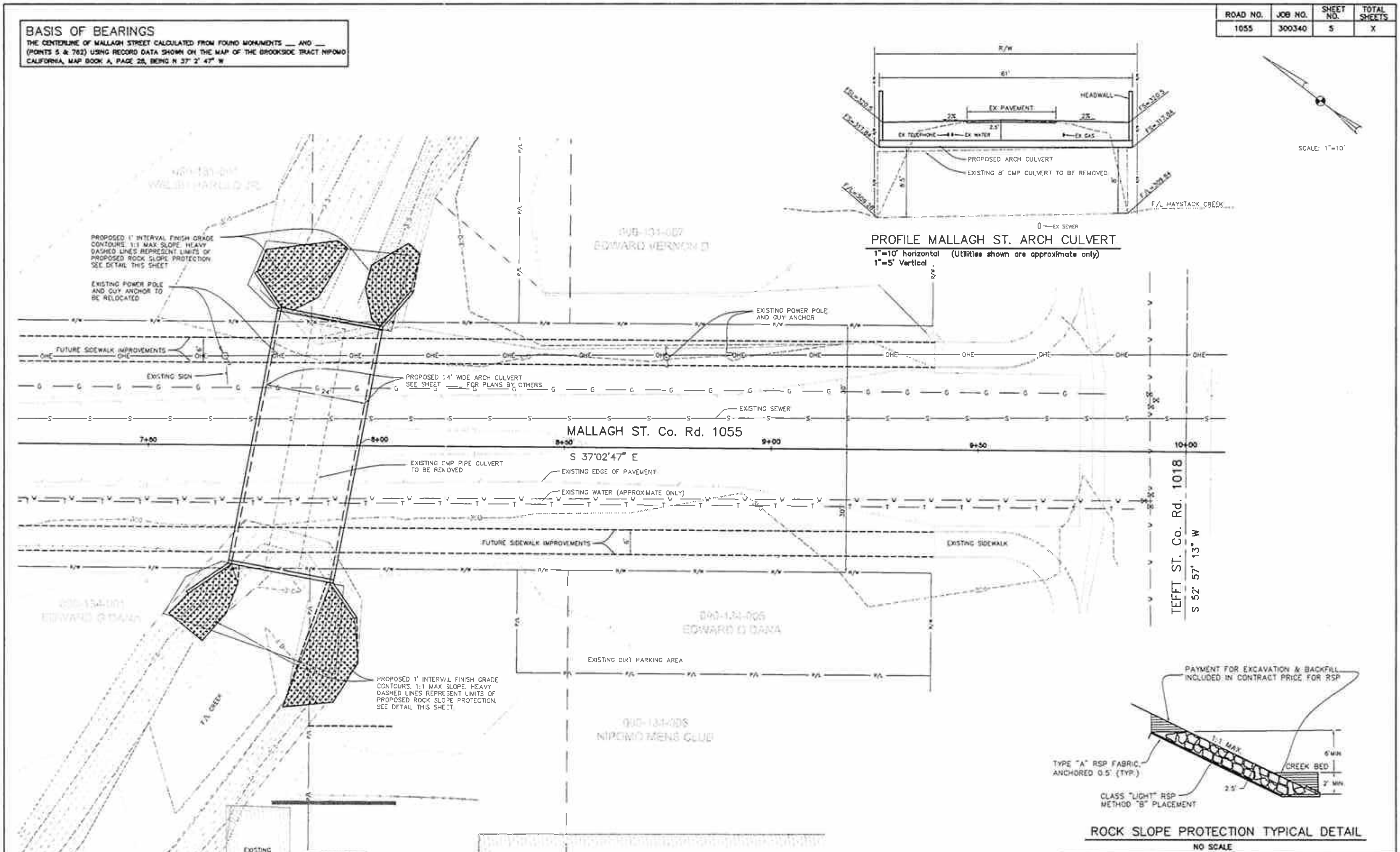
THOMPSON AVENUE ARCH CULVERT IMPROVEMENTS
PLAN AND PROFILE
OLDE TOWNE NIPOMO

Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1055	300340	5	X

BASIS OF BEARINGS

THE CENTERLINE OF MALLAGH STREET CALCULATED FROM FOUND MONUMENTS __ AND __ (POINTS 5 & 762) USING RECORD DATA SHOWN ON THE MAP OF THE BROOKSIDE TRACT NIPOMO CALIFORNIA, MAP BOOK A, PAGE 28, BEING N 37° 2' 47" W



PROFILE MALLAGH ST. ARCH CULVERT

1"=10' horizontal (Utilities shown are approximate only)
1"=5' Vertical

ROCK SLOPE PROTECTION TYPICAL DETAIL

NO SCALE

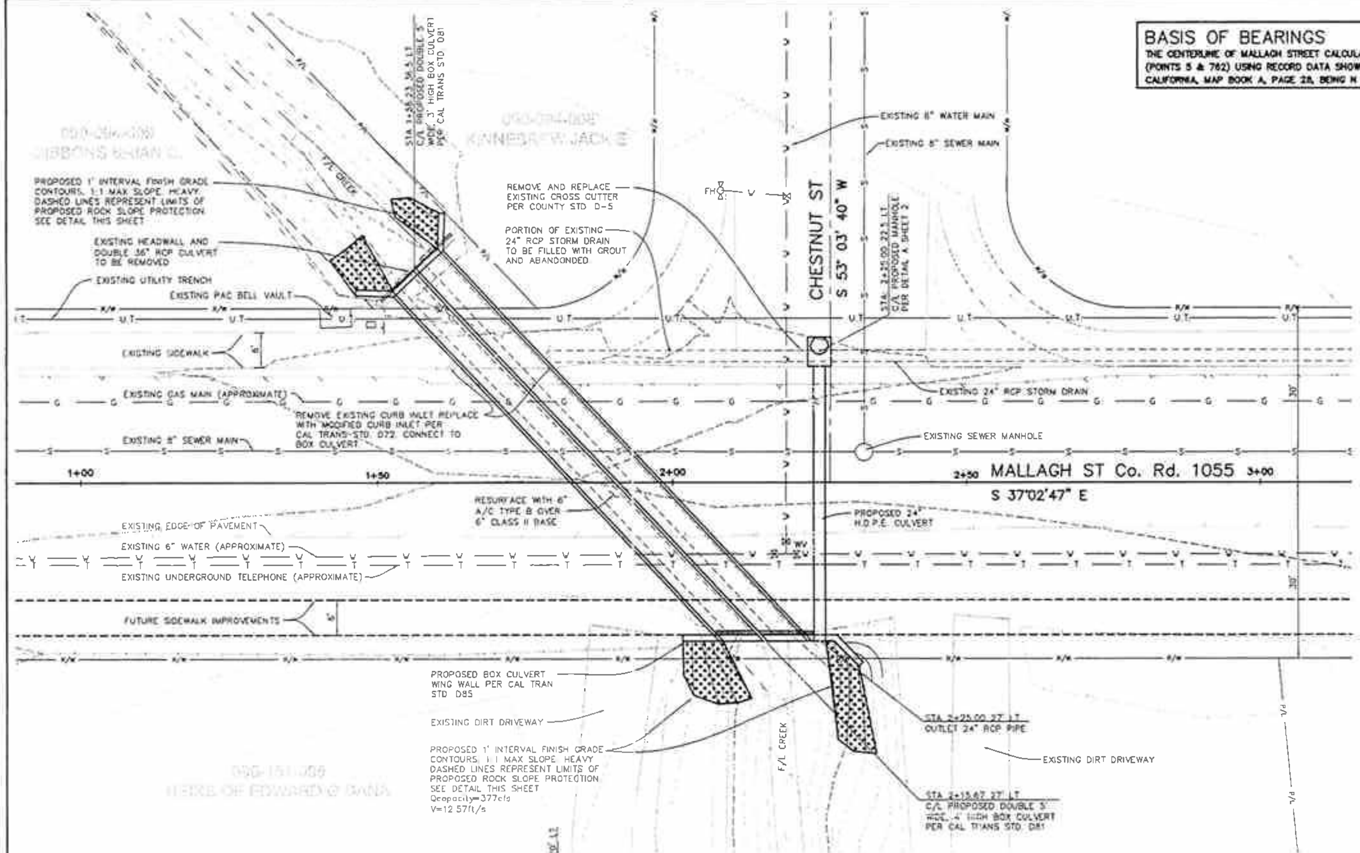
MALLAGH STREET ARCH CULVERT IMPROVEMENTS					
PLAN AND PROFILE					
OLDE TOWNE NIPOMO					
Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

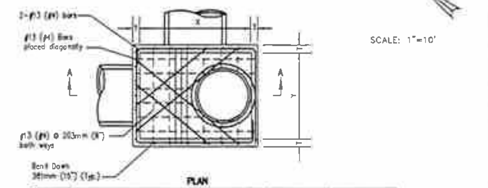
ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1055	300340	6	X

BASIS OF BEARINGS

THE CENTERLINE OF MALLAGH STREET CALCULATED FROM FOUND MONUMENTS __ AND __ (POINTS 5 & 762) USING RECORD DATA SHOWN ON THE MAP OF THE BROOKSIDE TRACT NIPOMO CALIFORNIA, MAP BOOK A, PAGE 28, BEING N 37° 02' 47" W

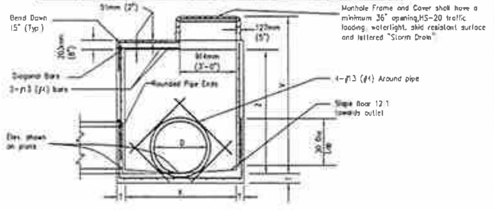


SCALE: 1"=10'



PLAN

TYPE	PIPE DIA.	X	Y	Z
A 4	up to 991mm (39")	1.22m (4')	1.22m (4')	1.83m (6')
A 5	1.1m (42" to 1.22m (48")	1.52m (5')	1.22m (4')	1.83m (6')
A 6	1.30m (51") to 1.50m (60")	1.83m (6')	1.22m (4')	1.83m (6')
A 7	1.60m (63") to 1.80m (72")	2.13m (7')	1.22m (4')	2.13m (7')
A 8	1.90m (75") to 2.13m (84")	2.44m (8')	1.22m (4')	2.44m (8')



SECTION A–A

NOTES

1. See Section 10.___ of the Standard Specifications, Section 10 for additional notes and details
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3. All precast components shall be reinforced with 6.35mm (1/4") diameter steel, wound spirally on 102mm (4") centers.
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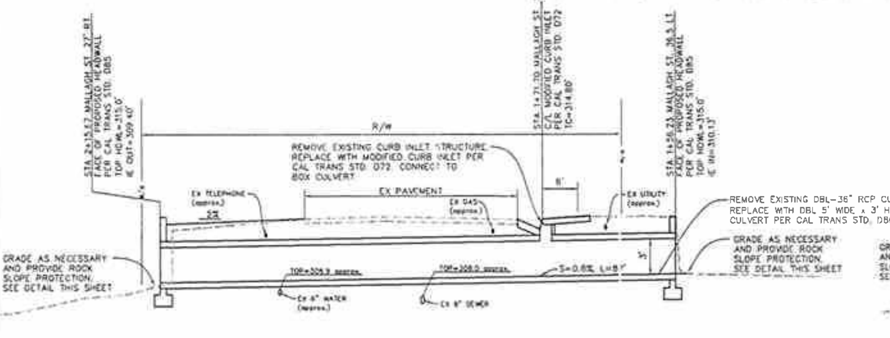
6. Exposed edges of concrete shall be rounded with a radius of 13mm (1/2")
7. Pinkerton A-640 with skid resistand surce, side pry hole, and HS-20 traffic loading, or approved equal, marked "Storm Drain"

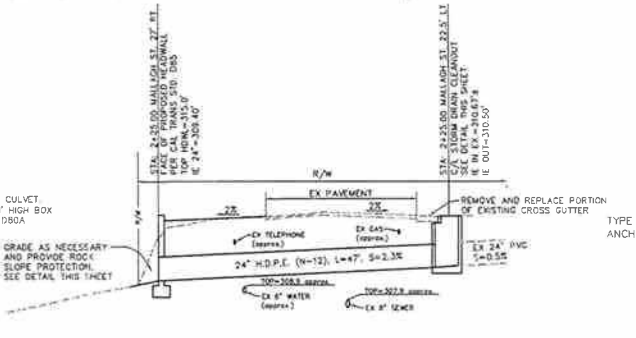
STORM DRAIN CLEANOUT

NO SCALE



PROFILE BOX CULVERT

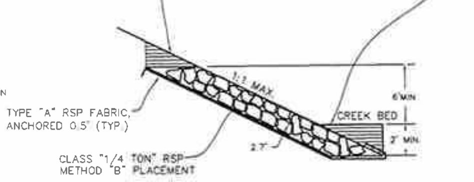
1"=10' horizontal (Utilities shown are approximate only)
1"=5' Vertical



PROFILE PIPE CULVERT

1"=10' horizontal (Utilities shown are approximate only)
1"=5' Vertical

PAYMENT FOR EXCAVATION & BACKFILL INCLUDED IN CONTRACT PRICE FOR RSP



TYPE "A" RSP FABRIC, ANCHORED 0.5' (TYP.)

CLASS "1/4 TON" RSP METHOD "B" PLACEMENT

ROCK SLOPE PROTECTION TYPICAL DETAIL

NO SCALE

MALLAGH STREET BOX CULVERT IMPROVEMENTS
PLAN AND PROFILE
OLDE TOWNE NIPOMO

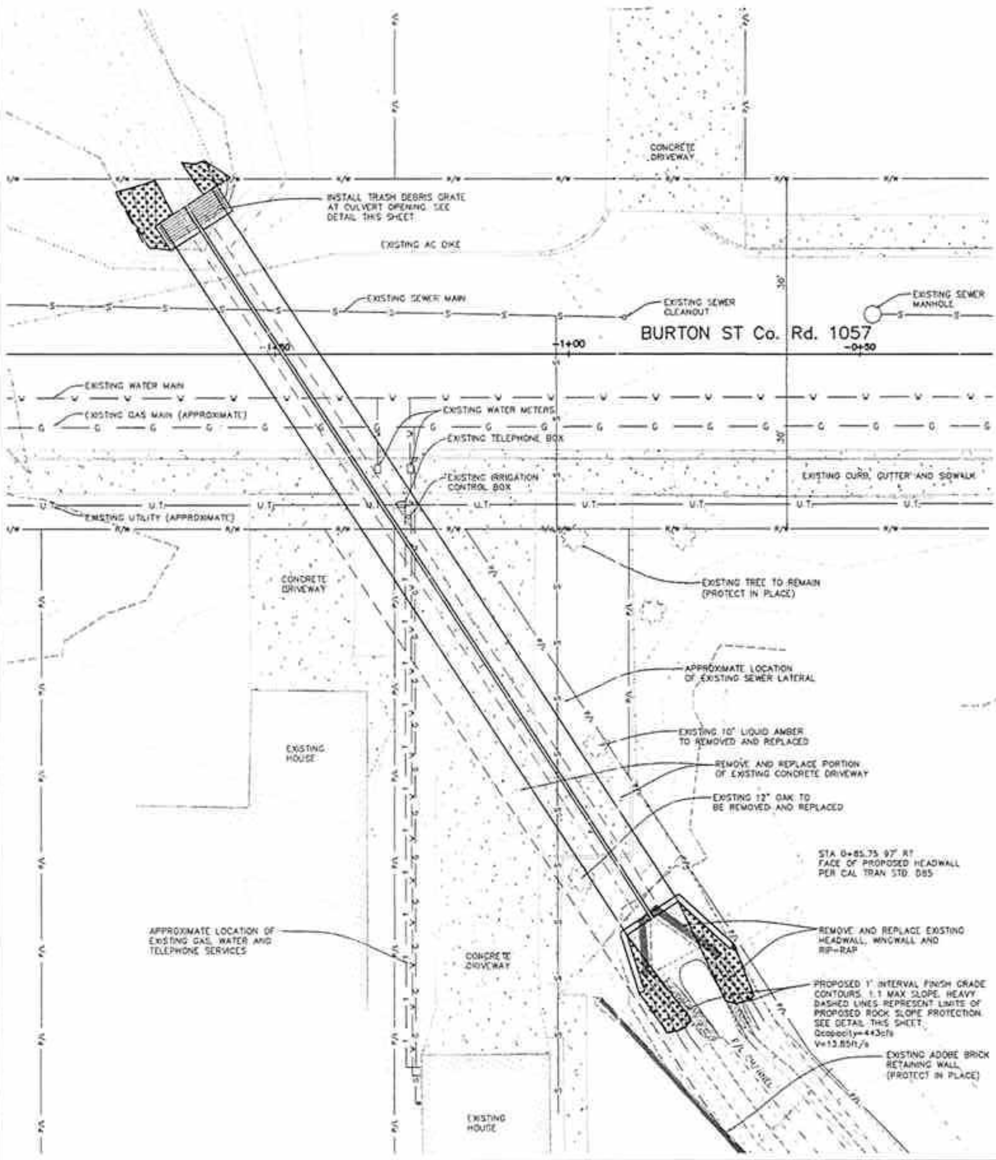
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

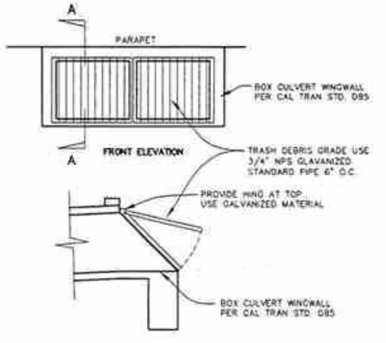
Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1057	300340	7	X

BASIS OF BEARINGS

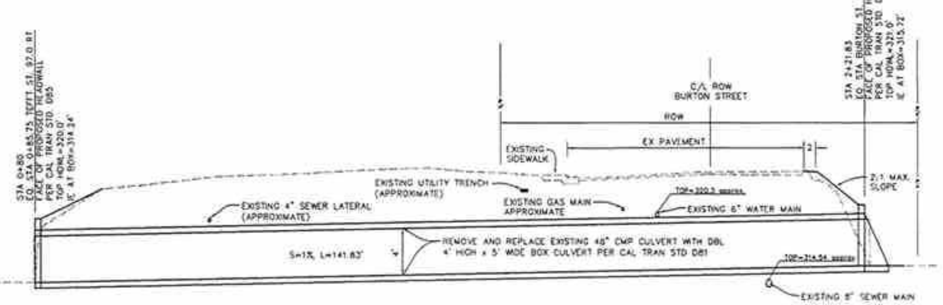
THE CENTERLINE OF MALLAGH STREET CALCULATED FROM FOUND MONUMENTS __ AND __ (POINTS 5 & 762) USING RECORD DATA SHOWN ON THE MAP OF THE BROOKSIDE TRACT NIPOMO CALIFORNIA, MAP BOOK A, PAGE 28, BEING N 37° 2' 47" W





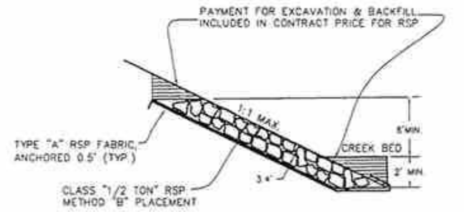
TRASH DEBRIS GRATE

NOT TO SCALE



PROFILE BOX CULVERT

1"=10' horizontal (Utilities shown are approximate only)
1"=5' Vertical



ROCK SLOPE PROTECTION TYPICAL DETAIL

NO SCALE

BURTON STREET BOX CULVERT IMPROVEMENTS
PLAN AND PROFILE
OLDE TOWNE NIPOMO

Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

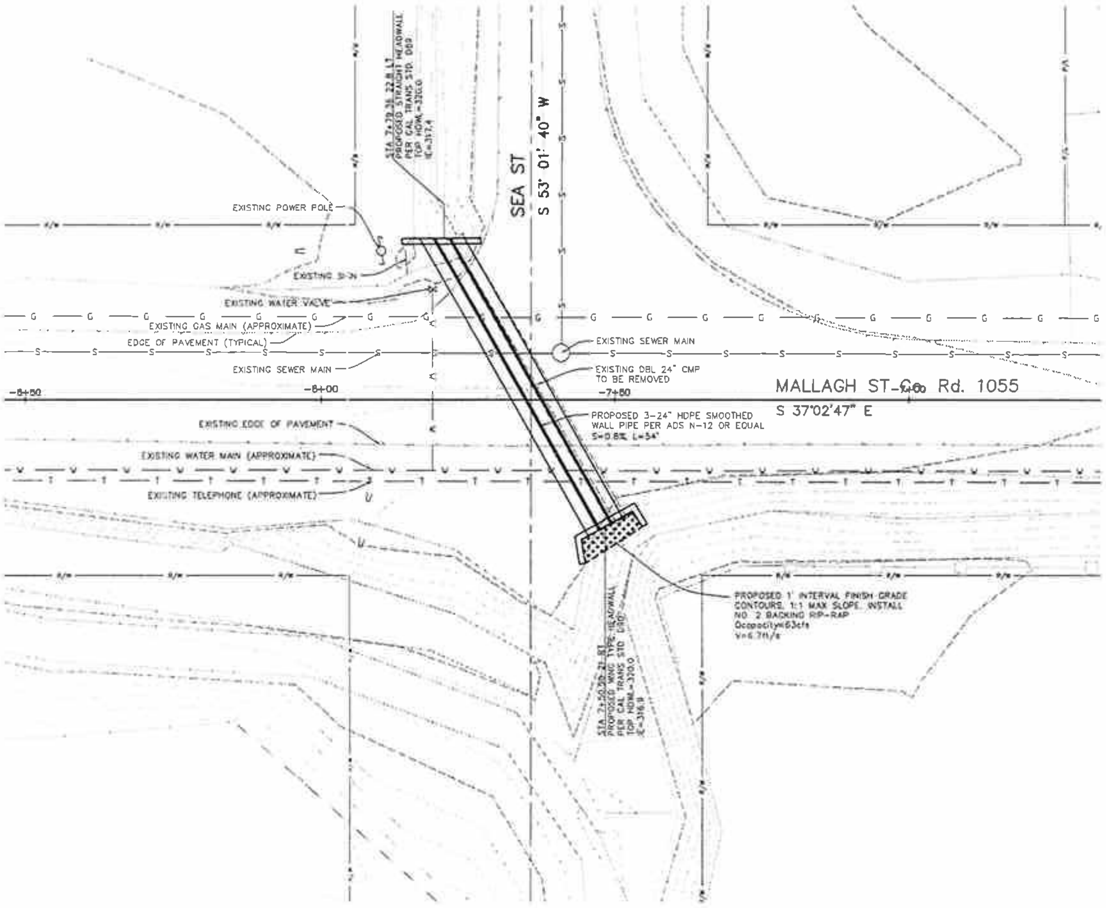
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
1057	300340	8	X

BASIS OF BEARINGS

THE CENTERLINE OF MALLAGH STREET CALCULATED FROM FOUND MONUMENTS __ AND __ (POINTS 5 & 762) USING RECORD DATA SHOWN ON THE MAP OF THE BROOKSIDE TRACT NIPOMO CALIFORNIA, MAP BOOK A, PAGE 28, BEING N 37° 2' 47" W

SCALE 1"=10'



0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

MALLAGH & SEA STREET PIPE CULVERT IMPROVEMENTS					
PLAN AND PROFILE					
OLDE TOWNE NIPOMO					
Designer	Date	Drawn By	Date	Design Engineer	Date
S. JONES	12/2006	S. JONES	12/2006	L. GIBSON	12/2006

Appendix G: Technical Memorandum 7:

ConocoPhillips Water Supply Feasibility Study

Cannon
ASSOCIATES
ENGINEERS
PLANNERS
SURVEYORS

Technical Memorandum

August 8, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813
Rebekah Oulton, RME 30480

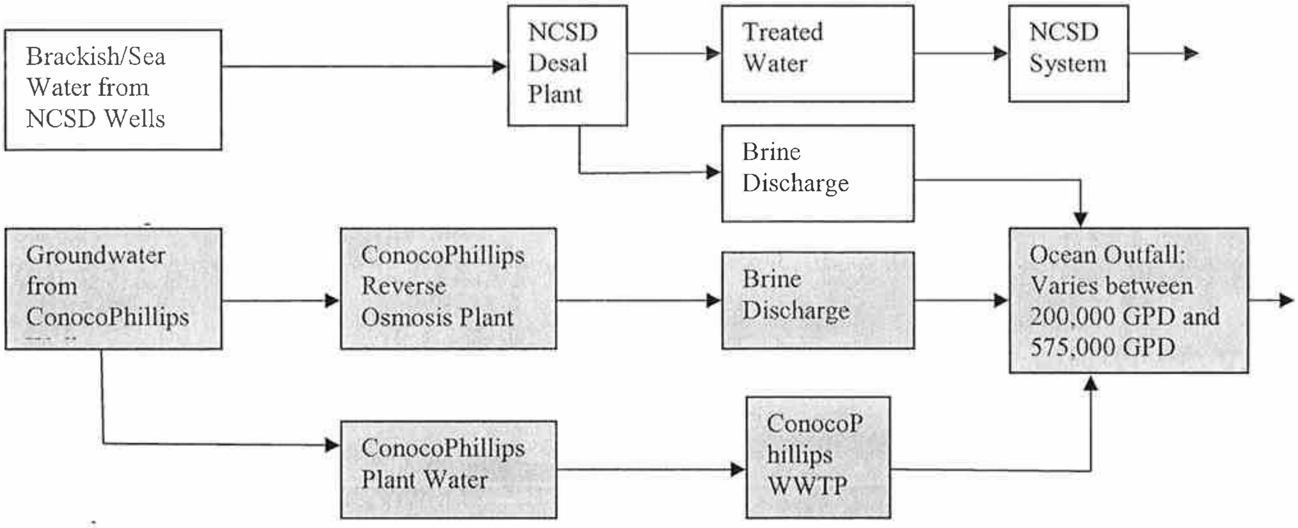
Subject: Technical Memorandum 7: ConocoPhillips Water Supply Feasibility Study

NCSD wishes to explore the possibility of supplementing its potable supplies with desalinated sea water or brackish groundwater, using the existing ocean outfall pipeline at the ConocoPhillips refinery for brine discharge. This Technical Memorandum examines the proposed project, explores the potential for such a project to cost effectively supplement potable water supply, and provides a scope of work for a feasibility study to consider this issue in detail should NCSD choose to pursue this alternative further.

1. Proposed Project Concept

ConocoPhillips currently processes almost 1.3 MGD of ground water extracted from four groundwater wells. This water is used in plant processes, cooling towers, and boilers. All plant process water is treated prior to release from the plant. ConocoPhillips is permitted to discharge up to 575,000 GPD of treated plant effluent and brine from their reverse osmosis (RO) facility, via an ocean outfall pipeline (Outfall). NCSD would like to explore the possibility of utilizing this existing Outfall for a desalination (desal) project to provide additional water for the NCSD system.

NCSD proposes utilizing slant drilling technologies to draw seawater or brackish groundwater, treating this water in a separate RO desal plant, and discharging brine waste from the desal process to the ocean via the Outfall. A diagram of the proposed project is shown below. Existing ConocoPhillips facilities are shaded.



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2. ConocoPhillips Facilities and Operations

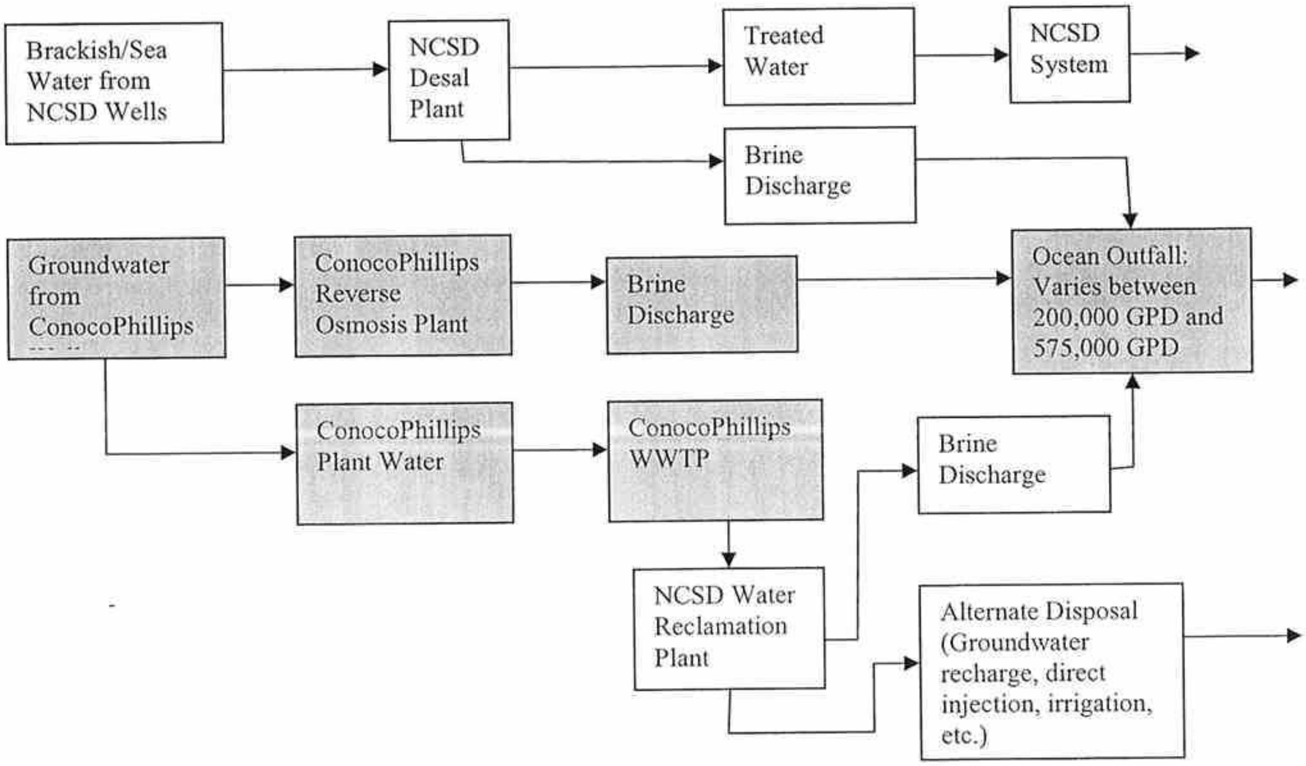
ConocoPhillips facilities include the existing RO plant and their ocean outfall pipe. They also operate four groundwater wells, which provide up to 1.3 MGD of groundwater for their operations. These wells would not be involved in the project, as plant operations cannot have the water source affected. Further, due to size limitations, use or expansion of their existing RO plant for the NCSD desal plant would not be feasible.

ConocoPhillips has indicated that they may be willing to negotiate for use or purchase of land for NCSD slant wells for brackish groundwater or ocean water as feed to the desal plant and for a separate NCSD desal plant site.

3. Potential Fatal Flaws

ConocoPhillips currently utilizes all of the permitted capacity in the Outfall, so there is no excess capacity for brine discharge from a NCSD desal plant. However, one possible way NCSD could potentially generate Outfall capacity would be by providing alternate disposal of ConocoPhillips' treated plant effluent, such as groundwater recharge, direct injection, or landscape irrigation.

According to ConocoPhillips staff, the treated plant water could potentially contain residual oil, water-treating chemicals, and process chemicals. It would likely require additional treatment prior to discharge to ground water. A diagram of the proposed revised project is shown below.



The feasibility of this proposal would need further review, including determination of ConocoPhillips' requirements regarding handling of their effluent, treatment requirements of that effluent prior to discharge, permitting requirements, additional costs related to effluent treatment, etc. Before pursuing this project further, NCSD should determine if ConocoPhillips will allow alternative treatment, disposal and/or reuse of their treated plant water for purposes of generating additional

Outfall capacity. If so, NCSD should determine how much capacity can be generated and if such effort is financially viable.

4. Potential Benefits

If this project is deemed feasible, it could potentially provide additional potable water for the NCSD system. However, financial viability for this project concept depends on two assumptions: that sufficient capacity can be generated is the Outfall, and that sufficient recovery can be achieved through RO.

ConocoPhillips currently uses the Outfall for discharge of both treated process water and waste brine from their own RO plant. The treated process water accounts for approximately 75% of the volume of discharge water. Assuming that all of this treated wastewater could be disposed of via alternate means (groundwater recharge, irrigation, etc.), then approximately 430,000 GPD of capacity would be available in the Outfall.

Depending on the source water used and the number of passes through the RO filters, a maximum recovery of between 70% and 90% can be expected. In general, the higher the salinity of the source water, the less recovery can be achieved. That is, seawater will generally show less recovery than brackish groundwater.

For purposes of this memo, a recovery of 80% is assumed. With 430,000 GPD of brine allowed to be discharged via the Outfall, approximately 2.2 MGD of potable water could be processed through the desal plant. This volume would provide up to 1.7 MGD or 1,900 AFY of desalinated water to the NCSD potable water system.

Actual achievable recovery of the RO system will need to be determined and potential Outfall capacity and will need to be reviewed and approved by ConocoPhillips in the development of the Feasibility Report for this project. Ultimately, the District plans to generate up to 5200 AFY of supplemental water through desalination. Generation of this volume may require an alternate discharge location or a modification to the existing facility and permit.

5. Cost Analysis

While there may be potential benefits for both NCSD and ConocoPhillips from pursuing this project, the question remains whether those benefits outweigh the potential costs. Based on discussions with other water agencies utilizing desal technologies, construction costs for an RO plant designed for treatment of 2.2 MGD could range between $5 million and $9 million. Previous cost estimates have placed the operating cost to treat brackish or seawater at $2,000 to $4,000/AF (Kennedy/Jenks, 2001). Assuming up to 1,900 AFY water produced, this project would cost NCSD between $3,800,000 and $7,600,000 per year for water treatment.

This estimate does not include cost of land. While land could potentially be available on ConocoPhillips' site for construction of the desal plant and drilling of the wells, lease or purchase arrangements with ConocoPhillips for use of that land have not been initiated.

This estimate also does not include cost for drilling, operating, and maintaining the brackish/seawater wells. Nor does this cost estimate address costs associated with infrastructure improvements necessary to tie in the desal plant to the existing NCSD water system. Such additional costs would need to be addressed in a detailed Feasibility Study should this project move forward.

6. Feasibility Study

Given the equally high costs of other supplemental water sources, we recommend that NCSD further investigate this alternative for supplementing their potable water system. A Feasibility Study should be developed to determine if this is truly a technically and economically viable project. A recommended Scope of Work for this Feasibility Study is outlined below.

The Feasibility Study should first review the project in more detail with ConocoPhillips to determine if pursuing the project further is viable for them. If so, it should then address the following key areas: technical feasibility, conceptual design, environmental impacts, regulatory requirements, economic analysis, and potential financing sources. Specific issues to address under each key area are identified below:

Technical Feasibility

- Determine ConocoPhillips treated plant effluent water quality prior to discharge.
- Determine the actual available capacity that could be discharged to the Outfall (as allowed by ConocoPhillips and by permit) and the corresponding rate of desal to be achieved.
- Develop proposed treatment and discharge alternatives in sufficient detail for agency review.
- Identify any "fatal flaws" associated with technical feasibility.

Conceptual Design

- Determine what modifications must be made to the existing NCSD system to tie into the desal plant.
- Confirm whether ocean water or brackish seawater will be drawn by the new NCSD wells.
- Determine what modifications must be made to the ConocoPhillips refinery site to accommodate the new wells and associated infrastructure.
- Confirm whether the desal plant can be located on ConocoPhillips property or whether an alternate site must be found. Determine what modifications must be made to the ConocoPhillips refinery site layout to accommodate the new desal plant and associated infrastructure. Or, identify potential alternative sites for the desal plant.
- Identify any "fatal flaws" associated with facility design.

Environmental Impacts

- Evaluate the Environmental Impacts of the Reclamation Plant.
- Evaluate the hydrogeologic impacts of brackish or ocean water wells on the environment.
- Identify any environmental impacts associated with the selected desal plant site.
- Identify any marine impacts associated with the brine discharge.
- Identify any "fatal flaws" associated with environmental impacts and review.

Regulatory Requirements

- Determine permitting and environmental review requirements for treatment and discharge/reclamation/reuse of ConocoPhillips' treated plant effluent.
- Determine if there are additional permit limitations on discharge, such as rate or concentration, which would limit feasibility of discharge of brine.
- Identify any "fatal flaws" associated with permitting or compliance.

Economic Analysis

- Confirm capital costs, construction costs, and operation and maintenance costs for the desal plant, wells, and associated facilities.
- Confirm impact of adding desal water to the NCSD system on NCSD customers' rates.
- Identify staffing requirements, compliance requirements, etc. associated with maintaining and operating the existing ocean outfall structure and the new desal plant.
- Identify costs associated with acquiring land or rights-of-use for the desal plant site and well sites.
- Determine the power requirements for the desal plant. Determine if it is possible to operate only during off-peak periods, and, if so, what the associated storage requirements are.
- Identify any "fatal flaws" associated with project economics.

Financing Sources

- Determine sources of financing (grants or loans) that may be available for assistance with this sort of project.
- Identify any "fatal flaws" associated with financing this sort of project.

7. References

Anderson, James. Superintendent Health and Safety, ConocoPhillips Refinery. Personal Correspondence and Discussions. March - June, 2007.

Kennedy/Jenks Consultants. *Evaluation of Water Supply Alternatives, Nipomo Community Services District*. October, 2001.

Veerapaneni, Srinivas et al. "Reducing Energy Consumption for Seawater Desalination."*American Water Works Association Journal*. Vol 99, No. 6, June 2007. pp 95-106.

Appendix H: Technical Memorandum 8:

Capacity at Blacklake Wastewater Treatment

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Technical Memorandum

June 20, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: **Technical Memorandum 8: Capacity at Blacklake WWTP**

The Blacklake Wastewater Treatment and Reclamation Facility (Facility) consists of grinders, three aeration ponds, and a chlorine contact facility. The plant was designed and has a permitted capacity for treatment of up to 200,000 gallons per day (GPD).

Monthly flow rates, as reported in the 2005 and 2006 Annual Reports to the Regional Water Quality Control Board, are shown in the table below. As shown, the plant is currently operating at approximately half of the design capacity, with a peak monthly flow (February 2006) at approximately 63% of capacity.

Month	2005 Flow Rate (GPD)	2006 Flow Rate (GPD)
January	47,600	69,500
February	73,400	125,400
March	87,100	90,600
April	88,800	80,200
May	74,500	80,400
June	66,300	84,800
July	55,700	76,000
August	64,500	120,400
September	59,800	120,000
October	56,300	105,800
November	64,300	84,000
December	14,300	69,900
Average	62,700	90,800

The monthly flow rates generally show a significant increase from 2005 to 2006. However, as the average increase in the dry summer period (April – October) is approximately equal to the average increase during the rainy winter period (October – April), this increase is not suspected to be caused by inflow and infiltration (I/I) problems. According to NCSD Operations staff, this higher flow rate in 2006 was likely due to recirculation from the effluent ponds due to periodic maintenance requirements.

The District has recently completed several projects to improve the capacity and effluent quality of the Facility. The pond liners have been or are being replaced. The aeration system was converted in 2006 from bottom aeration to surface aeration. The remote monitoring/telemetry system and effluent metering was replaced during 2005. As the area served by the Facility is now at or approaching full build out, additional projects to increase capacity at the Facility are not anticipated.

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Appendix I: Technical Memorandum 9:

Sewage Treatment Pond Sludge/Solids Disposal

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Technical Memorandum

August 29, 2007

To: Bruce Buel
Nipomo Community Services District

From: Mike Ratty, Garing, Taylor & Associates, RCE 30798
Larry Kraemer, Cannon Associates, RCE 44813

Subject: Technical Memorandum 9: Sewage Treatment Pond Sludge/Solids Disposal

NCSD wishes to examine the capacities of the Southland and Blacklake sludge handling and disposal systems. This technical memorandum reviews the anticipated sludge/solids loads at each facility and identifies a potential project to reduce sludge/solids disposal costs.

Sludge Generation

During the wastewater treatment process, sewage sludge is removed from the wastewater through settling in the retention ponds. The separated sludge is removed from the ponds and allowed to dry. The drying process includes initial water removal in the infiltration basins, where excess water is allowed to percolate out, then in sludge drying beds where additional water is removed through evaporation.

At the District's WWTPs, sludge removal from the ponds occurs occasionally, using pumps which direct settled solids from the ponds to the infiltration basins. Periodically, the ponds are also drained for maintenance, and all accumulated solids are removed at that time. NCSD staff has indicated that approximately 1,100 cubic yards of wet sludge were generated for each pond at Blacklake when they were drained to have the liners replaced. Solids from Blacklake are hauled to Southland for additional drying.

The Southland Wastewater Treatment Facility Master Plan, prepared by Boyle Engineering, examines the current and future sludge production rates at the Southland WWTP. Similar calculations were performed to estimate sludge production at the Blacklake WWTP. The results are shown in the table below:

Annual Sludge Production After Drying

	Southland WWTP		Blacklake WWTP		Total	
	Current	Future	Current	Future	Current	Future
Mass Sludge (tons)	260	710	40	100	300	750
Volume Sludge (CY)*	290	800	45	110	335	910

*Assume 50% dry before disposal

Sludge Disposal

After drying, sludge and solid wastes from the WWTPs are currently transported to a landfill for disposal. The cost of disposal of sludge/solids from sewage treatment facilities is increasing at a rapid rate. Offsite facilities willing to take solids are tightening their quality and water content

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standards before accepting treated sludge. It has been estimated that disposal of solids to a local landfill can cost up to $80.00 per cubic yard. Landfills also have maximum water content requirements. Solids generally need to have a water content of less than 50% to be acceptable. Solids that contain excessive amounts of sand may also be considered undesirable, which may be problematic for NCSD because the current Pond Relining Project at the Blacklake WWTP is generating solids with a high sand content.

There is currently sufficient space to continue with the current system of on-site drying and off-site hauling for sludge disposal, through the anticipated life of the plants. However, with off site disposal costs continuing to rise, it may be desirable to develop a less-expensive disposal option.

One such option is land application as biosolids. Biosolids are sludge wastes which have been treated sufficiently that they meet requirements for land application use. Due to their high nitrogen and phosphorus content, use of biosolids as fertilizer is seen in agriculture, timber production, and composting. Biosolids may be classified as either Class A or Class B, depending on their level of treatment. Class B biosolids may have some usage restrictions.

One potential use of biosolids for the District would be land application on available land at the Southland WWTP. As shown in Figure 9-1, a site is available for land application. The biosolids land application area consists of 10 acres where the solids would be spread and allowed to dry further. Plant materials would be grown on the areas where the biosolids are applied to absorb nitrates and other nutrients and help break down the solids. The plant material should be a rapidly-growing hay or grass that also has a large nitrate demand. Periodically, plant material would be harvested or removed prior to application of additional biosolids materials.

The majority of the costs involved in this disposal method involve the equipment and manpower required to move the solids from the sludge drying area to the dispersal area. This project should lower the cost of sludge disposal to less than $10.00 per cubic yard. The plant materials (hay, alfalfa, etc.) could also have salable value for agricultural uses. Agricultural use of the biosolids provides continual breakdown of the material as crops are grown and harvested.

Land application of biosolids is governed by 40CFR 503 on the federal level and Water Quality Order No. 2004-12-DWQ at the state level. Use of biosolids for land application such as described in this project must meet all state and federal requirements and will require a Waste Discharge permit through the Regional Water Quality Control Board.

Next Step

We recommend that a feasibility study be completed to prepare a cost/benefit analysis of pursuing this project further. The land application of biosolids has minimal capital costs, but permitting, monitoring, and reporting requirements may outweigh the potential cost savings that could be gained by avoiding current hauling and disposal costs. The feasibility study also should examine the following issues:

Technical Feasibility

- Determine what additional treatment requirements are necessary for sludge to meet Class A or Class B biosolids standards.
- Confirm how those requirements might impact existing operations at the WWTPs.

- Prepare a conceptual design showing revised layout and/or system operation to incorporate biosolids treatment and land application.
- Confirm if use limitations for Class B biosolids would affect the District's plans for land application of the material.
- Determine upfront and annualized costs for additional treatment of sludge necessary to meet with Class A or Class B biosolids requirements.

Regulatory/Environmental

- Determine the potential environmental impacts associated with biosolids treatment and land application.
- Confirm CEQA requirements for the project.
- Confirm permitting and compliance requirements at the state and federal levels for biosolids treatment and land application.
- Confirm upfront and annualized costs associated with these permitting and compliance requirements.

Public Relations

- Use of biosolids for agricultural production has been a controversial issue in some communities. Determine what PR issues the District must consider prior to use of biosolids in local agricultural production. Suggest strategies for handling public concerns.

References

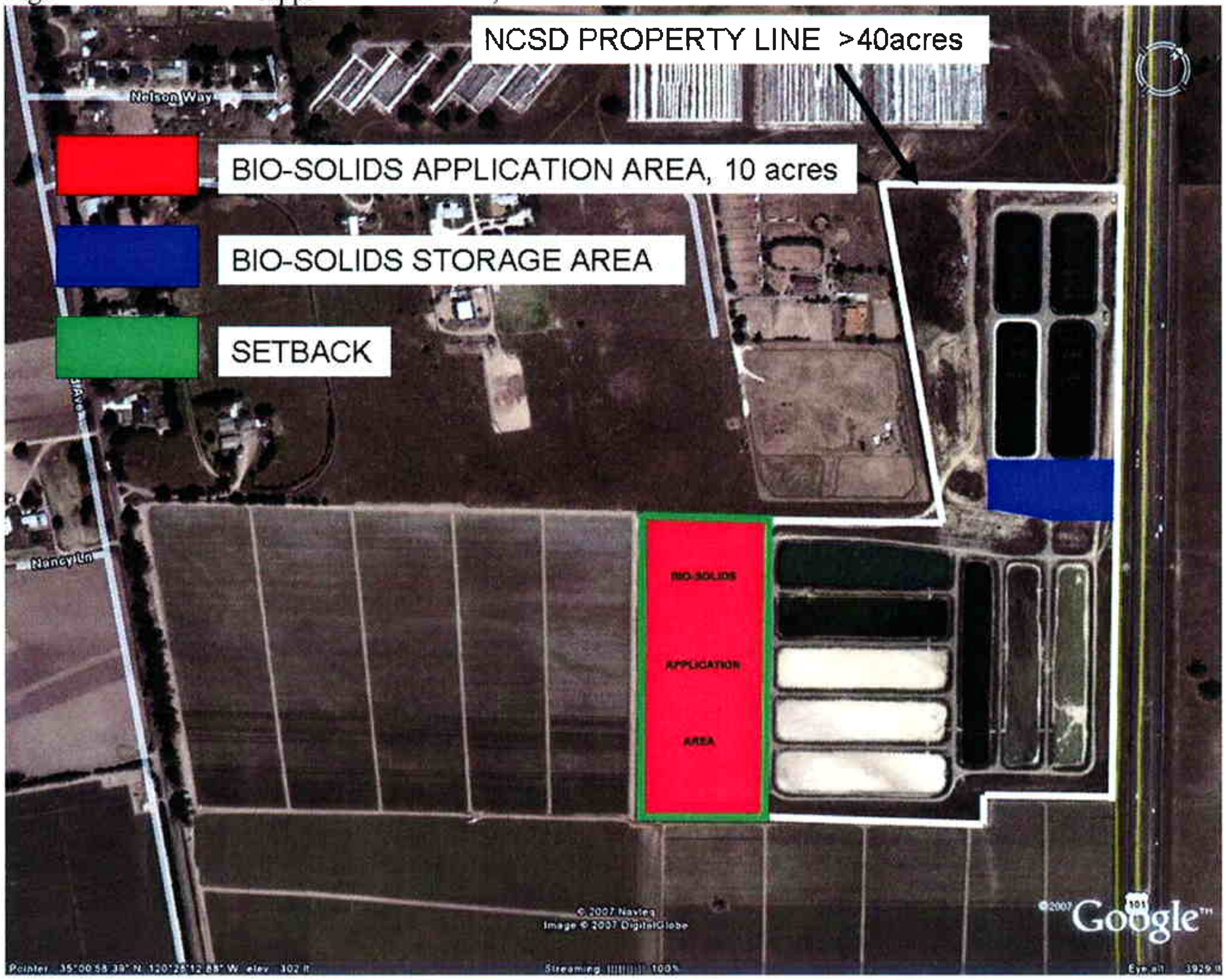
Boyle Engineering. *Southland Wastewater Treatment Facility Master Plan.* Prepared February 9, 2007

Water Environment Federation Biosolids Information Site: *http://www.wef.org/ScienceTechnologyResources/Biosolids/*

Environmental Protection Agency Biosolids Information Site: *http://www.epa.gov/owm/mtb/biosolids/genqa.htm*

State Water Resources Control Board Biosolids Information Site: *http://www.waterboards.ca.gov/programs/biosolids/*

Figure 9-1: Bio-Solids Application Site Plan, Southland WWTP.



Appendix J:

Technical Memorandum 10: Relocation and Groundwater Recharge of Southland WWTP Effluent

Phase 2 Hydrogeologic Investigation of the Southland WWTF, proposal by Fugro West, Inc.

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Technical Memorandum

August 10, 2007

To: Bruce Buel
Nipomo Community Services District

From: Mike Ratty, Garing, Taylor &Associates, RCE 30798
Larry Kraemer, Cannon Associates, RCE 44813

Subject: **Technical Memorandum 10: Relocation and Groundwater Recharge of Southland WWTP Effluent**

NCSD wishes to identify potential upgradient locations to recharge treated wastewater from the Southland WWTP. This memo reviews potential sites for the pumping of effluent from the Southland WWTP, presents a project for effluent discharge to the identified locations, and reviews associated costs for each alternative.

Site Identification

Based on guidance from NCSD staff regarding the geographic scope of interest (Study Area), initial screening was performed to identify potential areas for groundwater recharge. Preliminary graphics were developed showing the Study Area (Figure 1a) and the underlying groundwater elevations in the Spring of 1995, when a pumping depression was clearly evident (Figure 1b). Parcels located within the Study Area that met the following criteria (based on public records) were identified:

- Land use was listed as "Vacant, Government" or "Open Space Easement";
- Land use was listed as "0% developed", or "Vacant," or "AG," and 4 acres or larger;
- Land appeared on the GIS aerial photos as either vacant or primarily agricultural land use, and 10 acres or larger; or
- Land was owned by the District and 5 acres or larger.

NRCS Soil mapping data was obtained for the Study Area. The vast majority (98%) of the study area is mapped as Oceano Sand. This soil has a high infiltration rate ($K_{sat} > 6$"/hr). Therefore, in the absence of site-specific data, infiltration rate should not be a limiting factor.

Based on direction from District Staff, three sites within the Study Area (Figure 3) were selected as possible discharge locations.

Effluent Discharge

As shown on the attached exhibit (Figure 4), effluent from the Southland WWTP is proposed to be pumped to a remote infiltration basin in the Blacklake area. The proposed facilities required for this project include the following:

- Effluent Pump Station – located on the southerly end of Southland WWTP infiltration basins. This pump station includes a wetwell, submersible - duplex pumps, level and timing controls, power and telemetry feeds, inlet / outlet piping and site grading. The design flow output of this lift station is assumed to be 1.2 MGD or 834 GPM. This flow is a little less than double the average daily output of the treatment plant.
- Effluent Force Main – located for the most part in public streets and utility easements. This force main would consist of approximately 5.5 miles of 10" PVC water main.

Costs were estimated using the following assumptions:

- An average of 0.6 MGD of treated wastewater would be pumped to the new infiltration basins from the first of May to the end of October (6 months) each year for 30 years.
- Treated wastewater would be pumped from a newly installed pump station located at the southerly end of the Southland WWTP treatment ponds. The wet well and associated pumps and controls is estimated to cost $300,000.
- PVC pipe would be installed under existing paved roads with less than 3.5" of asphalt paving. Pipe installation is estimated to cost as follows:
  - 8" $109/LF
  - 10" $117/LF
  - 12" $125/LF
- The cost to acquire land should be considered if existing storm water detention basins could not be used for disposal or if is desired to dispose of effluent during the winter months. A 5 to 10 Acre parcel of land is estimated to cost approximately $1.0M to $1.5M. It should be noted that the "cost" of this land is probably not a cost but more of an investment because it's possible appreciation in value over time.
- Capital costs would be financed with a 30-year bond at 5% annual interest.
- Electricity costs would be as listed on the attached rate sheet [Rate schedule E-19 (FTA Rates), effective 9/1/2006 to 12/31/2006].
- Two pumping scenarios were examined: pump 0.6 MGD 24-hours per day, and pump 1.2 MGD 12 hours per day (during non-peak times.)
- Combined motor/pump efficiency was estimated at 50%.

- Approximately 80% of the applied water would infiltrate to the District's aquifer. The remainder is assumed to be lost to evaporation or "leakage" from the targeted aquifer.

Costs were calculated for conceptual alignments to each of the three potential discharge locations. The sensitivity of the results to changes in energy costs was examined by increasing the energy costs by 50% and re-running the analyses. Detailed cost analyses are included, below.

Results

As would be expected, the costs for disposal of effluent increases with the distance to the disposal site as well as the flow rate desired for pumping to that area. The higher the pumping rate the larger the required pipe size that is needed to minimize pipe friction losses and the energy required to over come them.

Energy conservation can be achieved by pumping effluent primarily during off-peak electric rate periods. However, doubling the flow rate and pumping only during off-peak times does not show cost savings to make up for the extra energy required for the higher flow rate. Still, to the extent feasible, every effort should be made to pump effluent during off- peak times and at as slow a flow rate as possible, to maximize energy and cost savings.

Increasing pipe size to lower the cost of the electricity for a given volume of effluent pumped was not justified due to the high capital cost involved with the larger pipe sizes. However, noting the wide variation in the energy cost per day required for the three pipe sizes, consideration probably should be given to increasing pipe size for energy conservation reasons.

The capital cost of the required effluent piping is the largest annual cost associated with this project. In the alternatives shown this cost will exceed 80% of the annualized cost. Consideration should be given for staging this project to initially pump effluent to the closer areas (Area #3) and possibly extending the recharge piping to the Willow Road (Area #1) area in the future. Since the cost increases with distance from the Southland WWTP, the District should determine for itself if the value of groundwater recharge in upgradient locations merits the additional costs associated with transporting the effluent.

Next Step

Should the District decide to pursue this project further, a Feasibility Study should be prepared. The following items should be addressed in the Feasibility Study:

- Select sites in Area 3 based on owner's intention to develop and contact owners to determine likelihood of cooperation. (Assumption: New developments will be required to build on-site storm water detention basins.)
- Develop a conceptual pipeline alignment to more precisely determine construction costs and potential impacts.
- Perform an environmental assessment of the proposed project. In addition to review of construction impacts, the environmental assessment should consider
    - hydrogeologic impacts including the impact to water quality within the aquifer (i.e., How will concentrations of salts, nitrates, and other constituents of concern in the groundwater change as the result of the proposed project?)

    - potential for "mounding" of groundwater to reduce effectiveness of the "dual use" basins. (i.e., What is a conservative annual rate of treated wastewater application that will not reduce each basin's ability to percolate storm water?)
- Identify regulatory requirements, including CEQA review requirements and permitting requirements for construction and discharge.

An estimated cost for the Feasibility Study is between $50,000 and $75,000.

References

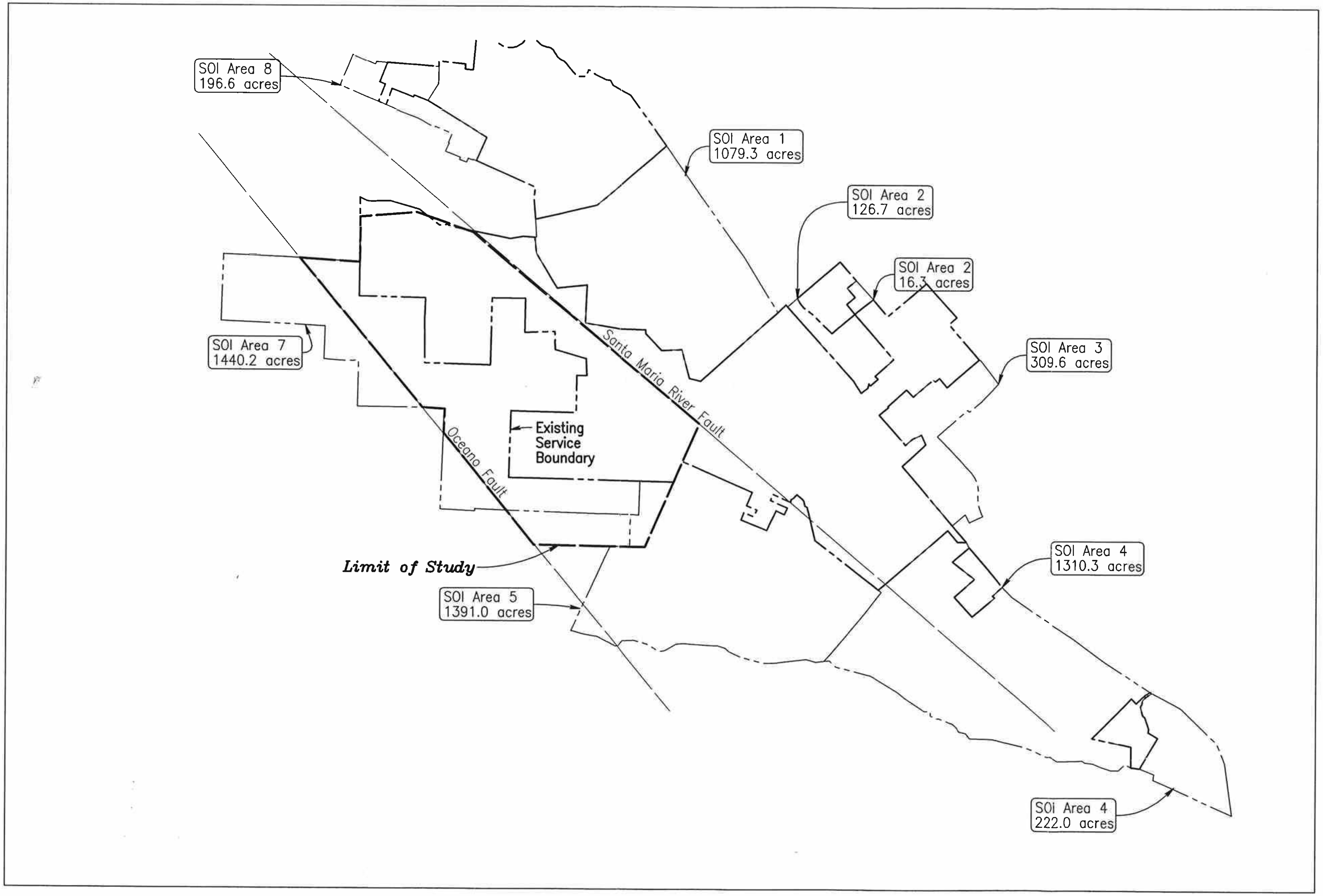
USDA, 2006, Natural Resources Conservation Service, Soil Survey maps created via http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

DWR, 2002, Water Resources of the Arroyo Grande - Nipomo Mesa, California Department of Water Resources, Division of Planning and Local Assistance, Southern District, http://www.dpla.water.ca.gov/sd/water_quality/arroyo_grande/arroyo_grande-nipomo_mesa.html

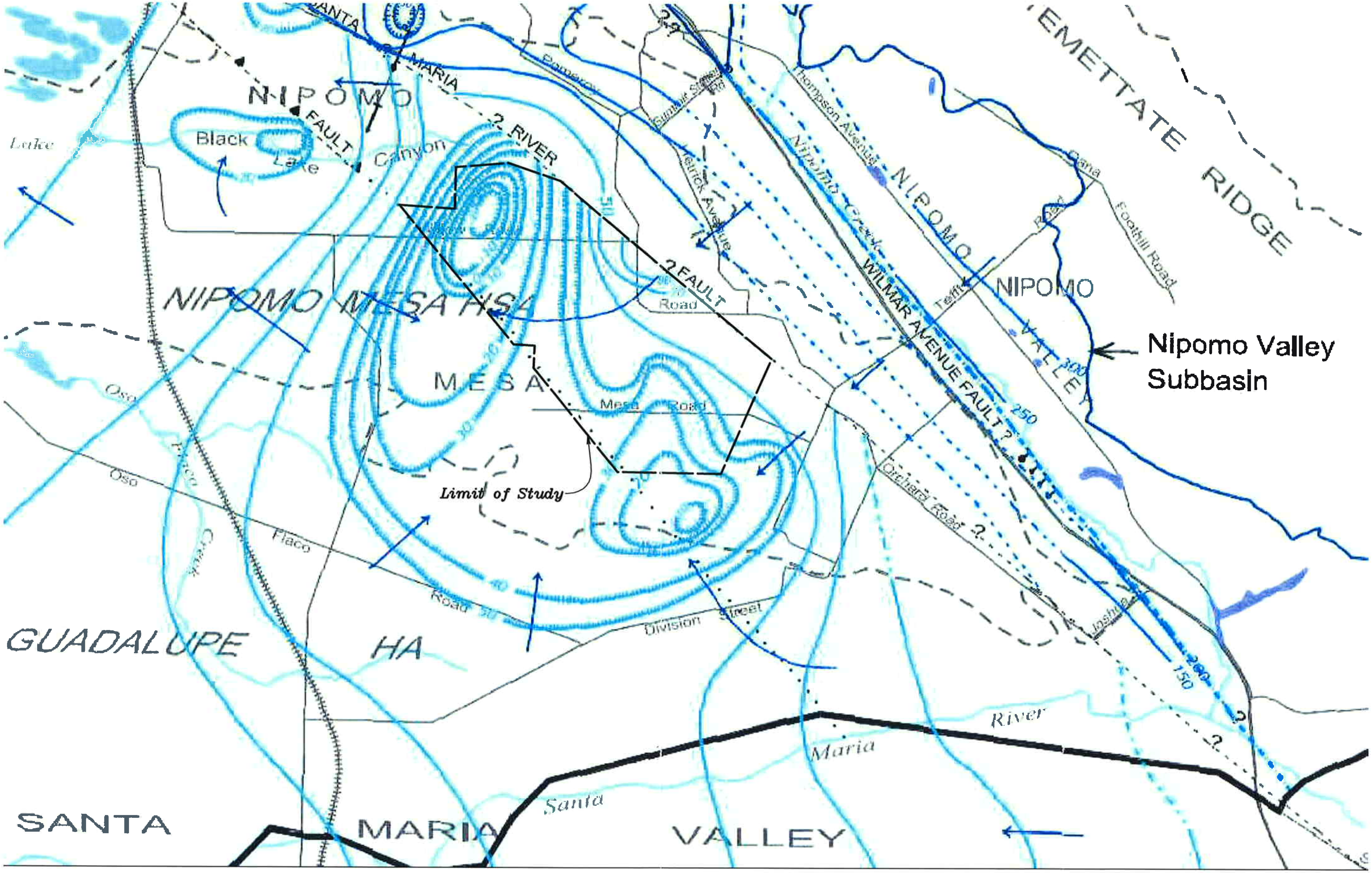
MetroScan, 2006, San Luis Obispo County Assessor's Data accessed through MetroScan (computer application), Version 3.7.0, First American Real Estate Solutions, L.P.

PG&E, 2006, Electrical rates from http://www.pge.com/tariffs/electric.shtml#COMMERCIAL, Comm'l_060901-061231.xls

Figures

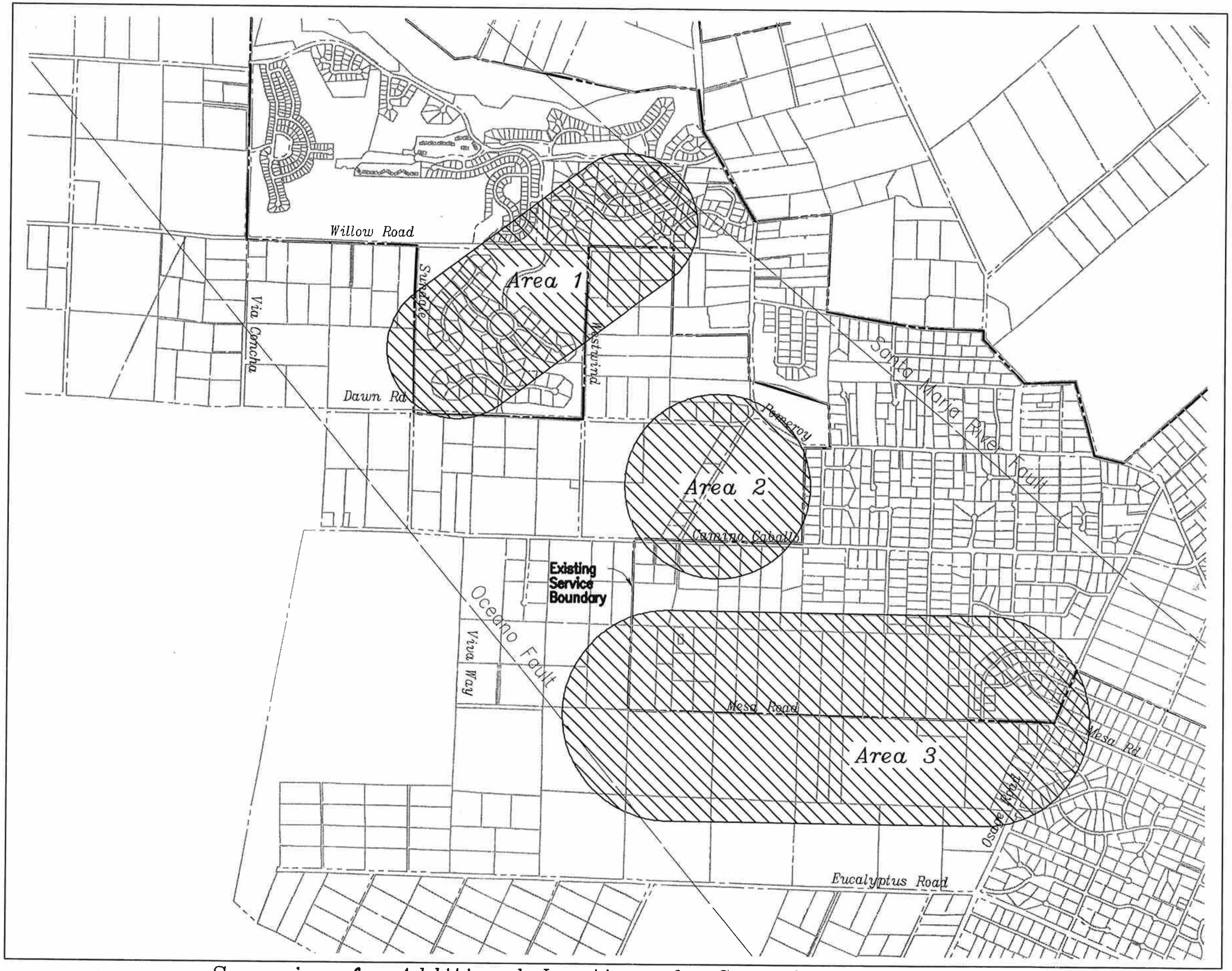


Screening for Additional Locations for Groundwater Recharge
Limit of Study Area in Relation to Existing Service Boundary and SOI Areas *Figure 1a.*



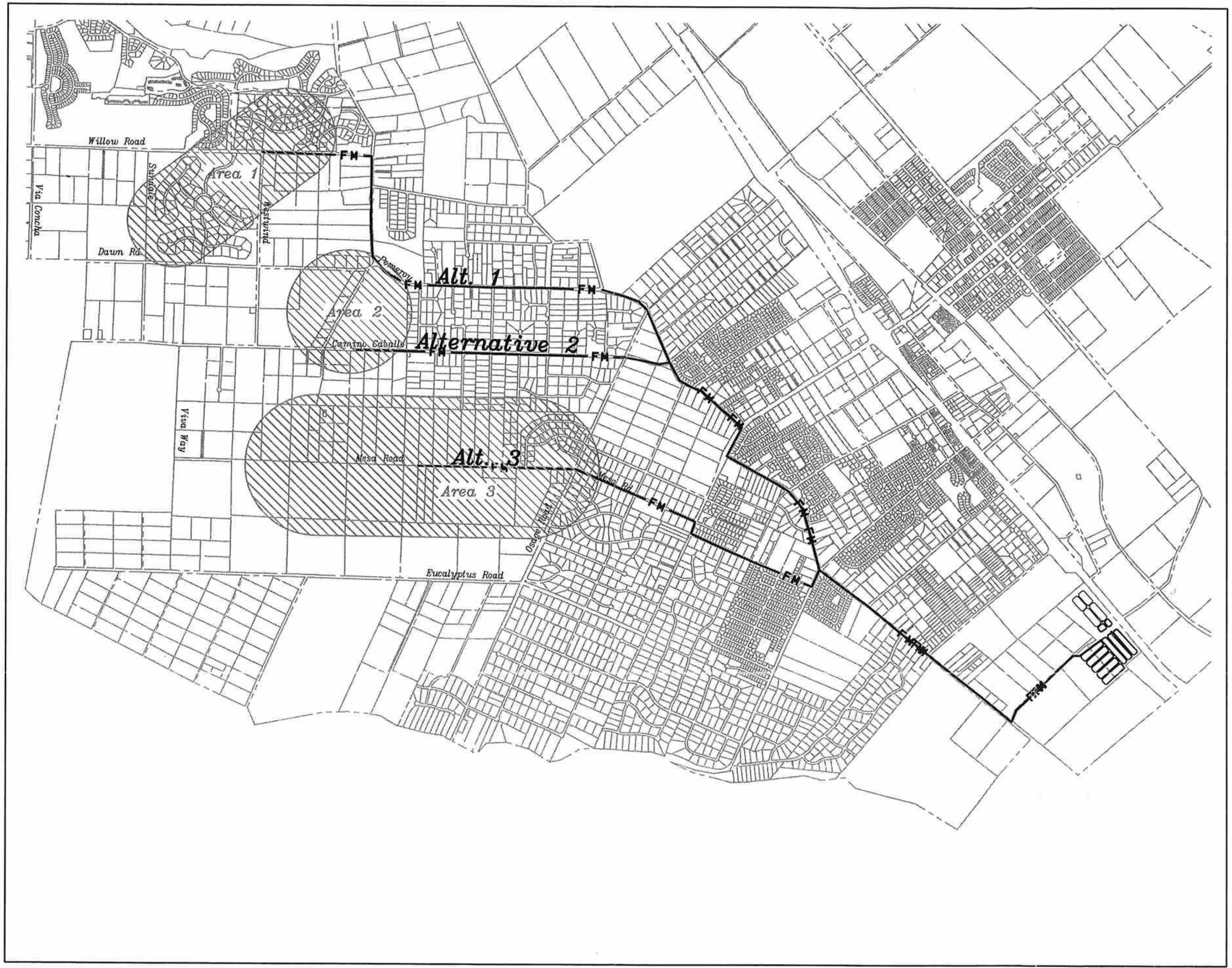
Screening for Additional Locations for Groundwater Recharge
Limit of Study Area in Relation to Spring 1995 Groundwater Elevations

Figure 1b.



Screening for Additional Locations for Groundwater Recharge
Locations where parcels appear to satisfy land use and size criteria.

Figure 3.



Screening for Additional Locations for Groundwater Recharge
Pipe Alignment Alternatives.

Figure 4.

Detailed Cost Analysis Tables

Alternatives Amortized Capital

	Alt loc-dia-Q											
Alternative	Alt 1-8-6	Alt 2-8-6	Alt 3-8-6	Alt 1-8-12	Alt 2-8-12	Alt 3-8-12	Alt 1-12-6	Alt 2-12-6	Alt 3-12-6	Alt 1-12-12	Alt 2-12-12	Alt 3-12-12
length (ft)	28150	22529	19016	28150	22529	19016	28150	22529	19016	28150	22529	19016
inlet elevation	302	302	302	302	302	302	302	302	302	302	302	302
outlet elevation	325	310	316	325	310	316	325	310	316	325	310	316
diameter (in)	8	8	8	8	8	8	12	12	12	12	12	12
flow rate (MGD)	0.6	0.6	0.6	1.2	1.2	1.2	0.6	0.6	0.6	1.2	1.2	1.2
kilowatts	17.43	12.735	12.105	98.265	75.615	67.59	6.915	4.155	4.95	22.62	15.375	15.87
hour per day	24	24	24	12	12	12	24	24	24	12	12	12
average energy price	$ 0.10113	$ 0.10113	$ 0.10113	$ 0.07829	$ 0.07829	$ 0.07829	$ 0.10113	$ 0.10113	$ 0.10113	$ 0.07829	$ 0.07829	$ 0.07829
Average demand charge	$ 7.93	$ 7.93	$ 7.93	$ 6.74	$ 6.74	$ 6.74	$ 7.93	$ 7.93	$ 7.93	$ 6.74	$ 6.74	$ 6.74
TDH (ft)	111	81	77	313	241	215	44	27	32	72	49	51
Wet Well Cost	240000	240000	240000	240000	240000	240000	240000	240000	240000	240000	240000	240000
Pump cost	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000	60000
pipe cost ($/foot)	$ 106.57	$ 106.57	$ 106.57	$ 106.57	$ 106.57	$ 106.57	$ 124.48	$ 124.48	$ 124.48	$ 124.48	$ 124.48	$ 124.48
Energy Costs												
energy cost per day	42.30	30.91	29.38	92.32	71.04	63.50	16.78	10.08	12.01	21.25	14.44	14.91
demand cost per month	$ 138.15	$ 100.94	$ 95.94	$ 661.98	$ 509.39	$ 455.33	$ 54.81	$ 32.93	$ 39.23	$ 152.38	$ 103.58	$ 106.91
Annual energy cost	$ 8,443.64	$ 6,169.23	$ 5,864.04	$ 20,589.64	$ 15,843.75	$ 14,162.25	$ 3,349.84	$ 2,012.81	$ 2,397.93	$ 4,739.61	$ 3,221.55	$ 3,325.27
30-year energy cost	$ 253,309.07	$ 185,076.94	$ 175,921.19	$ 617,689.27	$ 475,312.41	$ 424,867.63	$ 100,495.25	$ 60,384.35	$ 71,938.03	$ 142,188.28	$ 96,646.54	$ 99,758.09
Capital Costs												
Pipe	$ 3,000,059.61	$ 2,401,006.85	$ 2,026,612.20	$ 3,000,059.61	$ 2,401,006.85	$ 2,026,612.20	$ 3,504,067.85	$ 2,804,374.58	$ 2,367,081.85	$ 3,504,067.85	$ 2,804,374.58	$ 2,367,081.85
Wet well+Pumps	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00	$ 300,000.00
Total Capital Cost	$ 3,300,059.61	$ 2,701,006.85	$ 2,326,612.20	$ 3,300,059.61	$ 2,701,006.85	$ 2,326,612.20	$ 3,804,067.85	$ 3,104,374.58	$ 2,667,081.85	$ 3,804,067.85	$ 3,104,374.58	$ 2,667,081.85
Bond Interest Rate	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Annual Bond Cost	$204,451.06	$167,337.50	$144,142.35	$204,451.06	$167,337.50	$144,142.35	$235,676.26	$192,327.64	$165,235.72	$235,676.26	$192,327.64	$165,235.72
Total Annual Cost	$ 212,894.70	$ 173,506.73	$ 150,006.39	$ 225,040.70	$ 183,181.24	$ 158,304.60	$ 239,026.10	$ 194,340.45	$ 167,633.65	$ 240,415.87	$ 195,549.19	$ 168,560.99
Total 30-year Cost	$ 6,386,840.89	$ 5,205,201.85	$ 4,500,191.55	$ 6,751,221.08	$ 5,495,437.33	$ 4,749,137.99	$ 7,170,783.04	$ 5,830,213.54	$ 5,029,009.52	$ 7,212,476.07	$ 5,866,475.73	$ 5,056,829.58
Recharge												
30 yr Water Pumped (MG)	3240	3240	3240	3240	3240	3240	3240	3240	3240	3240	3240	3240
30 yr water pumped (af)	9943	9943	9943	9943	9943	9943	9943	9943	9943	9943	9943	9943
percent infiltrated	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
af infiltrated	7955	7955	7955	7955	7955	7955	7955	7955	7955	7955	7955	7955
cost per acre-foot infiltrated	$ 802.92	$ 654.37	$ 565.74	$ 848.72	$ 690.85	$ 597.03	$ 901.47	$ 732.94	$ 632.22	$ 906.71	$ 737.50	$ 635.72
Minimum Cost			minimum									

Alternatives Amortized Capital

Alternative 1	.6MGD Flow Rate by Pipe Size			1.2MGD Flow Rate by Pipe Size		
Pipe Size	8"	10"	12"	8"	10"	12"
length (ft)	28150	28150	28150	28150	28150	28150
inlet elevation	302	302	302	302	302	302
outlet elevation	325	325	325	325	325	325
flow rate (MGD)	0.6	0.6	0.6	1.2	1.2	1.2
kilowatts	17.6	8.3	5.7	107.7	41.1	21.4
hour per day	24	24	24	12	12	12
average energy price	$0.101	$0.101	$0.101	$0.078	$0.078	$0.078
Average demand charge	$7.93	$7.93	$7.93	$6.74	$6.74	$6.74
TDH (ft)	112	53	36	343	131	68
Wet Well Cost	$240,000	$240,000	$240,000	$240,000	$240,000	$240,000
Pump cost	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
pipe cost ($/foot)	$108	$118	$125	$108	$118	$125
Energy Costs						
energy cost per day	42.69	20.20	13.72	101.20	38.65	20.06
demand cost per month	$139.39	$65.96	$44.80	$725.68	$277.15	$143.87
Annual energy cost	$8,519.70	$4,031.64	$2,738.48	$22,570.87	$8,620.36	$4,474.69
30-year energy cost	$255,591.02	$120,949.32	$82,154.26	$677,126.06	$258,610.83	$134,240.73
Capital Costs						
Pipe	$3,040,200	$3,321,700	$3,518,750	$3,040,200	$3,321,700	$3,518,750
Wet well+Pumps	$300,000.00	$300,000.00	$300,000.00	$300,000.00	$300,000.00	$300,000.00
Total Capital Cost	$3,340,200.00	$3,621,700.00	$3,818,750.00	$3,340,200.00	$3,621,700.00	$3,818,750.00
Bond Interest Rate	5%	5%	5%	5%	5%	5%
Annual Bond Cost	$206,937.91	$224,377.89	$236,585.87	$206,937.91	$224,377.89	$236,585.87
Total Annual Cost	$215,457.61	$228,409.53	$239,324.35	$229,508.78	$232,998.25	$241,060.57
Total 30-year Cost	$6,463,728.26	$6,852,285.96	$7,179,730.48	$6,885,263.30	$6,989,947.47	$7,231,816.95
Recharge Cost						
30 yr Water Pumped (MG)	3240	3240	3240	3240	3240	3240
30 yr water pumped (af)	9943	9943	9943	9943	9943	9943
percent infiltrated	80%	80%	80%	80%	80%	80%
af infiltrated	7955	7955	7955	7955	7955	7955
cost per acre-foot infiltrated	$812.58	$861.43	$902.59	$865.58	$878.74	$909.14

Alternatives Amortized Capital

Alternative 2	**.6MGD Flow Rate by Pipe Size**			**1.2MGD Flow Rate by Pipe Size**		
Pipe Size	8"	10"	12"	8"	10"	12"
length (ft)	22529	22529	22529	22529	22529	22529
inlet elevation	302	302	302	302	302	302
outlet elevation	310	310	310	310	310	310
flow rate (MGD)	0.6	0.6	0.6	1.2	1.2	1.2
kilowatts	12.6	5.0	2.8	82.9	29.8	13.8
hour per day	24	24	24	12	12	12
average energy price	$0.101	$0.101	$0.101	$0.078	$0.078	$0.078
Average demand charge	$7.93	$7.93	$7.93	$6.74	$6.74	$6.74
TDH (ft)	80	32	18	264	95	44
Wet Well Cost	$240,000	$240,000	$240,000	$240,000	$240,000	$240,000
Pump cost	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
pipe cost ($/foot)	$108	$118	$125	$108	$118	$125
Energy Costs						
energy cost per day	30.49	12.20	6.86	77.89	28.03	12.98
demand cost per month	$99.57	$39.83	$22.40	$558.54	$200.99	$93.09
Annual energy cost	$6,085.50	$2,434.20	$1,369.24	$17,372.33	$6,251.41	$2,895.39
30-year energy cost	$182,565.02	$73,026.01	$41,077.13	$521,169.91	$187,542.20	$86,861.65
Capital Costs						
Pipe	$2,433,132	$2,658,422	$2,816,125	$2,433,132	$2,658,422	$2,816,125
Wet well+Pumps	$300,000.00	$300,000.00	$300,000.00	$300,000.00	$300,000.00	$300,000.00
Total Capital Cost	$2,733,132.00	$2,958,422.00	$3,116,125.00	$2,733,132.00	$2,958,422.00	$3,116,125.00
Bond Interest Rate	5%	5%	5%	5%	5%	5%
Annual Bond Cost	$169,327.77	$183,285.33	$193,055.62	$169,327.77	$183,285.33	$193,055.62
Total Annual Cost	$175,413.27	$185,719.53	$194,424.86	$186,700.10	$189,536.74	$195,951.01
Total 30-year Cost	$5,262,398.13	$5,571,585.91	$5,832,745.79	$5,601,003.02	$5,686,102.11	$5,878,530.31
Recharge Cost						
30 yr Water Pumped (MG)	3240	3240	3240	3240	3240	3240
30 yr water pumped (af)	9943	9943	9943	9943	9943	9943
percent infiltrated	80%	80%	80%	80%	80%	80%
af infiltrated	7955	7955	7955	7955	7955	7955
cost per acre-foot infiltrated	$661.56	$700.43	$733.26	$704.13	$714.82	$739.02

Alternatives Amortized Capital

Alternative 3	.6MGD Flow Rate by Pipe Size			1.2MGD Flow Rate by Pipe Size		
Pipe Size	8"	10"	12"	8"	10"	12"
length (ft)	19016	19016	19016	19016	19016	19016
inlet elevation	302	302	302	302	302	302
outlet elevation	316	316	316	316	316	316
flow rate (MGD)	0.6	0.6	0.6	1.2	1.2	1.2
kilowatts	11.6	5.5	3.5	72.5	27.3	13.8
hour per day	24	24	24	12	12	12
average energy price	$0.101	$0.101	$0.101	$0.078	$0.078	$0.078
Average demand charge	$7.93	$7.93	$7.93	$6.74	$6.74	$6.74
TDH (ft)	74	35	22	231	87	44
Wet Well Cost	$240,000	$240,000	$240,000	$240,000	$240,000	$240,000
Pump cost	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000
pipe cost ($/foot)	$108	$118	$125	$108	$118	$125
Energy Costs						
energy cost per day	28.20	13.34	8.38	68.16	25.67	12.98
demand cost per month	$92.10	$43.56	$27.38	$488.72	$184.06	$93.09
Annual energy cost	$5,629.09	$2,662.41	$1,673.51	$15,200.79	$5,724.97	$2,895.39
30-year energy cost	$168,872.64	$79,872.19	$50,205.38	$456,023.67	$171,749.17	$86,861.65
Capital Costs						
Pipe	$2,053,728	$2,243,888	$2,377,000	$2,053,728	$2,243,888	$2,377,000
Wet well+Pumps	$300,000.00	$300,000.00	$300,000.00	$300,000.00	$300,000.00	$300,000.00
Total Capital Cost	$2,353,728.00	$2,543,888.00	$2,677,000.00	$2,353,728.00	$2,543,888.00	$2,677,000.00
Bond Interest Rate	5%	5%	5%	5%	5%	5%
Annual Bond Cost	$145,822.27	$157,603.40	$165,850.18	$145,822.27	$157,603.40	$165,850.18
Total Annual Cost	$151,451.36	$160,265.80	$167,523.70	$161,023.06	$163,328.37	$168,745.57
Total 30-year Cost	$4,543,540.76	$4,807,974.05	$5,025,710.86	$4,830,691.79	$4,899,851.03	$5,062,367.13
Recharge Cost						
30 yr Water Pumped (MG)	3240	3240	3240	3240	3240	3240
30 yr water pumped (af)	9943	9943	9943	9943	9943	9943
percent infiltrated	80%	80%	80%	80%	80%	80%
af infiltrated	7955	7955	7955	7955	7955	7955
cost per acre-foot infiltrated	$571.19	$604.43	$631.80	$607.29	$615.98	$636.41

FUGRO

FUGRO WEST, INC.

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September 5, 2007
Project No. 3596.001

Nipomo Community Services District
PO Box 326
148 S. Wilson Street
Nipomo, California 93444

Attention: Mr. Bruce Buel
General Manager

Proposed Scope of Work and Fee Estimate
Phase 2 Hydrogeologic Investigation of the Southland WWTF
Nipomo, California

Dear Mr. Buel:

Fugro is pleased to submit this proposal for a comprehensive hydrogeologic investigation of Nipomo Community Services District's Southland Wastewater Treatment Facility (WWTF). This proposal is based on the results of Fugro's Phase 1 assessment, discussions with and direction from a representative of the Regional Water Quality Control Board (RWQCB), and meetings and discussions with you and representatives from Boyle Engineering. This proposal package presents our understanding of the project, a scope of work, fee estimate, and schedule to complete the work

PROJECT UNDERSTANDING

The District owns and operates the Southland WWTF, which is permitted to operate at a plant capacity of 0.9 million gallons per day (MGD). As the District plans for an upgrade and expansion of the facility to 1.3 MGD, a need was identified for additional assessment of the groundwater conditions beneath the site. The Phase 1 efforts, which were documented in a Fugro report to the District dated July 17, 2007, focused on the development of a baseline understanding of the local groundwater conditions.

The primary conclusions of the Phase 1 work effort included:

- A dual aquifer system is inferred to exist beneath the WWTF. The shallow aquifer, which ranges from 60- to 140-feet below ground surface, is separated from the deep aquifer by a thick, relatively impermeable aquitard (clay layer) that likely precludes vertical migration of groundwater from the surface to the deep aquifer. As a result, a perched effluent mound has formed beneath the WWTF that appears to be centered beneath the central portion of the percolation field.

- The discharged effluent from the mound may be flowing, in part, laterally towards Nipomo Creek.
- Based on a comparison of water quality analyses, the shallow aquifer beneath the Southland facility appears to consist largely of WWTF effluent. The present monitoring network is inadequate for measuring up- and downgradient water quality impacts, as required by the RWQCB.
- Water levels in the deep aquifer are 170 to 250 feet deep in the vicinity of the site. Limited data exist of water quality for the deep aquifer in the vicinity of the plant, and insufficient historical data exist to establish trends to assess whether effluent disposal has had any impact on water quality of the deep aquifer.
- Sufficient data do not exist to adequately evaluate the potential for the disposed effluent to reach the deep aquifer.

Based on the conclusions outlined above, and discussions with you, Boyle Engineering, and the RWQCB, the primary tasks to be addressed in this next phase of work include:

- Conduct an initial, feasibility level exploration program of potential new disposal sites west of the existing facility.
- Assess the potential for extracting discharged water from beneath the existing facility, for transport and subsequent disposal at another as-yet unidentified site.
- Recommend new monitoring well locations for the Southland WWTF, and meet with the RWQCB to discuss the strategy for developing an adequate monitoring well network, as appropriate.
- Assess the hydraulic relationship of the WWTF and Nipomo Creek, to evaluate whether discharged effluent may be contributing to flow in the creek.
- Obtain water quality samples from the deep aquifer.

SCOPE OF WORK

Task 1 – Feasibility Level Exploration Program of New Potential Disposal Sites

One option under consideration for the upgrade and expansion of the WWTF is to develop new sites for percolation ponds that will have sufficient capacity for increased loading. A feasibility level exploration program is proposed to evaluate the area west of the existing facility, generally in the area bounded by Eucalyptus, Mesa, and Camino Caballo, from Easy Lane on the west as far east as Calle Fresa and Waypoint. Included within this area are several vacant parcels and/or parcels under active agriculture. The District has been approached by the owners of and/or has access to two parcels in this area, including the 40-acre Kaminaka lot between Pomeroy and Calle Caballo, and the 10-acre Silva parcel off of Mesa Lane.

A screening level feasibility program will be conducted using Fugro's Cone Penetrometer Testing (CPT) rig to investigate subsurface conditions in the area. The CPT is an excellent tool for this level of investigation because it pushes a small diameter probe into the subsurface materials, and measures tip resistance at the end of the probe to provide a rapid qualitative evaluation of soil properties, consistency of the materials, and spatial variability of materials. A series of CPT holes will be advanced on the Kaminaka and Silva properties, as well as on any other vacant and/or agricultural properties on which we can gain access. We will work with District staff to attempt to contact property owners of a few select properties in the area to advance a series of CPT holes on the sites. If access is not possible on a sufficient number of properties to adequately canvass the area, then we will utilize the road rights-of-way and push several CPT holes along the shoulders of the roads, most likely concentrating on Mesa Lane.

Although the CPT can be an effective tool for rapid delineation of soil properties and a valuable tool for site screening, it should be noted that there are potential limitations should the subsurface materials be particularly dense or hard. If a sufficiently thick clay layer (aquitard) is present, the CPT may not be able to penetrate the clay; however, such information is particularly informative for this type of study.

Key issues to address for the new percolation pond sites include percolation capacity, local geology and hydrogeology, and presence of near-surface retarding clay layers.

Provision is included herein to conduct additional subsurface investigations if the results of the feasibility level screening program appears favorable. At the sites that appear most favorable, hollow-stem auger borings will be drilled at each site (likely two per site, based on an estimated two sites for further consideration) to depths of approximately 100 feet to verify soil conditions, percolation capacity, and stratigraphy. Undisturbed subsurface samples will be grabbed to obtain estimates of sustained infiltration rates based on laboratory-determined permeability values.

Task 2 – Assess the Potential for Extracting Discharge Water from Beneath the Southland WWTF, for Transport and Subsequent Disposal at Other Sites

Under this concept, discharged effluent will be pumped directly from the effluent mound beneath the Southland WWTF, and piped to a new site for additional percolation and disposal. To evaluate the potential for wells at the Southland site to extract sufficient effluent to make the concept viable, a series of pumping tests will be conducted on two of the existing monitoring wells, specifically MW-1 and MW-3. The existing purge pumps will be pulled from each monitoring well, and a temporary submersible pump set in each well. Each well will then be tested using a series of pumping tests, including a step-drawdown test, a 24-hour constant discharge test, and a recovery test. The length of the constant rate discharge test, while planned for 24 hours, will be run a sufficient duration to achieve the objectives of the test, or a maximum of 72 hours. Throughout the pumping tests, water levels will be monitored in the pumping well as well as in several of the on-site monitoring wells to measure hydraulic characteristics and parameters of the shallow aquifer beneath the site. At the conclusion of the constant rate pumping test, a water sample will be obtained to analyze for general mineral, nitrogen species, and other appropriate minerals and constituents as identified by the District and engineers from Boyle Engineering.

The results of this task will be critically important towards advancing the "put and take" concept of extracting discharged effluent from the mound beneath the Southland site, with subsequent disposal at the potential site(s) identified in Task 1, above. Should this concept appear favorable, it is likely that a site-specific numerical flow model should be constructed to simulate the impacts of the concept on the mound and the ability of the program to effectively control the effluent mound. The data obtained through these pumping tests will provide hydraulic conductivity values necessary to construct the flow model.

Task 3 – Recommend New Monitoring Well Locations at the Southland WWTF

As described in the Phase 1 report (Fugro, July 17, 2007), the water quality of the produced water in the existing monitoring wells appear to be equivalent to the water quality of the effluent, indicating that the shallow aquifer consists of effluent. Thus, the present monitoring network is inadequate for measuring up- and downgradient water quality impacts, as required by the RWQCB. In order to satisfy the requirements of the RWQCB, new monitoring well locations must be sited to effectively monitor the up- and downgradient water quality impacts of the site.

The work that was started in the Phase 1 efforts will be expanded to assess potential sites for new monitoring wells. Well logs for all the existing wells in the vicinity of the site will be obtained from the Department of Water Resources and reviewed for lithology, depth to groundwater, and presence of the aquitard that exists beneath the WWTF. Based on this review, we will recommend potential sites for new monitoring wells. Additional investigation of these sites may be necessary once identified, but the extent of those investigations will not be known until this initial review is conducted. Any additional necessary work will be outlined in subsequent work tasks. It should be noted that, given the history and mounding influence of the area, it might not be possible to obtain background upgradient water quality that has not been impacted by the mound. We will discuss the results of this task with the RWQCB and develop an appropriate strategy to address it.

Task 4 – Investigate the Relationship of the WWTF and Nipomo Creek

The discharged effluent from the Southland WWTF may be flowing, in part, laterally towards Nipomo Creek. If operations are to continue at the WWTF, the RWQCB will require an investigation of the potential water quality impacts to the creek. As indicated by the RWQCB, the Clean Water Act 303(d) list of impaired waters included Nipomo Creek as impaired with fecal coliform bacteria. Thus, the RWQCB indicates that any further investigation should include fecal bacteria analyses in order to assess or preclude effluent as a source for the possible impairment. We will pursue this approach as outlined by the RWQCB, although we may not be able to use fecal coliform as a chemical signature for identifying the source of the water.

We propose a first-level investigation at this time. If, through this initial investigation, we can rule out that the WWTF is not responsible or contributing to the impairment of the water quality of the creek, then additional investigation will not be needed. If, however, the results of this initial study suggest a possible link, additional work will likely be required to investigate the degree of hydraulic communication and contribution of the facility to the creek. This subsequent investigation, if necessary, will be developed in future work tasks.

A series of surface water quality samples will be obtained from Nipomo Creek from a point upstream of the WWTF, to a point downstream of the facility. Prior to obtaining the surface water samples, we will work with the District, engineers from Boyle Engineering, and the analytical laboratory chemists to identify possible effluent signatures that may be unique to the effluent. We will also identify an appropriate suite of bacteria analyses that will help either link or eliminate the WWTF effluent from the surface water flow. These signature constituents will then be analyzed for in the samples, as well as testing for basic general mineral and inorganic chemical constituents.

As discussed in our meetings during the development of this work effort, the laboratory cost of the water quality sampling task will not be known until the chemical signatures are identified. Thus, the costs of the laboratory analyses are not provided in the attached fee estimate, and will be paid for directly by the District.

Task 5 –Assess the Water Quality of the Deep Aquifer in the Vicinity of the Southland WWTF and Potential New Percolation Pond Sites

Before permits are granted and new Waste Discharge Requirements are issued by the RWQCB for the upgrade and expansion of the WWTF, the potential impacts of the expanded facility on the receiving aquifer must be evaluated. To assess this potential impact, the water quality of the deep aquifer must be known.

Based on our review of the well logs obtained from the DWR, as well as a canvass of the area, we will identify several potential water wells that pump groundwater from the deep aquifer for sampling. We will then work with District staff to contact the well owners and obtain permission to sample their well. This will provide a baseline for future investigations and discussions with the RWQCB.

Task 6 –Summary Report

The results of the tasks described above will be documented in a summary report, in which we will present the findings and conclusions and provide appropriate recommendations.

SCHEDULE

We can start work within two weeks of receiving a Notice to Proceed (NTP). We understand that time is of critical importance for all these activities, so we are prepared to assign appropriate personnel to the tasks to accomplish the work as quickly as possible.

The Task 1 efforts will be partly dependent on CPT rig availability. Typical backlog of the rig is about one month. In the time, however, work can proceed on gaining property access, permits, etc. Assuming that no difficulties are encountered with property access, data acquisition, contractor availability, etc., we estimate that approximately four to five months will be required to complete the work as outlined above.

FEE

We will provide our services on a time and expense basis according to the attached fee schedule rates. Our anticipated fee for the Phase 2 efforts described in this proposal is approximately $158,841.

We appreciate the opportunity to continue working with you on this project. We look forward to meeting with you and your Board on September 12 to discuss the proposal and answer any questions. Please contact us if you have questions or require additional information.

Sincerely,
FUGRO WEST, INC.

Paul A. Sorensen

Paul A. Sorensen, PG, CHg
Principal Hydrogeologist
California Professional Geologist
California Certified Hydrogeologist

David Gardner, PG, CHg
Senior Vice President
Principal Hydrogeologist

Appendix K: Technical Memorandum 11:

Southland Wastewater Treatment Plant Facility Master Plan

Cannon
ASSOCIATES

ENGINEERS
PLANNERS
SURVEYORS

Technical Memorandum

June 8, 2007

To: Bruce Buel
Nipomo Community Services District

From: Mike Ratty, Garing, Taylor &Associates, RCE 30798
Larry Kraemer, Cannon Associates, RCE 44813

Subject: **Technical Memorandum 11: Southland Wastewater Treatment Plant Facility Master Plan**

The *Southland Wastewater Treatment Facility Master Plan - Draft*, dated February 9, 2007, prepared by Boyle Engineering Corp. lists the following system improvements, future process alternatives and recommended Capital Improvement Plan.

Current System Improvements:

- Frontage Road Trunk Main
- Influent Pump Station
- Screening and Grit Removal
- Sludge Removal
- Operability and Automation

Future Process Alternatives:

- Expansion of Aerated Ponds
- Biolac® Conversion
- Activated Sludge
- Oxidation Ditch
- Tertiary Treatment

Of the Current System Improvements noted above, replacement or paralleling the Frontage Road trunk main, modifications to the influent pump station and installing screening and grit removal equipment is proposed to be accomplished by the year 2009.

The existing pump station capacity is adequate through 2015. However, improvements to the influent pump station are recommended for 2009, in conjunction with construction of the new Frontage Road trunk main. The new trunk main will require a very deep excavation, and it is likely that doing both projects at the same time will be more cost effective.

The installation of appropriately sized and rated variable frequency drives is recommended as the most economical method to forestall the periodic influent pump station pump failures, which are related to poor PG&E power quality. The installation of these drives will improve the power quality to the influent pump station motors such that the motors will stay on-line. In addition, the

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variable frequency drives will maximize the time between pump starts. Finally, variable frequency drives also minimize in-rush current, which has the effect of minimizing pump motor heating that may be caused by more frequent than desired starts.

The least costly options for screening and grit removal systems should be included in the Capital Improvement Plan for installation in 2009 (Parks & HLS 500 Hycor Shelisieve and Aerated Grid Chamber as noted on Page 54 of the Wastewater Treatment Facility Master Plan).

Of the Future Process Alternatives, the oxidation ditch (Biolac Wave Oxidation System) is the most cost effective future treatment option. Phase I Wave Oxidation System improvements are also proposed to be completed by 2009, and Phase II Wave Oxidation System Process Improvements are proposed to be completed by 2015. Phase I Process Improvements will increase the plant capacity to 1.7 MGD maximum monthly flow, and Phase II Improvements will raise the plant capacity to 2.4 MGD maximum monthly flow. Note that current permitted maximum monthly flow is 0.9 MGD and plant design capacity is 0.94 MGD.

Although not part of the Capital Improvement Plan presented in the Master Plan, sludge removal through the use of rental dredge equipment should be explored in the near term and arrangements made for such rental and sludge removal on an annual basis made and funded from the Wastewater Maintenance Account.

There appears to be no need to institute tertiary filtration or chlorination for water reuse in the near future. It should not be overlooked that the plant process currently recycles almost all of the influent wastewater through the use of infiltration basins although some of the water does evaporate. It may be appropriate to further study the subsurface travel of infiltrated effluent and an effort made to directly recover that effluent as potable water through the use of a groundwater well(s).

Appendix L: Technical Memorandum 12:

Southland Shop Upgrades

Cannon
ASSOCIATES

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PLANNERS
SURVEYORS

Technical Memorandum

June 20, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: Technical Memorandum 12: Southland Shop Upgrades

NCSD plans to construct improvements to the Southland Shop. The Shop, located south of the intersection of Southland Avenue and Frontage Road, provides office, storage, and garage space for NCSD operation and maintenance activities.

The proposed upgrade, as described in the Mitigated Negative Declaration adopted by the District in January 2007, will enlarge the existing office and storage space, provide shower facilities, expand garage space, improve security features such as lighting and fencing and provide paved access to some interior areas. Estimated costs for this upgrade are approximately $400,000.

One possible additional aspect of the shop upgrade may be installation of solar panels to offset electrical usage. Currently, the Shop uses an average of approximately 775 kwh per month. With the planned upgrade discussed above, this usage may double. Assuming solar panels are installed to offset current usage, costs and savings are estimated as shown on the table below. Details for these cost calculations are shown in the attached Quotation and Electric Usage Analysis from Pacific Energy Company.

Item	Approximate Cost
Installation	$24,000
Currently Average Monthly Electrical Costs	$127.00
Anticipated Average Monthly Electric Costs	$38.00
Anticipated Monthly Savings	$89.00
Estimated Payback Period	12 years

The attached invoice shows Federal Tax Credits and State Buydown Credits which may be available to offset some of the costs for installation of the solar system. The State Buydown Credit comes from the California Solar Initiative, a program which provides incentives on a declining tier structure; incentive amounts decrease as more projects utilize the program. The program is designed to provide funding assistance through 2017. Actual incentive funding and refund amounts that may be available will be determined at the time of installation.

Quotation

Quote Number:
8023

Ouote
May 10, 2007

Page: 1

PACIFIC
ENERGY
COMPANY

2121 Santa Barbara St.
San Luis Obispo, Ca. 93401

Voice: 805-544-4700
Fax: 805-544-3411

Website: www.alteryourenergy.com
EMail: info@alteryourenergy.com

Quoted to:
CANNON ASSOCIATES
364 PACIFIC STREET
SAN LUIS OBISPO, CA 93401

Ship To:
PROJECT 60801
NIPOMO, CA 93444

Phone 1	Phone 2	Fax	Customer ID	Good Thru	Payment Terms
805-544-7407	FRANK x258	805-544-3863	CANNON A	6/9/07	C.O.D.

Quantity	Item	Description	Unit Price	Extension
20.00	SW175 mono/P	SOLARWORLD SW175 mono/P 175watt (158.3) 24vdc 4.95amp SOLAR ELECTRIC MODULE, ALUMINUM FRAME, 25 year warranty. FOB SLO	977.00	19,540.00
2.00	DPTTRGM10/SQ160	DIRECT POWER ROOF or GROUND FIXED ALUMINUM MOUNT FOR 10 SHELL SQ175 MODULE. STACKED CONFIGURATION ONE-PIECE LEGS	657.00	1,314.00
1.00	XAN-GT3.0	GT3.0-NA-DS-240 (94.5%) 3000W 240Vac XANTREX INVERTER W/DISPLAY, 195-600vdc INPUT 10 year WARRANTY.	2,329.65	2,329.65
1.00	INSTALL/PVR2	INSTALL PV SYS (Five year warranty) 12-24 MODULES W/ ROOF MOUNTED RACKS. assumes: comp roof, accessible attic, ample load center, TO BE FIELD VERIFIED	6,500.00	6,500.00
	BUYDOWN PC175/20 CO	$1.90 Watt GT3.0 (94.5%) ESTIMATED ELIGIBLE CALIF. STATE BUYDOWN REBATE CONTRACTOR INSTALLED ** TO BE PAID BY STATE AFTER INSPECTION**	-5,684.55	
	TAX CREDIT	FEDERAL TAX CREDIT ... TAKEN ON TAX RETURN	-2,000.00	
	CEC AGRMNT	We agree to make this transaction at the prices stated assuming we get a rebate from the CEC in the amount specified. Accepted by:		

Installed by:____________________________
When is customer ready for install:____________________
Is this unit for new construction? ____________________
Customer Deposit Amount:________________________

Subtotal	**29,683.65**
Sales Tax	**1,796.73**
Freight	
Total	**31,480.38**

This is a Cash Price. Changes and Deletions will be charged accordingly. 50% of price is due on order with 50% due on delivery.Thanks for shopping at Pacific Energy Company.

Appendix M: Technical Memorandum 13:

County Drainage Projects, Impacts to NCSD Sewer System

Cannon
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PLANNERS
SURVEYORS

Technical Memorandum

May 18, 2007

To: Bruce Buel
Nipomo Community Services District

From: Larry Kraemer, RCE 44813

Subject: **Technical Memorandum 13: Sewer System Impacts Due to County Drainage Projects**

San Luis Obispo County intends to complete six drainage system improvement projects within the next three years. This memo examines the planned County drainage projects, identifies potential impacts to the sewer system, and evaluates an estimated cost for each relocation or temporary modification.

The six County drainage system projects are described below and shown on the figures at the end of Technical Memorandum 6 (Appendix F).

- **Project 1**, Tefft Street Box Culvert Improvements: Existing box culvert to be removed and replaced with double 5' high by 12' wide box culverts; existing grade & flowline to be maintained.
- **Project 2**, Thompson Avenue Arch Culvert Improvements: Existing box culvert to be removed and replaced with Contech arch culvert.
- **Project 3**, Mallagh Street Arch Culvert Improvements: Existing CMP pipe culvert to be replaced with Contech arch culvert. New structure will require additional depth beneath that of existing structure. Flow line to be maintained, but the footing for the arch culvert will be buried deeper.
- **Project 4**, Mallagh Street Box Culvert Improvements: Remove and replace existing dbl 36" rcp culvert with dbl 4' high by 3' wide box culvert. Also, abandon portion of existing 24" cmp and construct 24" HDPE culvert. New culvert will be buried 4" to 6" lower than current.
- **Project 5**, Burton Street Box Culvert Improvements: Remove and replace existing 48" CMP culvert with double 4' high by 5' wide box culvert.
- **Project 6**, Mallagh & Sea Street Pipe Culvert Improvements: Existing double 24" CMP culvert to be replaced with new triple 24" HDPE culvert. No changes to grade or depth of structure planned. *This project has been completed.*

As shown in the figures, the majority of projects have sewer lines within the immediate vicinity of the construction. Proposed projects were reviewed with Steve Jones of San Luis Obispo County staff and NCSD Operations staff. The following potential impacts were identified.

At this point, no permanent or temporary relocations for NCSD sewer lines seem to be required, other than possibly a temporary relocation of the 4” sewer lateral for project #5. The County may need to coordinate with the District for encasement of the existing sewer lines within the footings of several of the new structures.

Table 13-1: Sewer System Impacts

Drainage Project	Sewer System Impact
1. Tefft Street Box Culvert Improvements	Existing sewer line runs through project area and existing sewer manhole adjacent to project. Current sewer line is beneath center of existing structure, and future structure planned to match grade of existing structure, so no sewer line impacts are anticipated.
2. Thompson Avenue Arch Culvert Improvements	Sewer system ends before project area; no impacts anticipated
3. Mallagh Street Arch Culvert Improvements	Existing sewer in project area. footing to be designed to encase sewer line with no relocation required.
4. Mallagh Street Box Culvert Improvements	Existing 8" sewer in project area but below level of improvement work. No impacts anticipated for culvert replacements.
5. Burton Street Box Culvert Improvements	Existing 4" sewer lateral and 8" sewer main in project area. Sewer lateral will need temporary relocation or support during construction. Likely sewer main will be close to new box culvert; may need to encase existing line in place for protection.

Appendix N: Technical Memorandum 14:

Hazard and Security Projects for Water and Wastewater Facilities

Cannon
ASSOCIATES

ENGINEERS
PLANNERS
SURVEYORS

Technical Memorandum

August 10, 2007

To: Bruce Buel
Nipomo Community Services District

From: Jim Garing, Garing Taylor & Associates, RCE 26993
Larry Kraemer, Cannon Associates, RCE 44813

Subject: **Technical Memorandum 14: Hazard and Security Projects for Water and Wastewater Facilities**

The purpose of this memo is to evaluate the security of the District's water production and storage facilities and wastewater treatment and transmission facilities. This memo proposes projects to upgrade each facility's security and provides cost estimates for each such upgrade, including detailed cost estimates.

Water System Security Projects

The table below describes recommended measures to improve water system security, including an estimate of likely costs and an identification of the threats addressed by each measure. Proposed measures are categorized as to whether they address training, operations, planning, or facility modifications.

The facility recommendations below generally apply to all facilities in the system, including treatment facilities, administrative buildings, SCADA systems, site areas, tanks, pump, wells, and exposed pipelines. Note that system redundancy may provide the greatest degree of system security for any of the noted threats.

Training Measures

Proposed Security Measure	Threat Addressed	Estimated Cost
Conduct local emergency exercises to test local preparedness and familiarity with the ERP and NIMS. Regular drills provide staff with Emergency Response Plan familiarity and improve responsiveness when real emergencies occur. Drills also reveal procedures and measures which can be improved.	All	Staff time and/or outside consultant
Conduct employee security training through the American Water Works Association's security planning service. This program is available on-line at http://www.awwa.org/science/wise/.	Human Intrusion	$40 and Staff time.

Operations Measures

Proposed Security Measure	Threat Addressed	Estimated Cost
Appoint a security officer to implement and administer a formal security program. The formal designation of an individual fixes responsibility and increases the likelihood of implementation of a formal security program and its components.	All	Staff time. Initial preparation of a security plan should take less than 40 hours.
Develop mutual aid agreements with other water providers.	All	Interconnect with Golden State, Woodlands, and/or other neighboring providers such as City of AG.
Enlist neighbors to watch and report suspicious activity. Many of the District's critical components are located in semi-rural areas where threats and hazards are most noticeable to facility neighbors. Mailed and newspaper requests for neighborly assistance are normally not as effective as a staff member visit to a neighbor with a request to 'keep an eye' on a District facility and a written copy of who and where to call 24 hours a day. When neighbors don't have the telephone number to call or when there is no observable response by the District, neighbors tend to lose interest.	Human Intrusion	Staff time and/or outside consultant.

Planning Measures

Proposed Security Measure	Threat Addressed	Estimated Cost
NCSD has a formal Emergency Response Plan (ERP) prepared in 2006, that incorporates Vulnerability Assessments (VA) prepared in 2003, as required by the Environmental Protection Agency (EPA). These plans should be reviewed every third year and updated as required. The District may wish to expand upon some detail in its ERP. VAs identify a number of security measures that require frequent and repetitive actions such as site fire fuel perimeter clearance. A number of these measures are repeated below and inclusion of a measure does not imply current inadequate attention or performance.	All	Staff time and/or outside consultant
Determine adequate water storage and delivery needs for current and future system users.	All	Currently under study.
Refresh the Corporation Yard evacuation plan and adopt a personnel and equipment staging plan. The staging and disbursement of equipment in certain circumstances can improve response times and reduce equipment losses which can result by concentrating all resources at a single location.	All	Staff time.
Evaluate Corporation Yard compliance with the FEMA Earthquake Plan Ahead program. This program is accessible on the internet and provides recommendations for property loss.	Earthquake	Staff time.

Facility Modification Measures

Proposed Security Measure	**Threat Addressed**	**Estimated Cost**
Evaluate the need for improved redundancy at critical facilities. The single greatest measure that can be taken by utility providers is to provide redundancy for their system components. Redundancy results in a secondary or tertiary method of continuing service when one or more of the system components fail. Current system performance with the single largest supply well out-of-service was evaluated as part of the MPU.	All	To be determined by the degree or depth of evaluation
Install a centrally monitored and recorded surveillance system for well and reservoir sites. Protection of these critical system components is essential to security and public protection. Surveillance systems also act as deterrents.	Human Intrusion	$36,660 (includes admin fees and a contingency factor)
Where deficient, repair/replace security fencing and gating at all well, pump stations and reservoir sites. An annual budget should be instituted for repair and replacement of gates and fencing. All facilities should be reviewed with regularity to determine when and where improvements are warranted.	Human Intrusion	$18,400 (includes admin fees and a contingency factor)
Control key access and change locks when necessary. A formal system to limit the distribution of facility keys and to change or rotate locks is routinely practiced by many utilities. The loss or misplacement of a key should result in replacement of the corresponding lock. Records of key holders should be maintained.	Human Intrusion	Minimal
Where deficient, install/replace with solar/motion detector/LED security night lighting. These devices are relatively economical for their value in deterrence and access detention.	Human Intrusion	$15,600 (includes admin fees and a contingency factor)
Minimize the amount of fuel in areas surrounding wells and reservoirs with a vegetation management program and create defensible fire-resistant space around structures and facilities. Most of the District's facilities appear to be relatively fuel-free; however, a few require further evaluation.	Wildfires	Staff time and/or outside consultant.
Coordinate adequate access and turn-around space for fire-fighting equipment and use at facilities with CDF. Invite local CDF system facility reviews and visitations.	Wildfire	Staff time.
Ensure that District facilities meet the California Fire Code, Health and Safety Code, Building Code, and Code of Regulations (wildland fire prevention and suppression standards). Analyze the degree of severity of new construction sites and their applicability to Assembly Bill 337 (brush clearance and fire resistant roof material). Invite local CDF system facility reviews and visitations.	Wildfire	Staff time.
Facilities should not be constructed on or near known faults. Architects and engineers designing facilities rely on environmental evaluations and studies which should evaluate impacts of nearby faults.	Earthquake	Varies as to the location of the proposed facility.
Conduct a Phase I Seismic Evaluation of facilities, to determine if proactive measures/retrofits can be taken to minimize risk/danger. Measures may include tank anchorage, equipment anchoring, etc.	Earthquake	$50,000 (includes admin fees and a contingency factor)

Wastewater System Security Projects

The table below describes recommended measures to improve wastewater system security, including an estimate of likely costs and an identification of the threats addresses by each measure. Many of the recommendations listed for the District water system are duplicated below. Much of the cost attributable to implementing water system recommendations reduces the cost of implementing the sanitary sewer system recommendations listed below.

Proposed measures are categorized as to whether they address training, operations, planning, or facility modifications. The facility recommendations below generally apply to all facilities in the system, including treatment facilities, administrative buildings, SCADA systems, site areas, tanks, pump, wells, and exposed pipelines. Again, note that system redundancy may provide the greatest degree of system security for any of the noted threats.

Training Measures

Proposed Security Measure	Threat Addressed	Estimated Cost
Conduct local emergency exercises to test local preparedness and familiarity with the ERP and NIMS. Regular drills provide staff with ERP familiarity and improve responsiveness when real emergencies occur. Drills also reveal procedures and measures which can be improved.	All	Staff time to be shared with water system.
Conduct employee security training through the American Water Works Association's security planning service. This program is available on-line.	All	$40 and Staff time.

Operations Measures

Proposed Security Measure	Threat Addressed	Estimated Cost
Appoint a security officer to implement and administer a formal security program. The formal designation of an individual fixes responsibility and increases the likelihood of implementation of a formal security program and its components.	All	Staff time to be shared with water system. Initial preparation of a security plan for both utilities should take less than 40 hours.
Enlist neighbors to watch and report suspicious activity. Many of the District's critical components are located in semi-rural areas where threats and hazards are most noticeable to facility neighbors. Mailed and newspaper requests for neighborly assistance are normally not as effective as a staff member visit to a neighbor with a request to 'keep an eye' on a District facility and a written copy of who and where to call 24 hours a day. When neighbors don't have the telephone number to call or when there is no observable response by the District, they tend to lose interest.	Human Intrusion	Staff time and/or outside consultant

Planning Measures

Proposed Security Measure	Threat Addressed	Estimated Cost
Refresh the Corporation Yard evacuation plan and adopt a personnel and equipment staging plan. The staging and disbursement of equipment in certain circumstances can improve response times and reduce equipment losses which can result by concentrating all resources at a single location.	All	Staff time and/or outside consultant, to be shared with water system.

Facility Modification Measures

Proposed Security Measure	Threat	Estimated Cost
Evaluate the need for improved redundancy at critical facilities. The single greatest measure that can be taken by utility providers is to provide redundancy for their system components. Redundancy results in a secondary or tertiary method of continuing service when one or more of the system components fail.	All	To be determined by the degree or depth of evaluation.
Install a centrally monitored and recorded surveillance system at the treatment and disposal site and the Corporation Yard. Protection of the site is essential to security and public protection. Surveillance systems also act as deterrents.	Human Intrusion	$14,300 (includes admin fees and a contingency factor)
Where deficient, repair/replace locked security fencing at pump stations and the treatment and disposal facility. An annual budget should be instituted for repair and replacement of gates and fencing. All facilities should be reviewed with regularity to determine when and where improvements are warranted.	Human Intrusion	$15,150 (includes admin fees and a contingency factor)
Control key access and change locks when necessary. A formal system to limit the distribution of facility keys and to change or rotate locks is routinely practiced by many utilities. The loss or misplacement of a key should result in replacement of the corresponding lock. Records of key holders should be maintained.	Human Intrusion	Minimal
Where deficient, install/replace with solar/motion detector/LED security night lighting. These devices are relatively economical for their value in deterrence and access detention.	Human Intrusion	$7,800 (includes admin fees and a contingency factor)
Minimize the amount of fuel and create a defensible space in areas surrounding structures and facilities with a vegetation management program. Determine adequate water supply for fire suppression at the treatment and disposal facility. Coordinate adequate access and turn-around space for fire-fighting equipment and use at facilities with CDF. Invite local CDF system facility reviews and visitations.	Wildfire	Staff time and/or outside consultant
Facilities should not be constructed upon or near known faults. Architects and engineers designing facilities rely upon environmental evaluations and studies which should evaluate impacts of nearby faults.	Earthquake	Varies as to the location of the proposed facility.
Conduct a Phase I Seismic Evaluation of facilities, to determine if proactive measures/retrofits can be taken to minimize risk/danger. Measures may include tank anchorage, equipment anchoring, etc.	Earthquake	$50,000 to be shared with water system

References

http://www.fema.gov/plan/prevent/earthquake/index.shtm

National Emergency Response and Rescue Training Center (NERRTC):
http://teexweb.tamu.edu/nerrtc/

American Water Works Association security planning service
http://www.awwa.org/science/wise/

ASCE/AWWA/WEF. Guidelines for the Physical Security of Water Utilities. December 2006.

Detailed Cost Estimates

Water System

	Unit Cost	Cost
Video Surveillance System 24 Camera Installations		
16 Channel DVD Cards	$1,200	$2,400
Telecommunications	$300	$7,200
24 Cameras	$150	$3,600
Computer	$2,000	$2,000
Installation Costs	$400	$9,600
Recording Equipment	$1,000	$1,000
Posts and Mountings	$100	$2,400
Total		**$28,200**

AWWA security training course	$40	**$40**

Security Fencing & Locks - 100 Feet Length estimate		
Replace Chain Link 8' with posts & top wire	$90	$9,000
10 Locks	$15	$150
Two Replacement Gates	$2,500	$5,000
Remove existing materials		Staff Time
Total		**$14,150**

Security Night Lighting - 24 systems		
Solar/Motion Detector/Led Light	$150	$3,600
Installation Costs	$150	$3,600
Posts, Mountings, Misc.	$200	$4,800
Total		**$12,000**

Phase I Seismic Evaluation		**$35,000**

Subtotal		**$89,390**

Additional Items		
Administrative/Engineering/Legal Fees	15%	$15,660
Contingency	15%	$15,660
Grand Total		**$120,710**

Wastewater System

Video Surveillance System 10 Camera Installations		
16 Channel DVD Card and Telecommunications	$ 1,200	$1,200
Cameras – 10	$ 150	$ 1,500
Computer	$ 2,000	$ 2,000
Installation Costs – 10	$ 150	$ 1,500
Posts and Mountings – 10	$ 400	$ 4,000
Recording Equipment	$1,000	$ 1,000
Total		**$ 11,200**

Security Fencing & Locks 100 Feet Length		
Replace Chain Link 8' with posts	$ 90	$ 9,000
10 Locks	$ 15	$ 150
One Replacement Gates	$ 2,500	$ 2,500
Remove existing Gate		Staff Time
Total		**$ 11,650**

Security Night Lighting 12 systems		
Solar/Motion Detector/Led Light	$ 150	$ 1,800
Installation Costs	$ 150	$ 1,800
Posts, Mountings, Misc.	$ 200	$ 2,400
Total		**$ 6,000**

Subtotal		**$28,850**

Additional Items		
Administrative/Engineering/Legal Fees	15%	$4,330
Contingency	15%	$4,330
Grand Total		**$37,510**

Appendix O: Technical Memorandum 15:

FEMA Hazardous Mitigation Grant Program

Cannon
ASSOCIATES
ENGINEERS
PLANNERS
SURVEYORS

Technical Memorandum

August 10, 2007

To: Bruce Buel
Nipomo Community Services District

From: Jim Garing, Garing Taylor & Associates, RCE 26993
Larry Kraemer, Cannon Associates, RCE 44813

Subject: Technical Memorandum 15: FEMA Hazardous Mitigation Grant Program

The purpose of this technical memorandum is to determine the additional planning requirements necessary for the Nipomo Community Service District to qualify for FEMA's Hazard Mitigation Grant Program (HMGP) funding. This memo includes an overview of both the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation program. This memo also includes a list of recommended projects that might qualify for funding assistance through either program.

Background

FEMA provides financial assistance to local communities through two programs:

- Pre-Disaster Mitigation (PDM) project grants.
- Post-disaster Hazard Mitigation Grant Program (HMGP) project funding.

For a local government to qualify for funding, both programs require the jurisdiction to prepare a Local Hazard Mitigation Plan (LHMP) and to obtain State Office of Emergency Services (OES) approval of that Local Hazard Mitigation Plan.

The State Office of Emergency Services advises that the approved San Luis Obispo County Local Hazard Mitigation Plan qualifies the Nipomo Community Services District for PDM and HGMP funding; however, the District must submit its grant applications to the County for submittal to OES and FEMA. The County of San Luis Obispo is the currently OES and FEMA approved grant applicant for unincorporated community services districts in San Luis Obispo County.

In the event the District desires to be an OES direct grant applicant and chooses not to submit its applications through the County, it may do so by preparing its own Local Hazard Mitigation Plan and receiving OES approval. Alternatively, the District may partner with San Luis Obispo County during the County's five year Local Hazard Mitigation Plan update in 2011. That update could qualify the District as a direct applicant if Nipomo-specific information, as required at the time by OES, is contained in the updated County Local Hazard Mitigation Plan.

Pre-Disaster Mitigation (PDM) Project Grants

PDM grants are awarded for mitigation projects planned to reduce the potential for disaster, *prior* to the occurrence of a disaster. Funds are available in three categories:

- Mitigation planning, such as new plan development, updates and reviews of existing plans, risk assessment, and information dissemination;
- Mitigation projects, such as the elevation of floodproof structures, protective measures for water and sanitary sewer system retrofit projects and retrofit projects for seismic and wind projects. The types of projects eligible for PDM funding are similar to those eligible for HMGP funding;
- Management efforts to support these two activities.

FEMA applies a benefit-cost analysis method to determine a project's future benefits and compares it to the project's cost. According to information placed on the internet at *http://www.fema.gov/government/grant/resources/index.shtm* by FEMA, "FEMA must fund cost-effective mitigation projects." A FEMA Helpline (1-866-222-3580) is available to handle inquiries.

It is recommended that the District further explore the applicability of this program, including application procedures and specific types of projects eligible for funding.

FEMA Hazard Mitigation Grant Program (HMGP)

The FEMA Hazard Mitigation Grant Program is a national program which provides grants to local governments to implement long-term hazard mitigation measures *after* a major disaster declaration. The purpose of the program is to enable mitigation measures to be implemented during the immediate recovery from a disaster, and to reduce the loss of life and property as a result of a natural disaster.

In the event of a disaster declaration by the U.S. President, the District may apply for HMGP assistance. The State shall determine deadlines and other criteria at that time. The State selects eligible projects and submits them to FEMA for review to ensure project compliance with federal laws and regulations and to evaluate the project's potential environmental impacts. The time required for the environmental review depends on the complexity of the project.

Projects which may qualify HMGP funding include:

- Projects that reduce or eliminate losses from future disasters.
- Projects that provide a long-term solution to a problem, rather than an interim measure.
- Projects where the potential savings are greater than the cost of implementation.
- Projects that protect public and/or private property.
- Projects that protect property from repetitive damage and recovery costs.
- Projects that retrofit facilities to minimize damages from natural hazards.
- Projects that elevate flood-prone structures.
- Projects that develop and initiate vegetative management programs.
- Minor flood control projects that do not duplicate federal activities.

- Localized flood control projects, such as levees and floodwall systems for critical facilities.
- Post-disaster building code projects that support building code officials during the reconstruction process.

The minimum HMGP eligibility criteria for proposed projects is a yes answer to all of the following questions:

- Does the project conform to the State's Hazard Mitigation Plan?
- Does the proposed project provide a beneficial impact on the disaster area?
- Does the proposed project solve a problem independently?
- Is the proposed project cost-effective?
- Does the project meet environmental requirements?

Applications for HMGP projects should be submitted as soon as possible after a disaster declaration, therefore local agency preparations prior to a declaration can expedite the agency's application, as well as minimize the conflict for agency attention and resources during the recovery period.

Project Recommendations

The San Luis Obispo County Local Hazard Mitigation Plan identifies a number of potential natural disaster hazards to the Nipomo area that may potentially affect the District. Among the natural hazards identified by San Luis Obispo County for the Nipomo area are:

- Wildfires - High Severity / High Probability / High Value
- Flooding - Medium Severity / Medium Probability
- Earthquakes - Medium to High Severity / Low to Medium Probability
- Fault Rupture - Moderate Hazard

The District may consider implementing the following projects prior to a disaster declaration and/or damages within the community, to limit potential for disaster related to these hazards. Funding for such projects may be pursued under the PDM program. In the event of a disaster declaration, some of these projects may be eligible for HMGP funding instead.

The projects are broken down by category into training, facilities, planning, and human resources:

Training

- The National Emergency Response and Rescue Training Center (NERRTC) provides Emergency Operations Center (EOC) management and operations training at its College Station, Texas model facilities. A senior District staff member is encouraged to apply and attend a one week course next summer or fall. All expenses can be paid by the Homeland Security Agency upon application. Additional information is available on the NERRTC website: *http://www.teex.com/nerrtc*.
- Conduct emergency management training offered by FEMA.

Facilities

- Create a formal District EOC facility to respond to emergencies and for disaster recovery.
- Prepare and maintain a current list of District facilities and their estimated replacement cost. (See County Local Hazard Mitigation Plan Page 156 for list of Nipomo streets exposed to potential losses. These streets contain significant NCSD utilities.)
- Identify the most-likely District facilities to encounter damage or loss as a result of natural disaster. Concentrate protective measures on these facilities.
- Conduct a seismic evaluation of the District's facilities.
- Invite local law enforcement and fire officials to visit facilities.

Planning

- Create and/or update a Disaster Recovery Plan to bring facilities back into operation as quickly as possible after a forced shutdown. Include the Disaster Recovery Plan in the existing District Emergency Response Plan.
- Follow the National Incident Management System (NIMS) model required for local emergency management, response and recovery.
- Prepare a financial plan to fund projected recovery costs as an interim measure until such times as FEMA grant program reimbursements are received.
- Optional: Prepare and adopt a District Local Hazard Mitigation Plan consistent with the County of San Luis Obispo Local Hazard Mitigation Plan and the State's Hazard Mitigation Plan. Request Local Hazard Mitigation Plan approval from the State Office of Emergency Services. District letterhead should be addressed to the Governor's Office of Emergency Services, P.O. Box 419023, 3650 Shriver, Suite 110, Mather, CA 9565. Alternatively, the District should plan to coordinate with the County in their next update to their current plan.

Human Resources

- Conduct employee background checks to verify employee history.
- Review the District's insurance coverage and include an insurance adjuster on the Damage Assessment Team.

Appendix P: Technical Memorandum 16:

CCWA Disinfection and Regulatory Compliance

Cannon
ASSOCIATES
ENGINEERS
PLANNERS
SURVEYORS

Technical Memorandum

November 8, 2007

To: Bruce Buel
Nipomo Community Services District

Prepared by: Jim Garing, Garing Taylor & Associates, RCE 26993

Reviewed by: Larry Kraemer, Cannon Associates, RCE 44813
Rebekah Oulton, Cannon Associates

Subject: **Technical Memorandum #16: CCWA Disinfection and Regulatory Compliance**

CCWA water uses chloramines for disinfection, a method which is incompatible with the chlorine-based disinfection method currently used by the District. Use of CCWA supplemental water may necessitate additional compliance requirements or operational modifications to accommodate this alternate disinfection method. Compliance challenges and operational choices available to meet the regulatory requirements for use of CCWA water are reviewed below.

Compliance with Long Term 2 Enhanced Surface Water Treatment Rule (LT2)

Additional disinfection profiling and benchmarking may be required in the future with CCWA water. The District would need to contemplate significant changes to their disinfection practices:

- Create disinfection profiles for *Giardia lamblia* and viruses;
- Calculate a disinfection benchmark; and,
- Consult with the state prior to making a significant change in disinfection practices.

Compliance with Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR2)

Should the District begin using chloraminated CCWA water, the US EPA and CA DHS would likely reevaluate the District's monitoring plan and require that either a Standard Monitoring Plan or System Specific Study be conducted to characterize the potential change of DBPs in the distribution system. Being part of a "combined" distribution system at that point would require that the District collect TTHM and HAA5 quarterly samples from six separate sample locations.

Disinfection Alternatives

Boyle Engineering Corporation has prepared the "DRAFT, Nipomo Waterline Intertie Project - Preliminary Engineering Memorandum" (November 2006) to evaluate issues and costs of acquiring CCWA water. The Disinfection Alternatives summarized below are discussed in detail in the Boyle Memorandum.

Currently the District uses liquid sodium hypochlorite injection at each groundwater well to provide a free chlorine residual in the distribution system. Because the District's groundwater is relatively free of the naturally occurring organic precursors that can combine with free chlorine to form DBPs, there has been no significant sampling evidence of DBPs, and hence, no concern that DBPs will become elevated under current disinfection practices.

CCWA water is disinfected with chloramines (a mixture of chlorine and ammonia) to obtain a total chlorine residual. Boyle Engineering identifies three alternatives for addressing the differences in disinfectant type between the NCSD and CCWA water:

1. Uncontrolled Blending / No Change in Treatment:

   Uncontrolled blending of chlorinated NCSD groundwater with chloraminated CCWA water can be accomplished directly in the distribution system, or at a single location prior to discharge into the system.

   The second alternative is to blend District water with CCWA water at a single location, rather than directly in the system. While having the advantage of better controlling the blend, this alternative would require the district to pipe all of the active groundwater wells to a blend location, as well as construction of a storage tank to control the blend ratio.

2. Converting CCWA Water to Free Chlorine Residual:

   Chloramines can be removed from incoming CCWA water by adding enough additional free chlorine to take the chlorine residual to breakpoint. Additional chlorine would then need to be added to achieve the desired chlorine residual in the distribution system. This chlorinated CCWA water would then blend in the distribution system with NCSD groundwater that also contains a free chlorine residual.

   Once the CCWA water has been converted from chloramine to a free chlorine residual it will begin forming disinfection byproducts (DBPs) including TTHMs and HAA5s in the distribution system. The District will then have the potential for violating the TTHM and/or the HAA5 MCL.

   Two means of controlling DBPs are available: The simplest is to maintain only that level of free chlorine necessary to maintain a detectable residual at the furthest end of the system, and to reduce the age of water in the District system by frequently cycling the water storage tanks, and flushing at dead ends. A second means is to pass the water through a granular activated carbon (GAC) filter to remove natural organic materials (NOM) that react with chlorine to form DBPs.

3. Converting NCSD Groundwater to Chloramine Residual:

   The third alternative available is to maintain a chloramine residual throughout the NCSD system by converting the free chlorination treatment process at the wells to chloramination. This option would require both the addition of ammonia injection at the wells and also the redesign of the chlorine feed system at the wells because of the higher total chlorine residual typically maintained for chloramines, as discussed in the Boyle Memorandum.

   Chloramination will result in little increase in the formation of DBPs and present the fewest water quality problems in the distribution system relative to the other two alternatives (uncontrolled blending or conversion to free chlorine). The District could expect to see a reduction in customer complaints related to taste and odor problems because chloraminated water does not carry the chlorinous tastes and odors that are noticeable with water containing free chlorine.

Disinfection Alternative Cost Comparison

The Boyle report (Appendix V, Disinfection Alternatives Evaluation) summarizes the total cost of the Free Chlorine and Chloramination alternatives as follows:

Alternative	**Capital Cost**	**O&M Costs**
Free Chlorine with GAC Contactors [1]	$950,000	$155,000
Chloramination [2]		
Chloramine Boosting @ Tie-In Point	$260,000	$20,000
Chloramine Treatment for 5 Wells (@ capital cost of $140,000 / well)	$700,000	$35,000
Chloramination Total	$960,000	$55,000

[1] Does not include cost of pilot testing for sizing GAC contactors.

[2] Does not include potential tank mixing devices or chloramine boosting station at Quad Tanks. Cost also does not include increased manpower, analytical, and water loss costs for nitrification monitoring and control.

Recommendation

Capital costs for each option are comparable, O&M costs are significantly less for the chloramination option. Since chloramination would also result in the fewest water quality problems, conversion of the system to a chlormaine-based disinfection method is recommended as part of the incorporation of CCWA supplemental water.

References

Boyle Engineering, *DRAFT Nipomo Waterline Intertie Project – Preliminary Engineering Memorandum*. November, 2006.

Appendix Q: Technical Memorandum 17:

Final Report of the Classification Study and Organizational Review of the Utility Department at the Nipomo Community Services District

KOFF & ASSOCIATES, INC.
Human Resource Consulting Since 1984

FINAL REPORT
Of The
CLASSIFICATION STUDY
AND
ORGANIZATIONAL REVIEW
Of The
UTILITY DEPARTMENT
At The
NIPOMO COMMUNITY SERVICES DISTRICT

February 2007

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KOFF & ASSOCIATES, INC.
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February 23, 2007

Mr. Bruce Buel
General Manager
Nipomo Community Services District
P.O. Box 326
Nipomo, CA 93444

Dear Mr. Buel:

Koff & Associates, Inc. is pleased to present the final report of the classification study and organizational review of the Utility Department at the Nipomo Community Services District. This report documents the classification study process and provides recommendations for the classification plan, allocations of individual positions for all Department staff, updated class specifications, and recommendations regarding organization and staffing of the Department.

This report incorporates a summary of the study's multi-step process which included results of written Position Description Questionnaires, interviews with employees and their supervisors and managers, supervisory, management and employee review and comments in the form of draft class descriptions and class allocation recommendations.

We would like to thank you and other District staff for your assistance and cooperation, without which this study could not have been brought to its successful completion.

We will be glad to answer any questions or clarify any points as you are implementing the findings and recommendations. It was a pleasure working with your District and we look forward to future opportunities to provide you with professional assistance.

Very truly yours,

Georg S. Krammer
Chief Executive Officer

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BACKGROUND

In the Fall of 2006, Cannon Associates subcontracted with Koff & Associates, Inc. to conduct a classification study and organizational review for the Utility Department at the Nipomo Community Services District. This study was precipitated by several factors:

- The concern of management and the District Board of Directors that employees should be recognized for the level and scope of work performed and that they are paid on a fair and competitive basis that allows the District to recruit and retain a high-quality staff;

- The fact that class descriptions had not been systematically reviewed and updated and did not necessarily reflect current programs, responsibilities, technology, and professional certifications;

- The desire to have a classification plan and an organizational structure that can meet the needs of this growing District;

- The desire to ensure that the District has adequate career paths and a classification system that will foster career service within the District;

- The desire to ensure that internal relationships are based upon objective, non-quantitative evaluation factors; and

- The fact that the District is undergoing a complete overhaul of it Water Master Plan, whose purpose is to prepare the District for future growth.

A total of about six (6) authorized positions were studied in five (5) classes.

STUDY GOALS

The goals and objectives of the study were to:

- Obtain detailed information regarding each position through a variety of techniques, including written Position Description Questionnaires and interviews with employees, supervisors, and management;
- Prepare an updated classification plan, including recommended class descriptions and position allocations, that recognizes the scope and level of the various classes and positions, allows for organizational change to increase customer service levels and cost effectiveness, and is perceived equitable by management and employees alike;
- Provide class descriptions and other documentation that includes information required for compliance with the Americans with Disabilities Act (ADA) and appropriate qualifications, including knowledge, abilities, and other requirements that are job-related and meet other legal guidelines;
- Collect organizational information from a set of the comparator agencies that are similar to NCSD in size and service provision;
- Review, analyze, and make potential recommendations that may enhance organizational effectiveness; and
- Study any workload issues related to current operations and service provision of the Utility Department; and
- Provide sufficient documentation to allow the District to maintain the classification system on a regular basis.

STUDY PROCESS

The study procedures were as follows:

- An initial meeting was held with the project team, including District management to clarify study scope, objectives, processes and deliverables.
- An orientation meeting was held to which all employees were invited, to meet consultant staff involved with the project, clarify study objectives and procedures, answer questions, and distribute the Position Description Questionnaires.

- After the Position Description Questionnaires were completed and reviewed by supervisors and consultant staff, interviews were conducted with all employees of the Utility Department.
- Following the analysis of the classification information gathered, draft class concepts, specifications, and position allocations were developed for management, supervisory, and employee review.

- As organizational changes have occurred during the study, such changes were included in all draft material.

- After resolution of issues, wherever possible, including additional contacts to gain details and clarification, appropriate modifications were made to the draft specifications and allocations.

- After review of organizational structures and staffing of Districts with similar operations to NCSD, workload issues, staffing concerns, and organizational considerations were addressed.

- This final report was prepared.

In order to understand our classification recommendations, it is important to understand titling conventions, classification concepts, and how the class descriptions are structured. In preparing the class descriptions, we developed a consistent format that is somewhat different than that currently used by the District. This format has additional information relating to specific class characteristics, supervisory relationships, knowledge, abilities, skills, and other types of requirements, including those required by the ADA.

CLASSIFICATION CONCEPTS

The Difference between Positions and Classifications

"Position" and "Classification" are two terms that are often used interchangeably, but have very different meanings. As used in this report:

- A *position* is an assigned group of duties and responsibilities performed by one person. A position can be full-time, part-time, regular, or temporary, filled or vacant. Often the word "job" is used in place of the word "position."

- A *classification* or *class* may contain only one position, or may consist of a number of positions. When several positions are assigned to one class, it means that the same title is appropriate for each position; that the scope, level, duties, and responsibilities of each position assigned to the class are sufficiently similar (but not identical) that the same core knowledge, skills, and other requirements are appropriate for all positions, and that the same salary range is equitable for all positions in the class.

The description of a position often appears as a working desk manual, going into detail regarding work process steps, while a class description emphasizes the general scope and level of responsibilities, plus the knowledge, skills and other requirements for successful performance.

When positions are classified, the focus is on assigned job duties and the job related requirements for successful performance, not on individual employee capabilities or amount of work performed. Positions are thus evaluated and classified on the basis of such factors as knowledge and ability required to perform the work, the complexity of the work, the authority delegated to make decisions and take action, the responsibility for the work of others and/or for budget expenditures, contacts with others (both inside and outside of the organization), the impact of the position on the organization, and working conditions.

The Relationship of Classification and Compensation

Classification and the description of the work and the requirements to perform the work are separate and distinct from determining the worth of that work in the labor market and to the organization. While recommending the appropriate compensation for the work of a class depends upon an understanding of what that work is and what it requires (as noted above), compensation levels are often influenced by two factors:

- The external labor market; and
- Internal relationships within the organization.

The Purpose of Having a Classification Plan

A position classification plan provides an appropriate basis for making a variety of human resources decisions such as the:

- Design of an equitable salary structure;
- Development of job-related recruitment and selection procedures;
- Objective appraisal of employee performance;
- Development of training plans and succession planning;
- Organizational development and the management of change; and
- Provision of an equitable basis for discipline and other employee actions.

In addition to providing this basis for various human resources management and process decisions, a position classification plan can also effectively support systems of administrative and fiscal control. Grouping of positions into an orderly classification system supports planning, budget analysis and preparation, and various other administrative functions.

Within a position classification plan, job classifications can either be broad (containing a number of positions) or narrow (emphasizing individual job characteristics). Broad job classifications are indicated when:

- ➢ Employees can be hired with a broad spectrum of knowledge, skill and/or academic preparation and can readily learn the details of the organization, the department and the position on-the-job; or
- ➢ There is a need for flexibility of the assignment within a department or an organization due to changing programs, technologies or workload.

Individualized job classifications are indicated when:

- ➢ There is an immediate need to recruit for specialty knowledge and skills;
- ➢ There is a minimum of time or capability for on-the-job training; or
- ➢ There is an organizational need to provide for specific job recognition and to highlight the differences between jobs.

Most classification plans are a combination of these two sets of factors, and we have chosen the middle ground in this study as being most practicable in the District's changing environment and service delivery expectations. This approach resulted in recommendations to change the titles of some classes to more accurately reflect current responsibilities or use more contemporary titles (such as Maintenance Worker to Maintenance/Utility Worker) and to reclassify certain positions to reflect additional responsibilities or special skills (such as Utility Supervisor to Utility Superintendent). Detailed allocation recommendations are found in Appendix II of the report.

Class Descriptions

In developing the new and revised classification descriptions for all positions, the basic concepts outlined in the previous pages were utilized. The recommended class descriptions are included in Appendix I of this report.

As mentioned earlier, the class descriptions are based upon the information from the written Position Description Questionnaires completed by each employee, the individual job audit interviews, and from information provided by employees, supervisors, and managers during the multiple review processes. These descriptions provide:

- ➢ A written summary documenting the work performed and/or proposed by the incumbents of these classifications;
- ➢ Distinctions among the classes; and
- ➢ Documentation of requirements and qualifications to assist in the recruitment and selection process.

Just as there is a difference between a position and a class, there is also a difference between a position description and a class description. A position description, that is often known as a "desk manual", typically lists each duty an employee performs and may also have information about how to perform that duty. A class description normally reflects several positions and is a summary document that does not list every single duty performed by every employee. The class description, which is intended to be broader, more general and informational, is intended to indicate the general scope and level of responsibility and requirements of the class, not detail-specific position responsibilities.

The sections of each class description are as follows:

Title: This should be brief and descriptive of the class and consistent with other titles in the classification plan and the occupational area.

- The title of a classification is normally used for organization, classification and compensation purposes within the District. Often working titles are used within a department to differentiate an individual (for example, a District title of Administrative Assistant that designates a departmental office administrative support class may have a working title of Public Works Department Technical Assistant). All positions have a similar level of scope and responsibility; however, the working titles may give assurance to a member of the public that they are dealing with an appropriate individual. Working titles should be authorized by Human Resources to ensure consistency within the District and across departmental lines.

Definition: This provides a capsule description of the job and should give an indication of the type of supervision received, the scope and level of the work and any unusual or unique factors. The phrase "performs related work as required" is not meant to unfairly expand the scope of the work performed, but to acknowledge that jobs change and that not all duties are included in the class specification.

Supervision Received and Exercised: This section specifies which class or classes provide supervision to the class being described and the type and level of work direction or supervision provided to this class. The section also specifies what type and level of work direction or supervision the class provides to other classes. This assists the reader in defining where the class "fits" in the organization and alludes to possible career advancement opportunities.

Class Characteristics: This can be considered the "editorial" section of the specification, slightly expanding the Definition, clarifying the most important aspects of the class and distinguishing this class from the next higher-level in a class series or from a similar class in a different occupational series.

Examples of Essential Job Functions: This section provides a list of the major and essential duties, intended to define the scope and level of the class and to support the Qualifications, including Knowledge and Skills. This list is meant to be illustrative only. It should be emphasized that the description is a summary document, and that duties change, depending upon program requirements, technology and organizational needs.

Qualifications: This element of the description has several sections:

- A listing of the job-related knowledge and abilities required to successfully perform the work. They must be related to the duties and responsibilities of the work and capable of being validated under the Equal Employment Opportunity Commission's Uniform Guidelines on Selection Procedures. Knowledge (intellectual comprehension) and Skills (acquired proficiency) should be sufficiently detailed to provide the basis for selection of qualified employees.

- A listing of educational and experience requirements that outline minimum and alternative ways of gaining the knowledge and skills required for entrance into the selection process. These elements are used as the basic screening technique for job applicants.

- Licenses (and/or certifications) identify those specifically required in order to perform the work. Note that a California driver's license is not routinely included unless it is documented in the description that such a license is regularly used in the performance of the work. Examples of other required certifications include registration as a Professional Civil Engineer for specific Engineering classes or I.C.B.O. certificates for Building Inspectors. These certifications are often required by an agency of higher authority than the District (i.e., the State), and can therefore be appropriately included as requirements.

Physical Demands: This section identifies the basic physical abilities required for performance of the work. These are not presented in great detail (although they are more specifically covered for documentation purposes in the Position Description Questionnaires) but are designed to indicate the type of pre-employment physical examination (lifting requirements and other unusual characteristics are included, such as "Finger dexterity needed to access, enter and retrieve data using a computer keyboard") and to provide an initial basis for determining reasonable accommodation for ADA purposes.

Environmental Elements: These can describe certain outside influences and circumstances under which a job is performed; they give employees or job applicants an idea of certain risks involved in the job and what type of protective gear may be necessary to perform the job. Examples are loud noise levels, cold and/or hot temperatures, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and other job conditions.

Working Conditions: This section outlines off-hours or shift work, regular overtime, required travel that may not be immediately apparent to a job applicant or to an employee.

FINDINGS AND RECOMMENDATIONS

All class descriptions were updated or newly created in order to ensure that the format is consistent, and that the duties and responsibilities are current and properly reflect the required knowledge, abilities and skills.

Retitling of Classifications

One change in the classification plan, as noted above, was the retitling of a number of classes to accurately reflect the actual job responsibilities and duties performed by those in the class as well as industry terminology.

Two (2) classifications are recommended for title changes:

Current Class	Proposed Class
Utility Operator	Utility Operator/Water Quality Technician
Maintenance Worker	Maintenance/Customer Service Worker

These title changes are recommended to more clearly reflect the level and scope being performed by each class, as well as establish consistency with the labor market and industry standards. Any changes in compensation are not dependent upon a new title, but upon the market value as defined by job scope, level and responsibilities, and the qualifications required for successful job performance.

Reclassification of Classifications

We found that two positions worked out of class due to level and scope of work and/or job functions that have been added to the position over time. Therefore, approximately 33% of the positions are recommended for reclassification (with possible salary impact).

Positions in the following two (2) classes are recommended for reclassification:

Current Class	Proposed Class
Utility Supervisor	Utility Superintendent
Utility Field Foreman	1. Utility Field Supervisor
	2. Inspector/Maintenance Supervisor

It should be noted that there is currently only one incumbent in the Utility Field Foreman classification and that our recommendation is to split this class into two classes, which will be a reclassification in both cases, due to the additional supervisory responsibilities. This recommendation is partly due to the current organizational, staffing, and workload needs of the department, as discussed below.

MAINTAINING THE CLASSIFICATION PLAN

A classification plan is not a stable, unchanging entity. Positions may grow and change depending upon technology, service delivery requirements and a number of other factors. As mentioned above, a "snapshot in time" may become outdated quickly in some areas.

We are therefore including this final section to this report, which will assist the District in identifying appropriate placement of new and/or realigned positions within the recommended classification structure. By utilizing this process, the District will be able to change and grow the organization while maintaining a structure that has been created within this study.

In considering whether a position should be placed in a higher/lower classification or where a new classification should be placed within the plan, the following factors should be examined. Although they are not quantified, as requests for reclassification occur, each of the following factors should be addressed. These will provide guidance for maintenance of the classification and compensation plans.

1. Type and Level of Knowledge and Skill Required

This factor defines the level of job knowledge and skill, including those attained by formal education, technical training, on-the job experience and required certification or professional registration. The varying levels are as follows:

A. The basic or entry-level into any occupational field
This entry-level knowledge may be attained by obtaining a high school diploma, completing specific technical course work or obtaining a four-year or advanced college or university degree.

B. The experienced or journey-level in any occupational field
This knowledge and skill level recognizes a class that is expected to perform the day-to-day functions of the work independently, but with guidelines (written or oral) and supervisory assistance available. This level of knowledge is sufficient to provide on-the-job instruction to a fellow employee or an assistant when functioning in a lead capacity. Certifications, such as found in the District's Maintenance class series, may be required for demonstrating possession of the required knowledge and skills.

C. The advanced level in any occupational field
This knowledge and skill level is applied in situations where an employee is required to perform or deal with virtually any job situation that may be encountered. Guidelines may be limited and creative problem solving may be involved. Supervisory knowledge and skills are considered in a separate factor and should not influence any assessment of this factor.

D. **Total mastery of one or more occupational fields**
This level normally requires an advanced level of college or university education and is normally found in a research, educational or product development situation.

2. **Supervisory/Management Responsibility**

This factor defines the supervisory and managerial responsibility, including short and long-range planning, budget development and administration, resource allocation, policy and procedure development and direction of staff.

A. **No ongoing direction of programs or staff**
The employee is responsible for the performance of his or her own work and may provide side-by-side instruction to a co-worker.

B. **Lead direction of staff or program coordination**
The employee plans, assigns, directs and reviews the work of staff performing similar work to that performed by the employee on a day-to-day basis. Training in work procedures is normally involved. If staff direction is not involved, the employee must have responsibility for independently coordinating one or more programs or projects on a regular basis.

C. **Full first-line supervisor**
The employee performs the supervisory duties listed above, and, in addition, makes effective recommendation and/or carries out selection, performance evaluation and disciplinary procedures. If staff supervision is not involved, the employee must have programmatic responsibility, including development and implementing goals, objectives, policies and procedures and budget development and administration.

D. **First full managerial level**
The employee is considered mid-management, often supervising through subordinate levels of supervision. In addition to the responsibilities outlined above, responsibilities include allocating staff and budget resources among competing demands and performing significant program and service delivery planning and evaluation. Normally, this level would be titled a program or division manager.

E. **Department managerial level**
The employee is the director of a specified department, normally reporting to the Chief Executive Officer (i.e. General Manager) or to the governing body (i.e. Board of Directors).

F. **Chief Executive Officer level**
The employee has total administrative responsibility for the District.

3. Problem Solving

This factor involves analyzing, evaluating, reasoning and creative thinking requirements. In a work environment, not only the breadth and variety of problems are considered, but also guidelines, such as supervision, policies, procedures, laws, regulations and standards available to the employee.

A. Structured problem solving

Work situations normally involve making choices among a limited number of alternatives that are clearly defined by policies and procedures. Supervision, either on-site or through a radio or telephone, is readily available.

B. Independent, guided problem solving

Work situations require making decisions among a variety of alternatives; however, policies, procedures, standards and regulations guide the majority of the work. Supervision is generally available in unusual situations.

C. Application of discriminating choices

Work situations require searching for solutions and independently making choices among a wide variety of policies, procedures, laws, regulations and standards. Interpretation and evaluation of the situation and available guidelines are required.

D. Creative, evaluative or analytical thinking

Work situations require the analysis and application of organizational policies and goals, complex laws and/or general business or ethical considerations.

4. Authority for Making Decisions and Taking Action

This factor describes the degree to which employees have the freedom to take action within their job. The variety and frequency of action and decisions, the availability of policies, procedures, laws and supervisory or managerial guidance, and the consequence or impact of such decisions are considered within this factor.

A. Direct, limited work responsibility

The employee is responsible for the successful performance of his or her own work with little latitude for discretion or decision-making. Direct supervision is readily available.

B. Decision-making within guidelines

The employee is responsible for the successful performance of their own work, but able to prioritize and determine methods of work performance within general guidelines. Supervision is available, although the employee is expected to perform independently on a day-to-day basis. Emergency or unusual situations may occur, but are handled within procedures and rules. Impact of decisions is normally limited to the department or function to which assigned.

C. **Independent action with focus on work achieved**
The employee receives assignments in terms of long-term objectives, rather than day-to-day or weekly timeframes. Broad policies and procedures are provided, but the employee has latitude for choosing techniques and deploying staff and material resources. Impact of decisions may have significant department or District-wide service delivery and/or budgetary impact.

D. **Decisions made within general policy or elected official guidance**
The employee is subject only to the policy guidance of elected officials and/or broad regulatory or legal constraints. The ultimate authority for achieving the goals and objectives of the District are with this employee.

5. Interaction with Others

This factor includes the nature and purpose of contacts with others, from simple exchanges of factual information to the negotiation of difficult issues. It also considers with whom the contacts are made, from co-workers and the public to elected or appointed public officials.

A. **Exchange of factual information**
The employee is expected to use ordinary business courtesy to exchange factual information with co-workers and the public. Strained situations may occasionally occur, but the responsibilities are normally not confrontational.

B. **Interpretation and explanation of policies and procedures**
The employee is required to interpret policies and procedures, apply and explain them and influence the public or others to abide by them. Problems may need to be defined and clarified and individuals contacted may be upset or unreasonable. Contacts may also be made with individuals at all levels throughout the District.

C. **Influencing individuals or groups**
The employee is required to interpret laws, policies and procedures to individuals who may be confrontational or to deal with members of professional, business, community or other groups or regulatory agencies as a representative of the District.

D. **Negotiation with organizations from a position of authority**
The employee often deals with public officials, members of boards, councils, commissions and others to provide policy direction, explain agency missions and/or negotiate solutions to difficult problems.

6. Working Conditions/Physical Demands

This factor includes specific physical, situational and other factors that influence the employee's working situation.

A. Normal office or similar setting
The work is performed in a normal office or similar setting during regular office hours (occasional overtime may be required, but compensated for). Responsibilities include meeting standard deadlines, using office and related equipment, lifting materials weighing to 25 pounds and communicating with others in a generally non-stressful manner.

B. Varied working conditions with some physical or emotional demands
The work is normally performed indoors, but may have some exposure to noise, heat, weather or other uncomfortable conditions. Stand-by, call back or regular overtime may be required. The employee may have to meet frequent deadlines, work extended hours and maintain attention to detail at a computer or other machinery, deal with difficult people or regularly perform moderate physical activity.

C. Difficult working conditions and/or physical demands
The work has distinct and regular difficult demands. Shift work (24-7 or rotating) may be required; there may be exposure to hazardous materials or conditions; the employee may be subject to regular emergency callback and extended shifts; and/or the work may require extraordinary physical demands.

Based on the above factors, in the maintenance of the classification plan when an employee is assigned an additional duty or responsibility and requests a change in classification, it is reasonable to ask:

- What additional knowledge and skills are required to perform the duty?
- How does one gain this additional knowledge and skills – through extended training, through a short-term seminar, through on-the-job experience?
- Does this duty or responsibility require new or additional supervisory responsibilities?
- Are there are a greater variety of or more complex problems that need to be solved as a result of the new duty?
- Does the employee have to make a greater variety of or more difficult decisions as a result of this new duty?
- Are the impacts of decisions greater because of this new duty (effects on staff, budget, department or District-wide activities, relations with other agencies)?
- Are guidelines, policies, procedures provided to the employee for the performance of this new duty?
- Is the employee interacting with District workers, the public or others differently as a result of this new assignment?

- Have the working or physical conditions of the job changed as a result of this new assignment?

Application of these factors by asking the appropriate questions will enable the District to maintain the classification and compensation system in a timely and consistent manner.

ORGANIZATIONAL REVIEW AND RECOMMENDATIONS

Classification Study versus Organizational Review and Staffing

As mentioned above, a classification study is somewhat of a snapshot in time, as we study and analyze current positions, their bodies of work, required knowledge, skills, and abilities, minimum experience, education, and licensure requirements, and then make recommendations for changes that address the present situation.

In the course of the classification study, we also made recommendations for title changes to more correctly reflect bodies of work and perhaps more contemporary titling conventions, any necessary reclassifications to ensure that each incumbent be recognized for the correct levels and complexities of work and to create more efficiency for service delivery.

All of our classification recommendations are related to work, levels of effort, and practices that have already developed and can be addressed in the present.

What classification does not address and what the District requested to be looked at, in addition to classification, are organizational, workload, and staffing issues. NCSD is a fast growing District, whose jurisdiction and population served are steadily increasing. The District's location within a geographically and economically desirable area is attracting migrants and the communities the District serves are growing. With this growth, there are many plans to improve, replace, and/or expand the District's infrastructure. The District has to be prepared for the growing community it serves and is therefore looking into the future. In addition, many changes have already occurred and they have affected the District's current infrastructure and organizational structure, as well as staffing and workloads.

We feel that the District is well advised to look at other similar community services districts for possible organizational changes. In reviewing the Utility Department's current organizational structure, we compared NCSD to four (4) other similar community services districts to understand how they are coping with current workloads.

Current Organizational Structure

Currently, the District has six (6) employees within the Utility Department: one Utility Supervisor, one Utility Field Foreman, one Utility Operator, two Utility Workers, and one Maintenance Worker. The District also utilizes two (2) part-time interns, who equal about one full-time equivalent employee.

NCSD provides water treatment and distribution, as well as wastewater collection and treatment, and other services to residents. It serves a population of 12,000 residents, has approximately 4,000 water connections; 3,000 wastewater connections; 95 miles of water distribution lines; 42 miles of wastewater collection lines; 13 lift stations; 2 wastewater treatment plants (both are Grade II plants); and 9 producing water wells.

Our analysis shows that the infrastructure of the four (4) comparator agencies varies in comparison to NCSD; they have larger or more systems and facilities in some areas, but smaller or fewer systems and facilities in other areas. The exception is Templeton Community Services District, which overall seems smaller that NCSD, although we were not able to obtain all necessary information from this comparator agency.

NCSD has the highest number of miles of water distribution lines, the largest number of lift stations, and the greatest number of operating water wells, compared to the other four districts. It is also the only District with two (2) wastewater treatment plants, although two of the comparator agencies have one Grade III wastewater treatment plant each, whereas NCSD's wastewater plants are Grade II plants.

Two of the comparators have more water and sewer connections as well as more miles of sewer lines, two comparators have fewer.

Recommendations for Organizational Change

Utility Supervisor

The Utility Department is a separate recognized work unit at the District and also the largest department. Three out of the four comparator agencies have a Department Head who runs the Utility Department, such as a Director, Manager, or Superintendent. In addition, NCSD's incumbent currently functions like a Department Head.

However, it should also be noted that the current incumbent still performs more hands-on fieldwork than is typical for a Superintendent level due to the current staffing levels at the Department, including the fact that the only other supervisory class in the Department has taken on dual responsibilities and spends more time on the non-utility operations and maintenance or supervisory duties. (Please see below for more detailed information.)

Our recommendation therefore is related to the classification of the individual position of Utility Supervisor, as well as the organization of the Utility Department. We recommend reclassifying the Utility Supervisor to Utility Superintendent and with that, recognizing that the position that runs the Utility Department is a Department Head. Once the District is able to implement our recommendations and other organizational changes, we would expect this position to no longer perform any field duties, only under the most extenuating of circumstances (such as a shortage in staff and emergencies). Otherwise, this position will spend 100% of its time on the management and administration of the Utility Department.

Utility Field Foreman

As mentioned above, the Utility Field Foreman position has probably experienced the biggest increase in workload and also the most significant change to what the position used to be. According to the incumbent, at least sixty percent (60%) of his time is spent on construction inspection duties and the remainder is spent on utility operations and maintenance and supervisory duties. This development creates a bottleneck situation for utility operations and maintenance duties that partially have to be picked up by the current Utility Supervisor and the rest of the staff.

Part of the reason for the development is the fact that the current incumbent has the experience, knowledge, skills, and abilities to work in both areas of assignment. However, the increased workload is difficult for one person to carry.

Our recommendation is again related to both classification and organization in that we recommend the position of Utility Field Foreman to be split into two positions, Utility Field Supervisor and Inspector/Maintenance Supervisor. This will not only separate the two disciplines but will also set the Department up with an organizational/supervisory structure that it can build upon with future staffing needs.

Utility Operations and Maintenance Staff

Currently, the Department has one Utility Operator, two Utility Maintenance Workers, one Maintenance Worker, and two interns who equal one full-time equivalent employee.

In terms of current workload, a lot of issues will be resolved by having a full-time Utility Field Supervisor that is separate from the functional area of construction inspection, as we have recommended. However, the workload will quickly increase when the current Utility Supervisor (to be Utility Superintendent) releases all of his fieldwork-related duties and they are delegated downwards to the new Utility Field Supervisor and the operations and maintenance crew. The Utility Field Supervisor will absorb most of those duties but will most likely have to push down additional duties to the crew.

In addition, the District must plan for the expected growth in population and the changing infrastructure resulting from that. The District has many projects in progress at the time, such as creating and establishing a preventive maintenance program, as well as a new wastewater treatment plant that will require staff to have/obtain additional higher-level certifications.

Currently, it seems that the Department is only able to address the District's immediate and pressing needs. A large majority of the work consists of reactive maintenance duties, i.e., trying to "put out fires" and responding to emergencies. The District does not have the staffing capacity to implement and administer a preventive maintenance program, for example.

Again, we compared NCSD to the four comparator districts. Even though each district is different from the next, we can gather important information and ideas from other staffing models. The following is a table that shows the staffing at the four comparator districts:

Cambria CSD	McKinleyville CSD	Los Osos CSD	Templeton CSD *
• 1 AGM/Utilities Mgr. (Superintendent of Water & Wastewater) • 1 Water Supervisor • 1 Wastewater Supv. • 4 Water Operators • 4 Wastewater Operators	• Utilities Director • 1 Lead Worker • 6 Utility • 3 Maintenance Workers	• 1 Utilities Systems Manager • 1 Lead Operator • 5 Operators (all operators are dual certified)	• 1 Utilities Supervisor • 1 Utility Worker-Lead • 1 Utility Worker II A • .20 Utility Worker II B

* This information was taken from the District's website and could not be confirmed with the District.

Both, Templeton CSD and Los Osos CSD are generally smaller when comparing these districts' infrastructure to that of NCSD. Cambria CSD and McKinleyville CSD are larger in some areas but smaller in others, and it is our recommendation to model NCSD's utility operation after those two districts.

We understand that change is something that occurs overtime and the District may choose to implement some of our recommendations immediately and others in the longer run. However, we feel that the District would be well advised to add at least one or two more staff to the utility operations and maintenance crew, most likely, one to two Utility Workers. A potential District organizational structure can be found in Appendix III as one option to build upon the District's current Utility Department organizational structure.

Administrative Staff

Although the District's administrative and office classifications were not included in the scope of the organizational review and staffing/workload considerations, the growth of the District, the additional infrastructure, and increase in demand for service will undoubtedly have an affect on all of the District's classifications. Workload will increase for everyone and the District may want to take into consideration adding clerical or administrative positions to its staff to cope with the increased demand.

Appendix III, the Potential Organizational Chart, includes a suggested part-time administrative position that may be needed to carry this increased workload. This may not be an immediate need but should be a consideration for the future.

Certifications

One other area that the District may want to take into consideration as it goes through short-term and long-term changes are certification requirements for staff. Currently, most staff is cross-trained in the water and wastewater areas and most classifications require dual certification of some sort, including water treatment, water distribution, and/or wastewater treatment. The two Utility Workers each have an area of focus (i.e., either water or wastewater) but they are both cross-trained and cross-certified in both areas.

In addition, it is only a matter of time until the State of California will also put mandatory wastewater collection systems certifications into place that will need to be required from any staff whose duties are in that area of assignment.

As these state mandates are being implemented and at the same time, as the labor market tightens for qualified water and wastewater operators, the District may want to consider creating two separate functional areas that split the water from the wastewater side. Of course, it is in the District's best interest when all staff is cross-trained and cross-certified because that way, staff can provide the District with a maximum amount of expertise and the District can serve the public most efficiently and effectively. However, the reality of the labor market, as well as compensation realities that the District may face, may make it very challenging to recruit and retain a highly qualified, experienced, and cross-certified staff.

Currently, only one of the four comparator districts separates water from wastewater, the others still have staff that is cross-trained and cross-certified. However, the District may keep the model at Cambria CSD in mind that has a separate water and a separate wastewater division within the utility department.

We want to thank the District for its time and cooperation in bringing this study to a successful conclusion. It has been a pleasure working with the District on this critical project. Please do not hesitate to contact us if we can provide any additional information or clarification regarding this report.

Respectfully Submitted,
Koff & Associates, Inc.

Georg S. Krammer

Georg S. Krammer
Chief Executive Officer

Appendix I

Recommended Class Descriptions

Nipomo Community Services District **February 2007**
FLSA: EXEMPT

UTILITY SUPERINTENDENT

DEFINITION

Under general direction, plans, organizes, oversees, coordinates, and reviews the work of staff performing difficult and complex operations and maintenance functions and activities related to all programs and activities of the Utility Department; administers current and long-range planning activities; plans, manages, and coordinates the installation, operations, maintenance, and repair of water and wastewater facilities including treatment plants and underground collection and distribution lines; ensures the reliable operation of all equipment, whether stationary or mobile; ensures that District operations functions meet all applicable laws, regulations, and District policies; provides expert professional assistance to District management staff in areas of expertise; fosters cooperative working relationships with intergovernmental and regulatory agencies and various public and private groups; and performs related work as required.

SUPERVISION RECEIVED AND EXERCISED

Receives general direction from the General Manager. Exercises direct and general supervision over operations and maintenance staff through subordinate levels of supervision.

CLASS CHARACTERISTICS

This is a single-position mid-management classification that manages, oversees, and directs all activities of the Utility Department, including day-to-day operations, maintenance, and repair, short and long-range capital improvement planning and budgeting. Responsibilities include coordinating the activities of the department with those of other departments and appointed officials and managing and accomplishing the complex and varied functions of the department. The incumbent is accountable for accomplishing departmental planning and operational goals and objectives and for furthering District goals and objectives within general policy guidelines. This class is distinguished from the General Manager in that the latter has overall responsibility for the management of all District functions and activities, and for developing, implementing, and interpreting public policy.

EXAMPLES OF ESSENTIAL JOB FUNCTIONS (Illustrative Only)

Management reserves the right to add, modify, change or rescind the work assignments of different positions and to make reasonable accommodations so that qualified employees can perform the essential functions of the job.

- Develops and directs the implementation of goals, objectives, policies, procedures, and work standards for the Utility Department, including current and long-range planning.
- Prepares and administers the department's budgets, including materials and supplies, contract services, specified capital improvement projects, and vehicle and equipment expenses.
- Plans, organizes, administers, reviews, and evaluates the work of operations, technical, maintenance, and contract staff directly and through subordinate levels of supervision.
- Provides for the selection, training, professional development, and work evaluation of department staff; authorizes discipline as required; and provides policy guidance and interpretation to staff.
- Contributes to the overall quality of the department's service by developing, reviewing, and implementing operational plans, policies, and procedures to meet legal requirements and District needs.

- Coordinates activities of staff and the department with those of other District departments and outside agencies.
- Participates in and provides input for the District's capital improvement program, including assisting in determining facility construction and upgrade needs, rewriting the District's standard specifications for construction and development, redesigning facilities for better efficiency and effectiveness, and providing project oversight and inspection as required.
- Confers with and represents the department and the District in meetings with members of the Board of Directors, various governmental agencies, developers, contractors, business and industrial groups. and the public.
- Oversees the development or update of the District's wastewater and water plans and programs and other plans related to District infrastructure.
- Creates preventive maintenance programs and procedures for the District's water and wastewater systems and facilities, such as a flushing program for the District's water and wastewater pipelines.
- Prioritizes and allocates available resources; and reviews and evaluates program and service delivery, makes recommendations for improvement and ensures maximum effective service provision.
- Ensures compliance with all District operational and maintenance safety policies and procedures; provides for staff training in safety and compliance.
- Prepares and directs the preparation of a variety of written correspondence, reports, procedures, and other written materials.
- Maintains and directs the maintenance of working and official departmental files.
- Monitors changes in laws, regulations, and technology that may affect departmental operations; and implements policy and procedural changes as required.
- Provides technical advice to the District's management and the Board of Directors in District operations and maintenance matters.
- Receives, investigates, and responds to problems and complaints in a professional manner; identifies and reports findings and takes necessary corrective action.
- Responds to emergency situations as necessary.
- May perform utility maintenance and operations duties and provide technical assistance to crews in the field, on an as-needed basis.
- Performs other duties as assigned.

QUALIFICATIONS

Knowledge of:

- Administrative principles and practices, including goal setting, program development, implementation, and evaluation, and project management.
- Principles and practices of budget administration.
- Principles and practices of employee supervision, including work planning, assignment, review and evaluation, and the training of staff in work procedures.
- Principles and practices of the development, operations, maintenance, and management of water and wastewater facilities, including treatment plants and underground collection and distribution lines and related systems and facilities.
- Principles and techniques of capital improvement design, construction, inspection, funding, and long-term maintenance.
- Applicable Federal, State, and local laws, codes, and regulations concerning the operation of the Utility Department.
- Principles and practices of contract administration and evaluation.
- Organization and management practices as applied to the development, analysis, and evaluation of programs, policies, and operational needs of the assigned department.
- General principles of risk management related to the functions of the assigned area.

- Recent and on-going developments, current literature, and sources of information related to the operations of the department.
- Safety principles and practices.
- Record keeping principles and procedures.
- Modern office practices, methods and computer equipment.
- Computer applications related to the work.
- English usage, grammar, spelling, vocabulary, and punctuation.
- Techniques for dealing effectively with the public, vendors, contractors, and District staff, in person and over the telephone.
- Techniques for effectively representing the District in contacts with governmental agencies, community groups and various business, professional, educational, regulatory and legislative organizations.
- Techniques for providing a high level of customer service to public and District staff, in person and over the telephone.

Ability to:

- Plan, organize, administer, coordinate, review, and evaluate a comprehensive water and wastewater systems and facilities construction, operations, and maintenance program.
- Read and interpret plans, specifications, and diagrams used in the design and construction of water distribution and wastewater collection systems and treatment facilities.
- Recommend and implement goals, objectives, and practices for providing effective and efficient services.
- Manage and monitor complex projects, on-time and within budget.
- Plan, organize, schedule, assign, review, and evaluate the work of staff.
- Train staff in work procedures.
- Evaluate and develop improvements in operations, procedures, policies, and methods.
- Research, analyze, and evaluate new service delivery methods, procedures, and techniques.
- Prepare clear and concise reports, correspondence, policies, procedures and other written materials.
- Analyze, interpret, summarize, and present administrative and technical information and data in an effective manner.
- Interpret, explain, and ensure compliance with District policies and procedures, complex laws, codes, regulations, and ordinances.
- Conduct complex research projects, evaluate alternatives, make sound recommendations, and prepare effective technical staff reports.
- Effectively represent the department and the District in meetings with governmental agencies, community groups, and various businesses, professional, and regulatory organizations and in meetings with individuals.
- Establish and maintain a variety of filing, record-keeping, and tracking systems.
- Organize and prioritize a variety of projects and multiple tasks in an effective and timely manner; organize own work, set priorities, and meet critical time deadlines.
- Operate modern office equipment, including computer equipment and specialized software applications programs.
- Use English effectively to communicate in person, over the telephone and in writing.
- Use tact, initiative, prudence and independent judgment within general policy, procedural and legal guidelines.
- Establish and maintain effective working relationships with those contacted in the course of the work.

Education and Experience:
Any combination of training and experience that would provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the required qualifications would be:

Equivalent to an Associate's degree in water and/or wastewater sciences, pre-engineering, business or public administration, supervision or management, or a related field, and five (5) years of experience in utility operations, including two (2) years of supervisory experience.

License:

- Valid California class C driver's license with satisfactory driving record; specified assignments and/or equipment may require possession of a class B driver's license.
- Grade III Water Distribution Operator Certification from the State of California.
- Grade II Water Treatment Plant Operator Certificate as issued by the State of California.
- Grade II Wastewater Treatment Plant Operator Certificate as issued by the California State Department of Health Services and/or the California State Water Resources Control Board.
- Grade II Wastewater Collection System Maintenance Certification from the California Water Environment Association.

PHYSICAL DEMANDS

Must possess mobility to work in a standard office setting and use standard office equipment, including a computer, as well as to work in the field, and to inspect various operations sites, including traversing slippery surfaces, climbing ladders, stairs, and other access points; to operate a motor vehicle and to visit various District and meeting sites; vision to read printed materials and a computer screen; and hearing and speech to communicate in person, before groups, and over the telephone. This is partially a sedentary office, partially a field classification, and standing in and walking between work areas is required. Finger dexterity is needed to access, enter, and retrieve data using a computer keyboard, typewriter keyboard or calculator and to operate standard office equipment. Positions in this classification frequently bend, stoop, kneel, reach, push and pull drawers open and closed to retrieve and file information. Employees must possess the ability to lift, carry, push, and pull materials and objects necessary to perform job functions.

ENVIRONMENTAL ELEMENTS

Employees partially work in an office environment with moderate noise levels, controlled temperature conditions and no direct exposure to potentially hazardous physical substances. Employees also work in utilities and may be exposed to loud noise levels, cold and hot temperatures, inclement weather conditions, road hazards, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and hazardous physical substances and fumes. Employees may interact with upset staff and/or public and private representatives in interpreting and enforcing departmental policies and procedures.

WORKING CONDITIONS

May be required to work on evenings, weekends and holidays. Must be able to arrive at District facilities within sixty (60) minutes from the time an initial call-back notification.

Nipomo Community Services District **February 2007**

FLSA: NON-EXEMPT

UTILITY FIELD SUPERVISOR

DEFINITION

Under general direction, plans, schedules, assigns, and reviews the work of maintenance and operations staff within the Utility Department; coordinates, monitors, and provides technical input for assigned utility maintenance, construction, and repair projects, and other special programs; performs a variety of technical tasks relative to the maintenance and repair of District water and wastewater treatment facilities and water distribution and wastewater collection systems; provides technical assistance to the Utility Superintendent and acts for the Utility Superintendent in their absence; and performs related work as required.

SUPERVISION RECEIVED AND EXERCISED

Receives general direction from the Utility Superintendent. Exercises direct and general supervision over lower-level staff. Coordinates and monitors the work of outside contractors, vendors, and consultants.

CLASS CHARACTERISTICS

This is the working supervisory-level class in the utility series. Responsibilities include planning, organizing, supervising, reviewing, and evaluating the work of utility operations and maintenance staff. Incumbents are expected to independently perform the full range of utility maintenance and operations duties. Performance of the work requires the use of considerable independence, initiative, and discretion within established guidelines. This class is distinguished from the Utility Superintendent in that the latter has management responsibility for all utility maintenance and operations functions and activities of the District.

EXAMPLES OF ESSENTIAL FUNCTIONS (Illustrative Only)

Management reserves the right to add, modify, change or rescind the work assignments of different positions and to make reasonable accommodations so that qualified employees can perform the essential functions of the job.

- Plans, organizes, assigns, supervises, and reviews the work of assigned staff in the Utility Department.
- Trains staff in work and safety procedures and in the operation and use of equipment and supplies; implements procedures and standards.
- Evaluates employee performance, counsels employees, and effectively recommends initial disciplinary action; assists in selection and promotion.
- Monitors operations and activities of the utility operations and maintenance work unit; recommends improvements and modifications and prepares various reports on operations and activities.
- Determines and recommends equipment, materials, and staffing needs for assigned maintenance projects; participates in the annual budget preparation; prepares detailed cost estimates with appropriate justifications, as required; maintains a variety of records and prepares routine reports of work performance.
- Monitors and controls supplies and equipment; orders supplies and tools as necessary; prepares documents for equipment procurement; participates in informal bid processes for repair and construction projects as necessary.

- Coordinates with contractors in providing contract utility maintenance services.
- Performs the most complex utility maintenance and operations duties and provides technical assistance to crews.
- Answers questions and provides information to the public; investigates complaints; recommends corrective actions to resolve issues.
- Maintains logs and records of work performed; prepares periodic reports.
- Responds to emergency situations as necessary.
- Supports the Inspector/Maintenance Supervisor on certain projects, as assigned.
- Acts for the Utility Superintendent in their absence.
- Performs other duties as assigned.

QUALIFICATIONS

Knowledge of:

- Principles and practices of employee supervision, including work planning, assignment, review and evaluation, discipline, and the training of staff in work procedures.
- Principles and practices of utility maintenance and operations program development and administration.
- Principles, practices, equipment, tools and materials of utility construction, maintenance, and repair.
- Basic principles of contract administration for utility maintenance and repair projects.
- Basic principles and practices of budget and capital improvement program development, administration, and accountability.
- Safety principles, practices, and procedures of water and wastewater facilities and systems, including equipment and hazardous materials.
- The operation and maintenance of a variety of hand and power tools, vehicles, and power equipment.
- Applicable Federal, State, and local laws, codes, regulations and departmental policies, including National Pollution Discharge Elimination System (NPDES).
- Modern office practices, methods and computer equipment.
- Computer applications related to the work.
- English usage, grammar, spelling, vocabulary, and punctuation.
- Techniques for effectively representing the District in contacts with governmental agencies, community groups, and various professional, educational, regulatory, and legislative organizations.
- Techniques for providing a high level of customer service to the public and District staff, in person and over the telephone.

Ability to:

- Assist in developing and implementing goals, objectives, practices, policies, procedures, and work standards.
- Supervise, train, plan, organize, schedule, assign, review, and evaluate the work of staff.
- Organize, implement, and direct utility maintenance and operations activities.
- Analyze, interpret, apply, and enforce Federal, State and local policies, procedures, laws and regulations.
- Understand, interpret, and successfully communicate both orally and in writing, pertinent department policies and procedures.
- Identify problems, research and analyze relevant information, develop and present recommendations and justification for solution.
- Perform the most complex maintenance duties and operate related equipment safely and effectively.
- Develop contract specifications for utility maintenance contracts; administer such contracts.
- Develop cost estimates for supplies and equipment.

- Research, analyze, and evaluate new service delivery methods, procedures and techniques.
- Maintain accurate records and files of work performed.
- Make sound, independent decisions within established policy and procedural guidelines.
- Organize own work, set priorities and meet critical time deadlines.
- Operate modern office equipment including computer equipment and software programs.
- Use English effectively to communicate in person, over the telephone and in writing.
- Use tact, initiative, prudence and independent judgment within general policy and legal guidelines in politically sensitive situations.
- Establish and maintain effective working relationships with those contacted in the course of work.

Education and Experience:
Any combination of training and experience which would provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the required qualifications would be:

Equivalent to the completion of the twelfth (12th) grade and four (4) years of progressive field experience in the operation and maintenance of water production, treatment, and distribution facilities and equipment, and wastewater collection and treatment facilities. Supplemental college coursework in potable or wastewater sciences or related field is desirable.

License:

- Valid California class C driver's license with satisfactory driving record; specified assignments and/or equipment may require possession of a class B driver's license.
- Grade III Water Distribution Operator Certification from the State of California.
- Grade II Wastewater Treatment Plant Operator Certificate as issued by the California State Department of Health Services and/or the California State Water Resources Control Board.
- Grade II Water Treatment Plant Operator Certificate as issued by the State of California highly desirable.
- Grade II Wastewater Collection System Maintenance Certification from the California Water Environment Association highly desirable.

PHYSICAL DEMANDS

Must possess mobility to work in a standard office setting and use standard office equipment, including a computer, and to work in the field around water and wastewater facilities and systems; strength, stamina and mobility to perform medium to heavy physical work, to work in confined spaces, around machines and to climb and descend ladders, and operate varied hand and power tools and construction equipment; to attend meetings and to operate a motor vehicle; vision to read printed materials and a computer screen; and hearing and speech to communicate in person and over the telephone or radio. The job involves fieldwork requiring frequent walking in operational areas to identify problems or hazards. Finger dexterity is needed to access, enter and retrieve data using a computer keyboard or calculator and to operate above-mentioned tools and equipment. Positions in this classification bend, stoop, kneel, reach and climb to perform work and inspect work sites. Employees must possess the ability to lift, carry, push, and pull materials and objects necessary to perform job functions.

ENVIRONMENTAL ELEMENTS

Employees work primarily in the field and are exposed to loud noise levels, cold and hot temperatures, inclement weather conditions, road hazards, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and hazardous physical substances and fumes. Employees interact with upset public and private representatives, and contractors in interpreting and enforcing departmental policies and procedures.

OTHER REQUIREMENTS:

Regular on-call duty for response to off-hours emergency situations is required. Must be able to arrive at District facilities within thirty (30) minutes from the time an initial call-back notification.

Nipomo Community Services District **February 2007**

FLSA: NON-EXEMPT

INSPECTOR/MAINTENANCE SUPERVISOR

DEFINITION

Under general supervision, performs field inspections on the workmanship and materials used in a variety of construction and development projects within the District's jurisdiction, including water distribution and wastewater collection construction and repair work performed by private contractors, home owners, and District projects; reviews construction plans; ensures conformance with applicable Federal and State laws, District codes, approved plans, specifications, and departmental regulations; plans, organizes, implements, and oversees the District's preventive maintenance program and activities; and performs related work as required.

SUPERVISION RECEIVED AND EXERCISED

Receives general direction from the Utility Superintendent. Exercises direct or general supervision over maintenance staff.

CLASS CHARACTERISTICS

This is a journey-level construction inspection class that independently performs a variety of complex inspections of District infrastructure and private developments to ensure safety and conformance with plans and specifications. Responsibilities include working closely with engineers, developers, contractors, and the public to effect project modifications to meet field contingencies. This class has the authority to stop work on projects within specified guidelines until modifications in design, materials, or practices are accomplished. This class is distinguished from the Utility Superintendent in that the latter has management responsibility for entire Utility Department.

EXAMPLES OF ESSENTIAL FUNCTIONS (Illustrative Only)

Management reserves the right to add, modify, change or rescind the work assignments of different positions and to make reasonable accommodations so that qualified employees can perform the essential functions of the job.

- Inspects all phases of a variety of infrastructure, capital improvement, and private development construction projects for conformance with approved plans, specifications, contract provisions, and safe work practices in accordance with District, State, and Federal codes; inspects materials for identification and conformance to specifications; performs routine field tests as needed.
- Reviews plans and specifications of assigned construction projects; conducts pre-construction conferences, develops and issues notice-to-proceed documents.
- Records amounts of materials used and work performed; prepares necessary reports for progress payments.
- Confers with contractors and developers regarding conformance to standards, plans, specifications and codes; explains requirements and evaluates alternatives.
- Issues "stop-work" notices, notices of violation, and change orders within specific guidelines; conducts change order negotiations; consults with engineering staff regarding problems and change alternatives.
- Prepares and maintains daily inspection reports, progress payments, claims and other written documentation.

- Collects samples of materials for examination or analysis by laboratories; performs routine materials and field tests to assure material/workmanship quality.
- Inspects sites and reviews plans and specifications prior to the bidding or development process; attends bid openings for capital improvement and private construction projects.
- Assists in the District's National Pollution Discharge Elimination System (NPDES) water pollution prevention program as it relates to stormwater compliance.
- Acts as liaison between the District, contractors, other agencies, businesses, and residents; maintains communication among the parties and responds to and resolves issues and complaints or refers them to the proper office for resolution.
- Plans, organizes, implements, and oversees the District's preventive maintenance program and activities.
- Plans, organizes, assigns, supervises, and reviews the work of assigned maintenance staff in the Utility Department.
- Trains staff in work and safety procedures and in the operation and use of equipment and supplies.
- Performs other duties as assigned.

QUALIFICATIONS

Knowledge of:

- Materials, methods, equipment, tools, practices and procedures used in public work construction, including streets, gutters, sidewalks, drainage, water and wastewater lines and facilities, and related facilities and appurtenances, as well as private development construction projects.
- Principles and practices of construction and wastewater pollution inspection.
- Operation, materials, and methods of wastewater collection, treatment, water distribution and construction.
- Construction practices, procedures, methods, tools, equipment and supplies.
- Safety hazards and appropriate precautions applicable to work assignments.
- Applicable Federal, State, and local laws, codes, regulations and departmental policies governing the construction of assigned projects, including National Pollution Discharge Elimination System (NPDES).
- Technical principles and practices of engineering design, specification, and cost estimate preparation.
- Materials sampling, testing, and estimating procedures.
- Principles and practices of employee supervision, including work planning, assignment, review and evaluation, discipline, and the training of staff in work procedures.
- Principles, practices, techniques, and methods of preventative maintenance programs and related activities.
- Modern office practices, methods and computer equipment.
- Computer applications related to the work, including computer tracking programs for facility maintenance activities.
- English usage, grammar, spelling, vocabulary, and punctuation.
- Techniques for dealing effectively with the engineers, developers, contractors, District staff, and representatives of other agencies in an effective manner.
- Techniques for providing a high level of customer service to the public and District staff, in person and over the telephone.

Ability to:

- Interpret, apply, and explain laws, regulations, codes, and departmental policies governing the public works, infrastructure, capital improvement, and private development construction.

- Review and authorize change orders, claims, and progress payments within specific procedural guidelines.
- Detect and locate faulty materials and workmanship and determine the stage of construction during which defects are most easily found and remedied.
- Review and analyze construction plans, specifications, and maps for conformance with District standards and policies; read and interpret as-built plans of water and wastewater system construction projects.
- Coordinate and deal tactfully with contractors, engineers, and property owners.
- Respond to complaints or inquiries from citizens, staff, and outside organizations.
- Perform the entire range of construction inspection activities with a minimum of supervision.
- Effectively represent the department and the District in meetings with public and private organizations and individuals.
- Supervise, train, plan, organize, schedule, assign, review, and evaluate the work of staff.
- Plan, coordinate, oversee, and track facility maintenance activities.
- Prepare clear, effective, and accurate reports, correspondence, change orders, specifications, and other written materials.
- Maintain accurate records and files of work performed.
- Make sound, independent decisions within established policy and procedural guidelines.
- Organize own work, set priorities and meet critical time deadlines.
- Operate modern office equipment including computer equipment and software programs.
- Use English effectively to communicate in person, over the telephone and in writing.
- Use tact, initiative, prudence and independent judgment within general policy and legal guidelines in politically sensitive situations.
- Establish and maintain effective working relationships with those contacted in the course of work.

Education and Experience:
Any combination of training and experience which would provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the required qualifications would be:

Equivalent to the completion of the twelfth (12th) grade and two (2) years of increasingly responsible construction inspection experience. Supplemental college coursework in potable or wastewater sciences and/or building or construction inspection is desirable.

License:

- Valid California class C driver's license with satisfactory driving record.
- Inspector certification by the American Concrete Institute highly desirable.
- Grade I Water Distribution Operator Certification from the State of California.
- Grade I Wastewater Treatment Plant Operator Certificate as issued by the California State Department of Health Services and/or the California State Water Resources Control Board.

PHYSICAL DEMANDS

Must possess mobility to work in a standard office setting and use standard office equipment, including a computer; to inspect various commercial and residential development sites, including traversing uneven terrain, climbing ladders, stairs, and other temporary or construction access points; to attend meetings and to operate a motor vehicle; vision to read printed materials and a computer screen; and hearing and speech to communicate in person and over the telephone or radio. The job involves fieldwork requiring frequent walking in operational areas to identify problems or hazards. Finger dexterity is needed to access, enter and retrieve data using a computer keyboard or calculator and to operate above-mentioned tools and equipment. Positions in this classification bend, stoop, kneel, reach and climb to perform work and inspect work sites. Employees must possess the ability to lift, carry, push, and pull materials and objects necessary to perform job functions.

ENVIRONMENTAL ELEMENTS

Employees work primarily in the field and are exposed to loud noise levels, cold and hot temperatures, inclement weather conditions, road hazards, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and hazardous physical substances and fumes. Employees interact with upset public and private representatives, and contractors in interpreting and enforcing departmental policies and procedures.

OTHER REQUIREMENTS:

Regular on-call duty for response to off-hours emergency situations is required. Must be able to arrive at District facilities within thirty (30) minutes from the time an initial call-back notification.

Nipomo Community Services District **February 2007**
FLSA: NON-EXEMPT

UTILITY OPERATOR/WATER QUALITY TECHNICIAN

DEFINITION

Under general supervision, performs a wide variety of semi-skilled and skilled utility maintenance and repair work to operate and maintain potable water production, treatment, and related distribution equipment and facilities and wastewater collection and treatment equipment and facilities to assure the health and safety of the public water supply and the proper disposal of wastewater; takes water and wastewater samples and performs a variety of standard tests to determine water and wastewater quality and to ensure compliance with laws and regulations; performs general maintenance and repair of all District facilities; provides technical support to the Utilities Department; and performs related work as required.

SUPERVISION RECEIVED AND EXERCISED

Receives general supervision from the Utility Superintendent and/or the Utility Field Supervisor. May exercise technical and functional direction over assigned staff.

CLASS CHARACTERISTICS

This is a journey-level class in the utility operations and water quality functional area that performs the full range of duties required to ensure that water distribution and wastewater collection facilities and systems are maintained in a safe and effective working condition. Responsibilities include taking water and wastewater samples and coordinating with appropriate laboratories for chemical, physical, biological, and bacteriological analyses, and performing a wide variety of tasks in the maintenance and repair of assigned facilities and systems. This class is distinguished from the Utility Foreman/Construction Inspector in that the latter is working supervisory-level class in the series that assists in organizing, assigning, supervising, and reviewing the work of assigned staff involved in utility maintenance and operations.

EXAMPLES OF ESSENTIAL FUNCTIONS (Illustrative Only)

Management reserves the right to add, modify, change or rescind the work assignments of different positions and to make reasonable accommodations so that qualified employees can perform the essential functions of the job.

- Collects samples for testing at various sites throughout District's water and wastewater treatment facilities, as well as, water distribution, wastewater collection systems, and pump/lift stations to determine the effectiveness of each stage of the treatment process.
- Prepares samples for commercial laboratories to conduct chemical, biochemical, biological, bacteriological, and physical analyses related to the treatment, quality control, and distribution of potable water, as well as treatment, quality control, and disposal of wastewater influent and effluent, following standard procedures and guidelines.
- Receives and logs laboratory results, recognizing problems that may be occurring during the treatment process; ensures that test results are reviewed and reported.
- Sets up, calibrates, operates and performs minor maintenance and repair to a variety of sample collection instruments and equipment.
- Maintains control and quality assurance and follows safe work procedures.

- Maintains accurate records of work performed and laboratory results; enters data into and retrieves data from an automated data control system.
- Prepares periodic and special reports for submission to appropriate regulatory agencies in a timely manner, including State-mandated self-monitoring and other reports and paperwork; ensures that laboratories' certifications are in compliance with regulatory requirements.
- Inspects plant operational and remote pumping and storage equipment and facilities on a regularly-scheduled basis; reads and records readings of pumps, chemical feed and other production, treatment, distribution and collection equipment.
- Reviews and analyzes automated information and control system data and revises equipment settings as appropriate; notifies supervisor of unusual situations and makes inspections or corrects system problems as instructed.
- Adjusts chemical feeds and other equipment accordingly.
- Performs all duties of the Utility Worker, on an as-needed basis.
- Performs on-call duties and responds to after-hours emergencies.
- Performs related duties as assigned.

QUALIFICATIONS

Knowledge of:

- Chemical, biological, and physical characteristics of water and wastewater and basic laboratory procedures and processes.
- Principles, practices, equipment, and materials required for the collection, storage, and preparation of samples of potable water and wastewater for commercial laboratories.
- Sampling techniques and related statistical analysis techniques.
- Wastewater plant safety procedures and equipment.
- Basic principles of water and wastewater treatment and distribution/disposal.
- Applicable Federal, State, and local laws, codes, and regulations, including National Pollution Discharge Elimination System (NPDES).
- Technical report writing practices and procedures.
- Practices, methods, equipment, tools, and materials used in the maintenance construction, installation, and repair of water and wastewater treatment facilities and water distribution and wastewater collection systems.
- Principles and procedures of record keeping.
- Modern office practices, methods and computer equipment.
- Computer applications related to the work.
- English usage, spelling, vocabulary, grammar and punctuation.
- Techniques for providing a high level of customer service to public and District staff, in person and over the telephone.

Ability to:

- Collect potable water and wastewater samples and store and prepare for commercial laboratories for chemical, biochemical, biological, bacteriological, and physical analyses.
- Analyze and interpret the results of such tests and make appropriate recommendations for plant operations.
- Use and perform calibration and minor maintenance and repair on a variety of sample collection instruments and equipment.
- Maintain an inventory of supplies and equipment required for the performance of assigned duties.
- Interpret, apply, and explain complex laws, codes, regulations, and ordinances.
- Prepare and maintain clear and concise reports and accurate records and files.

- Utilize computer and related word processing, database, and spreadsheet software and applications.
- Perform construction, modification, maintenance, and repair work on water and wastewater treatment plant facilities and equipment, as well as, water distribution and wastewater collection systems.
- Locate underground utilities by use of blue prints and electronic locating equipment in accordance with Underground Service Alert (USA) regulations.
- Make accurate arithmetic calculations.
- Read and interpret construction drawings and specifications.
- Safely and effectively use and operate hand tools, mechanical equipment, power tools, and equipment required for the work.
- Follow department policies and procedures related to assigned duties.
- Understand and follow oral and written instructions.
- Organize own work, set priorities, and meet critical time deadlines.
- Use English effectively to communicate in person, over the telephone and in writing.
- Use tact, initiative, prudence and independent judgment within general policy, procedural and legal guidelines.
- Establish and maintain effective working relationships with those contacted in the course of the work.

Education and Experience:
Any combination of training and experience which would provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the required qualifications would be:

Equivalent to the completion of the twelfth (12th) grade and three (3) years of experience in the operation and maintenance of water and/or wastewater treatment facilities and equipment. Experience in the operation of water production and distribution systems and/or wastewater collection systems is highly desirable.

License:

- Valid California class C driver's license with satisfactory driving record.
- Grade II Water Distribution Operator Certification from the State of California.
- Grade I Water Treatment Plant Operator Certificate as issued by the State of California highly desirable.
- Grade I Wastewater Treatment Plant Operator Certificate as issued by the California State Department of Health Services and/or the California State Water Resources Control Board.
- Grade I Wastewater Collection System Maintenance Certification from the California Water Environment Association highly desirable.

PHYSICAL DEMANDS

Must possess mobility to work in the field walking for long periods of time, sometimes over rough, uneven or rocky surfaces; strength, stamina, and mobility to perform medium to heavy physical work, to work in confined spaces, around machines, and to climb and descend ladders, and operate varied hand and power tools and construction equipment; vision to read printed materials and a computer screen; and hearing and speech to communicate in person and over the telephone or radio. Finger dexterity is needed to access, enter, and retrieve data using a computer keyboard or calculator and to operate above-mentioned tools and equipment. Positions in this classification bend, stoop, kneel, reach, and climb to perform work and inspect work sites. Employees must possess the ability to lift, carry, push, and pull materials and objects necessary to perform job functions.

ENVIRONMENTAL ELEMENTS

Employees work in the field and are exposed to loud noise levels, cold and hot temperatures, inclement weather conditions, road hazards, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and hazardous physical substances and fumes. Employees interact with upset public and private representatives, and contractors in interpreting and enforcing departmental policies and procedures.

OTHER REQUIREMENTS:

Regular on-call duty for response to off-hours emergency situations is required. Must be able to arrive at District facilities within thirty (30) minutes from the time an initial call-back notification.

Nipomo Community Services District **February 2007**
FLSA: NON-EXEMPT

UTILITY WORKER

DEFINITION

Under general supervision, performs a wide variety of semi-skilled and skilled utility maintenance and repair work to operate and maintain potable water production, treatment, and related distribution equipment and facilities and wastewater collection and treatment equipment and facilities to assure the health and safety of the public water supply and the proper disposal of wastewater; performs general maintenance and repair of all District facilities; provides technical support to the Utilities Department; and performs related work as required.

SUPERVISION RECEIVED AND EXERCISED

Receives general supervision from the Utility Superintendent and/or the Utility Field Supervisor. May exercise technical and functional direction over assigned staff.

CLASS CHARACTERISTICS

This is a journey-level class in the utility maintenance functional area that performs the full range of duties required to ensure that water distribution and wastewater collection facilities and systems are maintained in a safe and effective working condition. Responsibilities include inspecting and attending to assigned areas in a timely manner, and performing a wide variety of tasks in the maintenance and repair of assigned facilities and systems. This class is distinguished from the Utility Foreman/Construction Inspector in that the latter is working supervisory-level class in the series that assists in organizing, assigning, supervising, and reviewing the work of assigned staff involved in utility maintenance and operations.

EXAMPLES OF ESSENTIAL FUNCTIONS (Illustrative Only)

Management reserves the right to add, modify, change or rescind the work assignments of different positions and to make reasonable accommodations so that qualified employees can perform the essential functions of the job.

- Operates and maintains light, medium, and heavy equipment and trucks appropriate to the construction, maintenance, and repair of the District's water distribution and wastewater collection systems.
- Inspects water services for compliance with established codes and/or damaged or worn parts, and makes repairs as necessary.
- Repairs transmission and distribution water mains, including installing parts as necessary.
- Installs and replaces water and fire services and hydrants, including, and setting up and maintaining traffic control to ensure safe traveling conditions for the public.
- Maintains and repairs fire hydrants, including installing parts and fittings, and performing scheduled maintenance and making repairs.
- Performs visual checks of meter conditions and connections to ensure efficient operations, and reports damaged or non-functioning meters.
- May read commercial and residential water meters on assigned routes, and records subsequent data in a legible and accurate manner.

- May repair or replace meters as necessary to ensure efficient operation, maintains complete and accurate records, and/or reports potential or existing problems to immediate supervisor.
- Inspects and maintains District water well sights; takes samples at water wells; checks chlorine residuals; handles chlorine and other hazardous chemicals safely; sets up and maintains eye-wash stations; monitors and maintains chlorination equipment and installs chlorine analyzers; repairs well head meters and installs piping and large meter equipment.
- Monitors telemetry systems and takes corrective action; checks and records system pressure readings.
- Performs maintenance and repair duties in and around water and sewer lift stations and pumps.
- Inspects and services lift stations, pumps, check valves, and floats as necessary.
- Maintains the District's wastewater collection system in a safe and sanitary manner to ensure safe conditions.
- Assists in installation, maintenance, and repair of wastewater mains and laterals.
- Performs asphalt and concrete repair and patchwork; removes trees, brush, and debris from right-of-ways to access sewer main lines and laterals.
- Installs and maintains different metering devices throughout the City's infrastructure to monitor wastewater flows; downloads necessary information onto a computer.
- Inspects wastewater treatment plant operational and remote pumping and storage equipment and facilities on a regularly-scheduled basis; reads and records readings of pumps, chemical feeds, and other production, treatment, distribution, and collection equipment.
- Cleans bar screens, aerators, and related wastewater treatment equipment.
- Performs welding, masonry, carpentry, minor electrical, and plumbing duties.
- Uses test equipment and makes operating adjustments to a variety of equipment.
- Checks and adds oil to pumps and engines, grease bearings, and performs other related preventive maintenance work on equipment.
- Disassembles equipment and replaces or renews bearings and packing; removes and replaces water and oil hoses on gasoline engines; replaces air and oil filters; replaces or repairs water or air valves.
- Performs preventive maintenance, including providing for and checking proper fluid levels, maintaining accurate records of work performed, and logging amount of sludge distributed into the ground.
- Performs maintenance painting of and minor modifications to equipment and facilities; maintains landscaped areas and green space around District facilities; controls animal, insect and vegetation pests as required; performs concrete, welding, and other semi-skilled maintenance work as required.
- Observes safe work methods and makes appropriate use of related safety equipment as required.
- Performs a variety of ground maintenance activities, including mowing, edging, and trimming landscape areas as scheduled and painting pumps and pipes when needed.
- Makes minor adjustments on service equipment; maintains tools and equipment in working order.
- Maintains logs of daily activities.
- Interacts with outside contractors in the course of large construction, maintenance, and repair projects.
- Performs on-call duties and responds to after-hours emergencies.
- Performs related duties as assigned.

QUALIFICATIONS

Knowledge of:

- Basic principles and practices of water and wastewater treatment, as well as, water distribution and wastewater collection system operations.
- Practices, methods, equipment, tools, and materials used in the maintenance construction, installation, and repair of water and wastewater treatment facilities and water distribution and wastewater collection systems.

- Gas and diesel engine maintenance and repair.
- Hydraulics and control systems.
- Principles and practices of gas and electrical welding, masonry, carpentry and plumbing.
- The operation and minor maintenance of a variety of hand and power tools, vehicles, and power equipment.
- Basic traffic control procedures and traffic sign regulations.
- Shop arithmetic.
- Safety equipment and practices related to the work, including the handling of hazardous chemicals.
- Safe driving rules and practices.
- Basic computer software related to work.
- English usage, spelling, vocabulary, grammar and punctuation.
- Techniques for providing a high level of customer service to public and District staff, in person and over the telephone.

Ability to:

- Perform construction, modification, maintenance, and repair work on water and wastewater treatment plant facilities and equipment, as well as, water distribution and wastewater collection systems.
- Operate specialized maintenance and repair equipment.
- Set up and operate traffic area construction zones, including cones, barricades and flagging.
- Locate underground utilities by use of blue prints and electronic locating equipment in accordance with Underground Service Alert (USA) regulations.
- Troubleshoot maintenance problems and determine materials and supplies required for repair.
- Make accurate arithmetic calculations.
- Read and interpret construction drawings and specifications.
- Safely and effectively use and operate hand tools, mechanical equipment, power tools, and equipment required for the work.
- Perform routine equipment maintenance.
- Maintain accurate logs, records, and basic written records of work performed.
- Follow department policies and procedures related to assigned duties.
- Understand and follow oral and written instructions.
- Organize own work, set priorities, and meet critical time deadlines.
- Use English effectively to communicate in person, over the telephone and in writing.
- Use tact, initiative, prudence and independent judgment within general policy, procedural and legal guidelines.
- Establish and maintain effective working relationships with those contacted in the course of the work.

Education and Experience:
Any combination of training and experience which would provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the required qualifications would be:

Equivalent to the completion of the twelfth (12th) grade and one (1) year of experience in construction or maintenance work. Experience in underground facilities maintenance and repair is highly desirable.

License:

- Valid California class C driver's license with satisfactory driving record.
- Grade I Water Distribution Operator Certification from the State of California must be obtained within twelve (12) months of hire.

- Wastewater Operator-in-Training Certificate as issued by the California State Department of Health Services and/or the California State Water Resources Control Board within must be obtained within twelve (12) months of hire.
- Grade I Wastewater Collection System Maintenance Certification from the California Water Environment Association desirable.

PHYSICAL DEMANDS

Must possess mobility to work in the field walking for long periods of time, sometimes over rough, uneven or rocky surfaces; strength, stamina, and mobility to perform medium to heavy physical work, to work in confined spaces, around machines, and to climb and descend ladders, and operate varied hand and power tools and construction equipment; vision to read printed materials and a computer screen; and hearing and speech to communicate in person and over the telephone or radio. Finger dexterity is needed to access, enter, and retrieve data using a computer keyboard or calculator and to operate above-mentioned tools and equipment. Positions in this classification bend, stoop, kneel, reach, and climb to perform work and inspect work sites. Employees must possess the ability to lift, carry, push, and pull materials and objects necessary to perform job functions.

ENVIRONMENTAL ELEMENTS

Employees work in the field and are exposed to loud noise levels, cold and hot temperatures, inclement weather conditions, road hazards, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and hazardous physical substances and fumes. Employees interact with upset public and private representatives, and contractors in interpreting and enforcing departmental policies and procedures.

OTHER REQUIREMENTS:

Regular on-call duty for response to off-hours emergency situations is required. Must be able to arrive at District facilities within thirty (30) minutes from the time an initial call-back notification.

Nipomo Community Services District **February 2007**
FLSA: NON-EXEMPT

MAINTENANCE/CUSTOMER SERVICE WORKER

DEFINITION

Under general supervision, performs a variety of work in the construction, modification, maintenance, repair, and operation of District infrastructure, including storm and sanitary sewers, water and wastewater systems, and drainage facilities; obtains water and other meter readings and records consumption; cleans, inspects, and repairs water meters; identifies irregularities in meter equipment and related plumbing; performs meter setting and meter replacement activities; provides a variety of customer service functions; monitors District water wells, lift stations, and other equipment, as needed; and performs related work as required.

SUPERVISION RECEIVED AND EXERCISED

Receives general supervision from the Utility Field Supervisor and/or the Inspector/Maintenance Supervisor. May exercise technical and functional direction over assigned staff.

CLASS CHARACTERISTICS

Initially under close supervision, this class learns District infrastructure, systems, and facilities, use of tools and equipment, and a wide variety of practices and procedures. As experience is gained, assignments become more varied and are performed with greater independence. The incumbent is responsible for learning to work independently in the field to read water meters, record consumption, maintain meters, perform customer service activities, and other field duties. Responsibilities include inspecting and attending to assigned areas in a timely manner, and performing a wide variety of tasks in the maintenance and repair of assigned facilities and systems. This class is distinguished from Utility Worker in that the latter requires more technical knowledge and skills pertaining to the maintenance and repair of District infrastructure and requires professional certifications.

EXAMPLES OF ESSENTIAL FUNCTIONS (Illustrative Only)

Management reserves the right to add, modify, change or rescind the work assignments of different positions and to make reasonable accommodations so that qualified employees can perform the essential functions of the job.

- Obtains and records water meter readings from homes and businesses for the purpose of billing water usage, including making necessary calculations and reporting inconsistent readings to supervisor.
- Performs opening and closing of consumers' water accounts by turning water on or off and recording the readings, including processing service orders from the District office.
- Delivers notices from the District office to consumers such as demand for payment, high consumption, returned mail, shut off, or returned check and other door hangers.
- Provides information to customers, including addressing complaints and billing concerns, rereading meters as requested, and answering questions regarding leaks and meter readings.
- Performs various maintenance duties, including removing and installing water meters and meter boxes, and making minor meter repairs.
- Performs visual checks of meter conditions and connections to ensure efficient operations, and reports damaged or non-functioning meters.

- Assists in repairing transmission and distribution water mains, including installing parts repairing system leaks, and replacing service line connections.
- Installs and replaces fire hydrants, including installing parts, fittings, and performing related maintenance and repair duties.
- Performs maintenance and ground-keeping duties at District water well sights; takes samples at water wells; utilizes chlorine and other hazardous chemicals safely; performs maintenance and repair duties in and around lift stations and pumps.
- Performs a variety of duties in the maintenance of drainage structures to ensure efficient drainage.
- Operates specialized vehicles and a variety of light to medium equipment related to the construction, maintenance, and repair of District systems and facilities.
- Performs a variety of weed abatement duties to eliminate hazards to the public and vehicles, as necessary.
- Sets up traffic control and safety equipment when using vehicles on a street or other roadway; and uses safety equipment and observes all safety procedures as specified by the District.
- Notifies supervisor of the need for repair or additional maintenance as found during routine inspection and cleaning activities; and prepares work orders or notes service requirements.
- Ensures that adequate materials and supplies are available for maintenance and repair work.
- Contacts the public to inform them of activities and shutdowns; and explains applicable rules and regulations.
- Marks the location of underground utilities in response to USA requests.
- Maintains complete and accurate records, and/or reports potential or existing problems to supervisor.
- Maintains light to medium equipment and trucks appropriate to the functional area of assignment.
- Operates a variety of hand and power tools and equipment related to work assignment as instructed.
- Maintains work areas in a clean and orderly condition, including securing equipment at the close of the workday.
- Completes work orders, picks up and deliver mail, and makes bank deposit; delivers office generated materials, as required.
- Interacts with outside contractors in the course of large construction, maintenance, and repair projects.
- Performs on-call duties and responds to after-hours emergencies.
- Performs related duties as assigned.

QUALIFICATIONS

Knowledge of:

- District street and address system, including awareness of hazards.
- A variety of meters and meter reading equipment and their respective functions.
- Principles, practices, and tools to maintain, repair, place, and set water meters.
- Billing procedures and policies of water utility services.
- Basic maintenance principles, practices, tools, and materials for maintaining and repairing water distribution systems, including water hydraulics, valves, pipe materials and water service components; water wells, lift stations, and pumps; asphalt and concrete repair; and other related facilities and systems.
- The operation and minor maintenance of a variety of hand and power tools, vehicles, and power equipment.
- Basic traffic control procedures and traffic sign regulations.
- Shop arithmetic.
- Safety equipment and practices related to the work, including the handling of hazardous chemicals.
- Safe driving rules and practices.
- Basic computer software related to work.

- English usage, spelling, vocabulary, grammar and punctuation.
- Techniques for providing a high level of customer service to public and District staff, in person and over the telephone.

Ability to:

- Read meters efficiently and recording accurate consumption information.
- Maintain accurate and up-to-date records using automated and manual systems.
- Read maps and schematics.
- Perform maintenance and repair work on water meters, water distribution and related systems, facilities, and equipment such as found in the District.
- Operate specialized maintenance and repair equipment.
- Set up and operate traffic area construction zones, including cones, barricades and flagging.
- Locate underground utilities by use of blue prints and electronic locating equipment in accordance with Underground Service Alert (USA) regulations.
- Troubleshoot maintenance problems and determine materials and supplies required for repair.
- Make accurate arithmetic calculations.
- Read and interpret construction drawings and specifications.
- Safely and effectively use and operate hand tools, mechanical equipment, power tools, and equipment required for the work.
- Perform routine equipment maintenance.
- Maintain accurate logs, records, and basic written records of work performed.
- Follow department policies and procedures related to assigned duties.
- Understand and follow oral and written instructions.
- Organize own work, set priorities, and meet critical time deadlines.
- Use English effectively to communicate in person, over the telephone and in writing.
- Use tact, initiative, prudence and independent judgment within general policy, procedural and legal guidelines.
- Establish and maintain effective working relationships with those contacted in the course of the work.

Education and Experience:
Any combination of training and experience which would provide the required knowledge, skills and abilities is qualifying. A typical way to obtain the required qualifications would be:

Equivalent to the completion of the twelfth (12th) grade. No experience is required. Field experience reading utility meters or reading and recording data with speed and accuracy, and/or maintenance or repair experience in underground utilities, general construction, or landscape and/or facilities maintenance are desirable.

License:

- Valid California class C driver's license with satisfactory driving record.
- Must obtain a Grade I Water Distribution Operator Certification from the State of California within twelve (12) months of hire.
- Must be bondable by District's fidelity bond insurer.

PHYSICAL DEMANDS

Must possess mobility to work in the field walking for long periods of time, sometimes over rough, uneven or rocky surfaces; strength, stamina, and mobility to perform medium to heavy physical work, to work in confined spaces, around machines, and to climb and descend ladders, and operate varied hand

and power tools and construction equipment; vision to read printed materials and a computer screen; and hearing and speech to communicate in person and over the telephone or radio. Finger dexterity is needed to access, enter, and retrieve data using a computer keyboard or calculator and to operate above-mentioned tools and equipment. Positions in this classification bend, stoop, kneel, reach, and climb to perform work and inspect work sites. Employees must possess the ability to lift, carry, push, and pull materials and objects necessary to perform job functions.

ENVIRONMENTAL ELEMENTS

Employees work in the field and are exposed to loud noise levels, cold and hot temperatures, inclement weather conditions, road hazards, vibration, confining workspace, chemicals, mechanical and/or electrical hazards, and hazardous physical substances and fumes. Employees interact with upset public and private representatives, and contractors in interpreting and enforcing departmental policies and procedures.

OTHER REQUIREMENTS:

Regular on-call duty for response to off-hours emergency situations is required. Must be able to arrive at District facilities within thirty (30) minutes from the time an initial call-back notification.

Appendix II

Recommended Employee Allocations

Nipomo Community Services District
Appendix II - Employee Allocation List
February 2007

Last Name	First Name	Job Title	Proposed Classification	Action	Department	Supervisor
Migliazzo	Dan	Utility Supervisor	Utility Superintendent	Reclass	Utility	Bruce Buel
VACANT		Utility Field Foreman	Utility Supervisor	Reclass	Utility	Dan Migliazzo
VACANT		Utility Field Foreman	Construction Inspector	Title Change	Utility	Dan Migliazzo
Brewer	Reed	Maintenance Worker	Maintenance/Customer Service Worker	Title Change	Utility	Dan Migliazzo
German	Scott	Utility Worker	Utility Worker	No Change	Utility	Dan Migliazzo
Rodriguez	Rigo	Utility Worker	Utility Worker	No Change	Utility	Dan Migliazzo
Motely	Rick	Utility Operator	Utility Operator/Water Quality Technician	Title Change	Utility	Dan Migliazzo

Appendix III

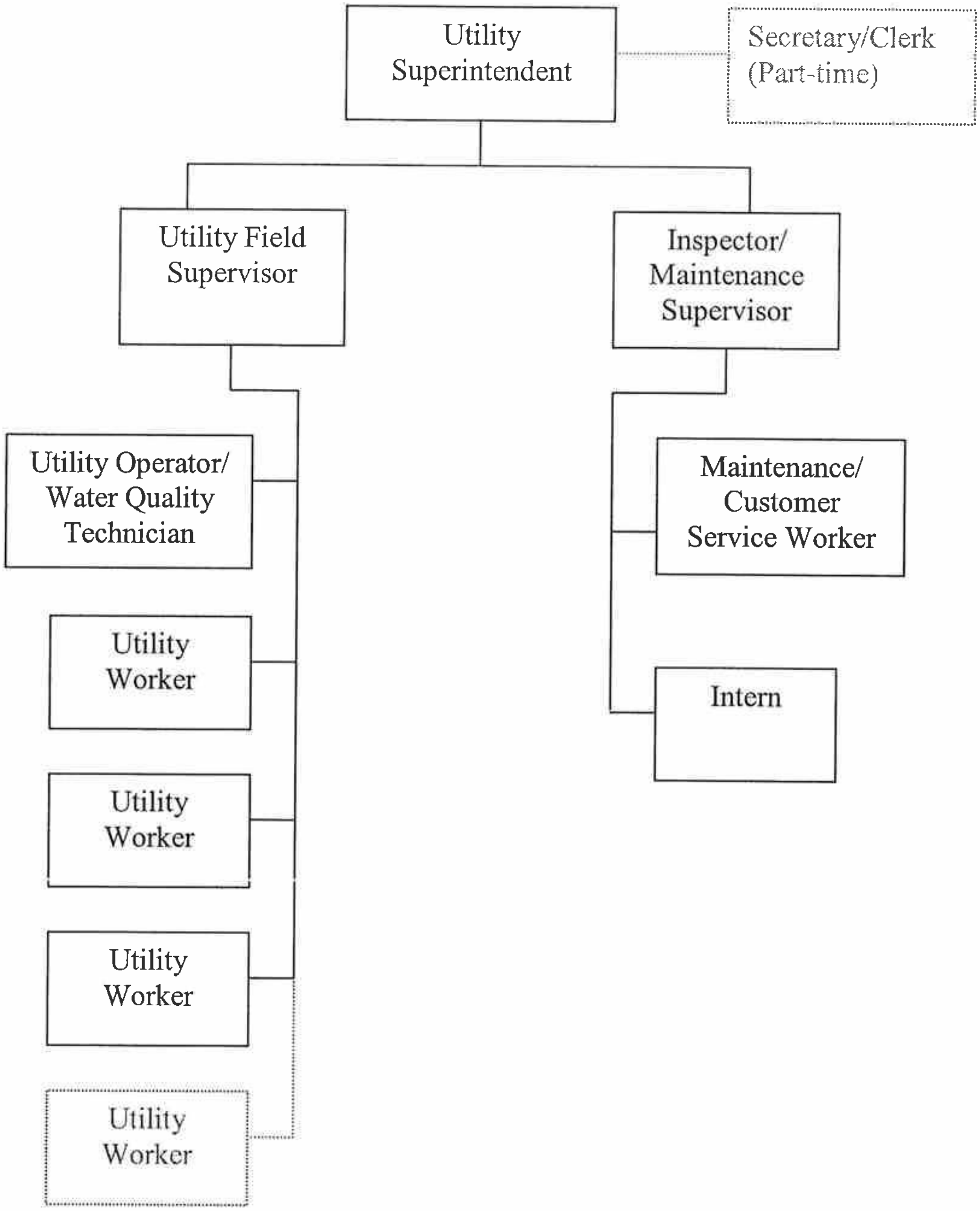
Potential Department Organizational Structure

Appendix III

POTENTIAL DEPARTMENT ORGANIZATIONAL STRUCTURE

Nipomo Community Services District Utility Department

February 2007



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latest news

gbaMS Announces 2007 Annual Conference & Training
GBA Master Series, Inc., (gbaMS) has confirmed the date and location of its 2007 Annual Conference & Training. This year's conference will be held Monday, Oct. 1, to Wednesday, Oct. 3, in Kansas City, Missouri, at the Westin Crown Center.
(Read more)

ArcNews Magazine: **Integrating GIS for Infrastructure Management**
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WaterWorld Magazine: **New Server Cures Regional Utility's Problems**
Sanitation District No. 1 of Northern Kentucky, a longtime gbaMS user, developed a better workflow for its field crews with a Citrix server and gbaMS software. (Read more)

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