Appendix E

Drainage Master Plan

SUTTER POINTE SPECIFIC PLAN AREA

DRAINAGE MASTER PLAN

MAY 20, 2008

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I. INTRODUCTION

A. General

The Sutter Pointe Specific Plan (SPSP) area consists of approximately 7,582 acres within Sutter County. This area is located north of the Sutter County and Sacramento County Line, south of the Cross Canal, east and west of Highway 99, and west of the Natomas East Main Drainage Canal and the Pleasant Grove Canal (Figure 1). The SPSP is in the Natomas Basin watershed, which consists of approximately 53,000 acres within Sacramento County and Sutter County. The Natomas Basin is generally bounded by the Natomas Cross Canal on the north, the Sacramento River on the west and south, the American River on the south, and the Natomas East Main Drainage Canal and the Pleasant Grove Creek Canal on the east.

As part of the Commercial/Industrial Specific Plan, which was approved for 3,500 acres in South Sutter County, Borcalli & Associates, Inc. developed the "South Sutter County Specific Plan Area Drainage Master Plan," dated October 31, 2001. The entire plan area from the 2001 report is updated by this new report.

In November 2004, the County voted 59 percent in favor of Measure M, an advisory measure to determine the sentiments of Sutter County residents relating to the character and size of development in the SPSP area. The measure allows a residential and employment-generating community of approximately 7,500 acres. In January 2006, the Measure M Group of developers submitted a General Plan Amendment application. In July 2006, the Measure M Group submitted a Specific Plan application for the Measure M area. The Measure M Group has retained the services of Wood Rodgers, Inc., to develop a Drainage Master Plan for the SPSP area to dovetail with their General Plan amendment activities.

B. Purpose

The purpose of the Drainage Master Plan is to identify facilities to accommodate existing and planned development within the SPSP area, while mitigating potential adverse impacts to storm water runoff and flooding.

II. REGULATORY AGENCIES, POLICIES, AND GUIDELINES

A. Local

Sutter County

Sutter County is responsible for reviewing and approving development proposals within the unincorporated areas of Sutter County. The Sutter County General Plan contains specific goals, policies, and implementation measures intended to minimize the potential impacts associated with drainage and flooding hazards.

The "Sutter County Department of Public Works Design Standards," adopted by the Board of Supervisors on January 24, 2006 (as may be amended), addresses improvements and private works dedicated to the public and accepted by the County for maintenance or operations, as well as improvements to install within existing rights-of-way and easements. The Design Standards, and any subsequent updates, would aid in regulating and guiding design; preparing plans for construction of streets, highways, alleys, drainage, sewerage, street lighting, water supply facilities, and related public improvements; and setting guidelines for all private works that involve drainage, grading, trees, and related improvements.

It is the policy of Sutter County to protect all new habitable structures from the 100-year (one percent) flood event. It is also Sutter County's policy to protect two lanes of travel in each direction for arterial roadways from the 100-year (one percent) flood event. All current and updated Sutter County policies and drainage criteria should apply, at the discretion of the County, to development within SPSP as development is approved.

Where other public agencies assert jurisdiction over aspects of drainage improvements required by Sutter County, approval would be provided by such jurisdictions prior to issuing permits or approving improvement plans.

Sutter County is a participant in the National Flood Insurance Program, and all development in the County would comply with the County of Sutter Flood Damage Prevention Ordinance. The Flood Damage Prevention Ordinance, in part, states:

> *"…to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions…"*

As the local administrator for the National Flood Insurance Program, Sutter County is responsible for coordinating the processing of revisions to Flood Insurance Rate Maps (FIRMs) through the Federal Emergency Management Agency (FEMA).

During the planning process of a development, phasing scenarios are developed based upon the best available information. However, actual development phasing

can vary significantly due to the many factors that influence the type, rate, and location of development. Sutter County is the entity responsible for ensuring the integrity of the SPSP, which includes the Drainage Master Plan, is upheld during all phases of a plan's implementation.

Reclamation District 1000

Reclamation District 1000 (RD 1000) operates and maintains facilities that provide drainage and flood control protection for land within the Natomas Basin. A document entitled, "Reclamation District 1000 Proposed Interior Drainage Plan and Procedures," dated August 1993, includes drainage policies and procedures to provide guidance for the drainage and flood control protection for development within the Natomas Basin. RD 1000 requires the use of the "Sacramento City/County Drainage Manual Volume 2: Hydrology Standards," dated December 1996, as the basis for technical analyses. The "Sacramento City North Natomas Drainage Design and Procedures Manual," dated July 1998, is also used as a technical reference for analyses performed within the Natomas Basin.

Correspondence from RD 1000 to Sutter County included three primary criteria for development within the Natomas Basin, as follows:

- Development cannot raise the 100-year storm water surface elevation in the drainage system.
- Development must provide detention to prevent runoff in excess of the rate of agricultural runoff.
- Development must provide additional pumping and carrying capacity to the extent that such demands on RD 1000's pumping plants and canals are increased.

In October 2000, the Board of Supervisors approved and authorized the Chairman to sign an agreement between Sutter County and RD 1000, which defines the roles and responsibilities relative to planning for drainage in the South Sutter County area. As discussed below, this agreement will likely be superseded by a new agreement that reflects the responsibility of each with respect to the SPSP.

RD 1000 developed hydrologic and hydraulic computer models, SWMM, and HEC-2, representing drainage and flooding conditions within the Natomas Basin. These models are used by RD 1000 to evaluate existing and post-project conditions and to compare the results to estimate the impacts of a proposed project or the cumulative impact of several projects. These models were also used to provide the hydrologic and hydraulic analyses for establishing the FIRM for the Natomas Basin. RD 1000 charges a fee to fund costs associated with developing and

maintaining the models and project-specific analyses and reviews performed by RD 1000.

Natomas Central Mutual Water Company

The Natomas Central Mutual Water Company (NCMWC) operates and maintains facilities that provide irrigation water to land within the Natomas Basin. NCMWC does not have generic prohibitions or regulations limiting the planning horizons of landowners. NCMWC does not govern land use decisions. NCMWC attempts to facilitate requests from landowners regarding specific projects. General guidelines are to be formulated by NCMWC to use in preparing infrastructure plans for the SPSP. It is the policy of NCMWC that proposed development must not adversely impact water users outside the development area. NCMWC wants to be involved early in the development process. In evaluating the impacts of proposed development, existing and future water demands must be considered within the impact area.

Based upon communication with NCMWC, the alternatives noted below would be analyzed to address NCMWC's facilities within, or affected by development within the SPSP area.

Much of the RD 1000 channel system is utilized by NCMWC to convey irrigation water during the irrigation season. It is anticipated that the remaining RD 1000 channels (after development of the SPSP) would be able to provide sufficient water conveyance through the plan area to where water can be pumped into the remaining NCMWC delivery system. New pumping facilities may need to be constructed near the edges of the plan area, together with potential conveyance connections such as pipe and/or small bermed channels to maintain NCMWC's supply to land outside of the SPSP area. It is not, however, the intention for the Drainage Master Plan to identify specific changes to water supply conveyances, but that these would be addressed by planning efforts (by others) directly related to water supply.

B. Regional

Sacramento Area Flood Control Agency

Due to the Sacramento region's vulnerability to devastating flooding and the large population at risk in the area, in 1989, state and local leaders formed the Sacramento Area Flood Control Agency (SAFCA). Established by the California Legislature to coordinate flood control on a regional basis, SAFCA is a "joint powers agency" consisting of the following entities:

- City of Sacramento
- County of Sacramento

- County of Sutter
- American River Flood Control District
- RD 1000

SAFCA has indicated its policy is to leave the management of interior drainage in the Natomas Basin with the counties, cities, and RD 1000. To the extent improvements are proposed that affect levees that are part of the flood control levee system that surround the Natomas Basin, SAFCA wants to be kept informed throughout the planning process. This includes levees along the Cross Canal, Sacramento River, American River, Natomas East Main Drainage Canal, and the Pleasant Grove Canal.

The former Pleasant Grove Flood Control Plan once included a provision to raise a portion of the west levee of the Pleasant Grove Creek Canal, where the levee is intersected by Sankey Road in South Sutter County. This improvement was designed to eliminate potential overflow into the Natomas Basin resulting from high stages in the Pleasant Grove Creek Canal. The potential overflow, referred to as the Sankey Gap overflow, flows through the SPSP area.

As the "lead agency," SAFCA prepared a "Draft Subsequent Environmental Impact Report SAFCA Local Project Pleasant Grove Flood Control Plan," dated April 5, 1995. "Responsible agencies" for the Local Project Pleasant Grove Flood Control Plan include Sutter County and RD 1000. In September 1989, SAFCA entered into a Joint Powers Agreement with Sutter County and RD 1000. This agreement requires these agencies to review the environmental documentation and approve or disapprove the project jointly with SAFCA. The report assesses the potential environmental effects of the proposed Pleasant Grove Flood Control Plan, identifies means to minimize potential adverse impacts, and evaluates reasonable alternatives to the proposed project. The current status of SAFCA's plan is changing and, although it appears that there is no formal consideration moving forward at this time for modifying the existing Sankey Gap overflow, SAFCA may consider modifying or eliminating the Sankey Gap overflow.

Continuously updating and revamping previous planning, in 2006, SAFCA released information regarding the integrity of the levees surrounding the Natomas Basin. A draft levee evaluation report was released for public review (dated March 13, 2006), and public presentations were made at SAFCA's monthly board meetings in March and April 2006, at which time SAFCA discussed its plans for rehabilitating the levees against underseepage in the Natomas Basin.

SAFCA's flood risk reduction program focuses on the major floodplains in the Sacramento area, including the Natomas Basin. The goals of the program are to:

- Provide at least 100-year level of flood protection as quickly as possible.

- Work toward achieving urban-standard ("200-year") flood protection before 2025.

- Ensure the structural integrity of the levee system.

To this end, SAFCA was successful in obtaining support of the community through a Proposition 218 proceeding to create a new special benefit assessment district with assessments to support construction of the levee improvements on the Sacramento River and Natomas levees by the 2012/13 time frame, and the Folsom Dam modifications in the 2018/19 time frame. SAFCA has also adopted a developer impact fee to help fund additional levee improvements. With the completion of these improvements, the Natomas Basin will be afforded a 200-year level of flood protection. However, SAFCA's plans include working toward even greater protection.

Most recently the State and Governor have accelerated the importance of completing the design work for all of the levee improvements intended to protect Natomas, and construction work is scheduled to continue this year on a portion of the Natomas Cross Canal levee. To date approximately 1 mile of levee has been rehabilitated with cutoff wall construction along the Natomas Cross Canal, with an additional 5,000 feet planned for construction in 2008.

This Drainage Master Plan addresses interior drainage conditions and identifies the facilities needed to detain and pump storm runoff from the SPSP area

C. State

Central Valley Flood Protection Board (CVFPB)

The CVFPB is responsible for overseeing and maintaining major portions of the Sacramento River Flood Control Project, including the levee system that surrounds the Natomas Basin. The levee system includes levees along the Cross Canal, Sacramento River, American River, and the Natomas East Main Drainage Canal. The CVFPB has guidelines and criteria for work in or near levees and wants to be kept informed of any proposals that include work near flood control levees.

The CVFPB is the lead agency responsible for the oversight of levee systems constructed by federal projects. The State of California agreed to assume operational responsibility after completion of construction to maintain and operate levee systems protecting the areas within the SPSP. Over the past decade the CVFPB has become increasingly involved in all areas associated with the Federal-State Flood Protection Project (Project). The CVFPB is responsible for issuing encroachment permits for work proposed on or adjacent to Project levees.

D. Federal

Federal Emergency Management Agency (FEMA)

FEMA is the Federal Administrator of the National Flood Insurance Program. Flood Insurance Studies and FIRMs prepared by FEMA show inundation areas and depths for potential flooding. FEMA has published standards and criteria that can be found in "Guidelines for Specifications for Flood Hazard Mapping Partners," dated February 2002. The FEMA FIRMs for Sutter County, California, that include the SPSP area, are Community Panel Numbers 060394 0265 D and 060394 0305 D, dated July 6, 1998.

As developments are proposed and constructed, FEMA is responsible for issuing revisions to FIRMs such as Conditional Letters of Map Revision (CLOMR) and Letters of Map Revision (LOMR) through the local agencies responsible for working with the National Flood Insurance Program.

While the current mapping shows approximate Zone A designations, it is anticipated that the current mapping will be updated to include more detailed depiction of the floodplain with base flood elevations and models being submitted to FEMA in relation to changes in the floodplain resulting from development within the SPSP area. In fact, for development to occur within the SPSP area, it is anticipated that internal embankments/berms would have to be constructed and so flood elevations would be critical to design and completion of development for the plan area. FEMA has publicly announced its intentions to map a new special flood hazard zone within the Natomas Basin in November 2008, likely identifying where flood insurance will be required for federally backed mortgaged structures at risk.

U.S. Army Corps of Engineers (USACE)

The USACE had overall authority for the Sacramento River Flood Control Project before construction completion and maintains authority over the Nation's waterways including those surrounding the Natomas Basin. These levees and waterways include the Cross Canal, Sacramento River, American River, and the Natomas East Main Drainage Canal. Accordingly, the USACE is a key entity in defining and reviewing modifications to the levees and discharges to the receiving waters with respect to quantity and quality, as they were the designers of the original projects and continue to provide hydraulic and hydrologic expertise in these areas throughout the Nation.

USACE also plays a key role in evaluating the impacts to waterways from a wetlands/habitat perspective. The environmental process for review and approval of development and the facilities to serve that development has proven to be lengthy, and has had impacts to costs of drainage facilities because of restrictions on construction practices that directly impact waterways. This Drainage Master

Plan is intended to identify the types, sizes, and locations of drainage facilities, and the environmental impacts of those facilities would be evaluated by others as part of the SPSP Environmental Impact Report (EIR) process.

III. EXISTING CONDITIONS

A. Topography

Topography within the SPSP area was developed using aerial photogrammetric mapping techniques with one-foot contour intervals in NGVD29 and NAD83 datums. Refer to Figure 2 for a depiction of the topographic coverage.

B. Land Use

The existing land use within the SPSP is primarily agricultural, with the exception of some employment-generating development, including Sysco Inc. on Pacific Avenue and some additional development immediately south of Sysco. The Sysco site is a 50-acre site located southeast of the intersection of Pacific Avenue and Sankey Road. Contained within the SPSP area along the east side of Pacific Avenue are existing employment-generating developments. The Sysco site and existing developments adjacent to the SPSP, in relation to the existing FEMA 100-year floodplain from Sankey Gap, are shown on Figure 3.

In the Natomas Basin, rapid development is occurring within the North Natomas Community Plan (NNCP) area and in South Natomas areas of the City of Sacramento. The Metro Air Park (MAP) development is currently in the planning stages within the unincorporated area of the County of Sacramento. The boundaries of South Natomas, the NNCP, and MAP are also shown on Figure 1.

C. Soils Information

Based upon a report of the U.S. Department of Agriculture National Resource Conservation Service entitled, "Soil Survey of Sutter County, California," dated 1988, the soils within the vicinity of the SPSP area have been classified as follows:

- "Soils on Terraces, San Joaquin – Cometa: Moderately deep and very deep, level to nearly level, well drained sandy loam and loam; on terraces."

- "Soils in Basins and on Basin Rims – Clear Lake-Capay: Deep and very deep, level to nearly level, poorly drained and moderately well drained clay and silty clay; in basins and on basin rims."

Based upon information provided by RD 1000, soils within the vicinity of the SPSP area have been classified as "C" and "D" soils with respect to hydrologic considerations. The "C" soils, which cover more than 50 percent of the area, have hardpan located 20 to 40 inches below the surface. Based upon the soil types in the area and basin modeling results developed by RD 1000, an appropriate constant loss rate for hydrologic modeling is 0.003 inches per hour.

D. Groundwater Data

Historical data for spring and fall groundwater levels, published by the California Department of Water Resources, shows the groundwater table within the SPSP area to be rarely less than 10 feet to 20 feet below existing ground. The groundwater table within the area appears to be affected mostly by seasonal irrigation practices. During the summer when irrigation ditches and canals are conveying water and fields are being irrigated, the groundwater elevations increase. No groundwater was encountered during construction of the storm water detention basin at Sysco's site (Figure 3), the bottom of which was 12 to 13 feet below existing ground level. In 2000, two borings at the Sysco site revealed groundwater depths 19 to 20 feet below existing ground levels. Based upon observations in North Natomas, the groundwater levels tend to be lower once the area is urbanized and no longer irrigated.

Groundwater quality data within the area indicates that a portion of the Natomas Basin may have TDS levels above 450 mg/l, but that much of the area is less than 450 mg/l and should not pose a serious problem in the temporary construction discharge of groundwater due to dewatering practices. Presented in Appendix A, on Figure A-1, are the locations of groundwater wells monitored by the California Department of Water Resources. Also presented in Appendix A is groundwater level data available for this report, as well as locations associated with each of the groundwater wells.

E. Existing Drainage and Irrigation Facilities

The Natomas East Main Drainage Canal is part of the flood control system that protects the Natomas Basin from exterior flooding. The Natomas East Main Drainage Canal runs north to south along the eastern boundary of the SPSP area.

RD 1000 operates and maintains the primary drainage and flood control system within the Natomas Basin. Storm water runoff from within the Natomas Basin and the Sankey Gap must be pumped to receiving waters that include the Sacramento River, American River, the Natomas East Main Drainage Canal, and the Cross Canal. The existing drainage and flood control system within the Natomas Basin consists of levees, drains, pump stations, improved detention basins, and natural (floodplain) storage areas. RD 1000 operates and maintains eight pumping plants that pump drainage from the Natomas Basin to receiving waters. The major drainage and flood control facilities for RD 1000 are shown on Figure 4. The existing agreement (dated October 2000) between Sutter County and RD 1000, addressed the responsibility of each for drainage in the event the 3,500-acre Specific Plan moved forward. The existing agreement will need to either be amended or replaced to address: (1) the use of RD 1000's system for receiving urban runoff from the SPSP, and (2) funding for construction and maintenance of drainage improvements to serve the SPSP.

In addition to typical roadside ditches and field drains, three of RD 1000's main drains, the East Main, the North Main, and the Sutter Canal (a formerly unnamed channel east of Highway 99), run through the SPSP area. The drains within the SPSP area not only convey drainage runoff water, but also convey irrigation water for the NCMWC outside of the rainy season.

Based upon information provided by RD 1000, the estimated runoff rate from existing agricultural land within the SPSP area is approximately 0.16 cfs/acre for the 100-year storm event with a 10-day duration without tailwater conditions. It has already been determined through development in the basin and modeling by RD 1000 that this unit runoff rate must be lowered to mitigate the impacts of development on the RD 1000 system.

Drainage from within the developed or developing areas of the Natomas Basin is pumped into RD 1000's drainage/flood control system. The facilities within developed areas are operated and maintained by the City of Sacramento, or parties other than RD 1000.

NCMWC operates and maintains surface water conveyance facilities within the Natomas Basin. The irrigation delivery system consists of drains, laterals, ditches, or canals, underground pipes, check structures, and pump stations.

NCMWC's North Main Canal runs north to south through the SPSP area east of Highway 99. In addition, NCMWC's facilities within the SPSP area include drains, laterals, check structures, and pump stations. Specifically, the "County Line check structure and lift pumps," "30s pumps," "Riego Pumps West," "Riego Pumps East," "Frazier Pump," and various check structures are located within the SPSP area. Facilities operated by the NCMWC are shown on Figure 5.

F. 100-Year Floodplain

Due to the generally flat terrain, the 100-year floodplain within the undeveloped portions of the Natomas Basin is generally spread out (less confined). Within the SPSP area, FEMA FIRM Community Panel Numbers 060394 0265 D and 060394 0305 D, dated July 6, 1998, show the following flood zone designations:

1. "Other Flood Areas, **Zone X (shaded)**, Areas of 500-year flood; areas of 100-year flood with average depths of less than one foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood."

2. "Other Flood Areas, **Zone X (unshaded)**, Areas determined to be outside 500-year floodplain."

3. "Special Flood Hazard Areas Inundated By 100-Year Flood, **Zone A**, no base flood elevations determined."

FEMA's current 100-year floodplain is presented on Figure 3.

The Pleasant Grove Canal is located outside and to the east of the Natomas Basin. In the 100-year storm event, the capacity of the Pleasant Grove Canal is exceeded, and flow enters the Natomas Basin where Sankey Road crosses RD 1000's eastern boundary. The location where this overflow occurs is referred to as the Sankey Gap. In the 100-year storm event a peak flow of 1,200 cfs, totaling 3,740 acre-feet, enters the Natomas Basin at the Sankey Gap according to reports by RD 1000, which were originally provided by Schaaf & Wheeler in 1994 and 2002, while coordinating with RD 1000 during past SAFCA work. The Sankey Gap flow travels west along Sankey Road with a smaller amount on the south side of Sankey Road with the majority of the existing flow along the north side of Sankey Road. It is anticipated that future refinement of the Sankey Gap hydrology and hydraulics will occur before final design, and it is understood that preliminary refinement has already begun through MBK Engineers as a consultant to RD 1000 and SAFCA. Preliminary findings, based upon conservative assumptions, suggest that the overflow may increase, but current planning level analysis using the above peak flow and volume have been acceptable to the County for use in this study. The design will be based upon the best available information at the time of development of the plan area.

Based upon information provided by RD 1000, the 100-year floodplain within the Natomas Basin north of Riego Road and east of Highway 99 is due to the Sankey Gap overflow. Depths range from 0.5 foot to 3.5 feet within the floodplain as a result of overflow from the Sankey Gap. At the location north of Riego Road and east of Highway 99, the 100-year floodplain is at El. 19.5 (NGVD29), approximated from Zone A boundaries and available topographic mapping. RD 1000 estimates the floodplain within the Zone A designation of the SPSP area south of Riego Road and areas west of Highway 99 at approximately El. 17 (NGVD29). The cause of the Sankey Gap flooding is due to a lack of conveyance capacity in the Cross Canal to allow runoff from Pleasant Grove Creek and adjacent watersheds to enter the Sacramento River. Also, during high stages in the Sacramento River water backs up in the Cross Canal and ponds in the Pleasant Grove Creek Canal and adjacent areas.

It continues to be the responsibility of RD 1000 and their consultant(s) to determine regional flooding impacts within the Natomas Basin through modeling of their system of channels/pumping during all planning efforts, including this Drainage Master Plan. More specific details on Sankey Gap overflow should be obtained from them. It is also anticipated that more detailed studies will be required before final designs can be completed and approved.

IV. REGULATORY PERMITTING REQUIREMENTS

To the extent that improvements are required on existing drains and canals, or new levees or pump stations on the flood control system that surrounds the Natomas Basin, the following permits may be required:

- USACE 404 Permit
- State Water Resources Control Board 401 Water Quality Certification
- Permits Associated with the Endangered Species Act
- CVFPB Encroachment Permit
- California Department of Fish and Game Streambed Alteration Permit

The construction of new conveyance facilities may require modifying existing or new structures at Highway 99 and county roads. Accordingly, encroachment permits from Caltrans and Sutter County may be required.

Construction activities can result in the degradation of the quality of surface runoff. Residual herbicides may also enter surface waterways at higher rates as agricultural soils are disrupted and exposed during construction.

A National Pollutant Discharge Elimination System (NPDES) Permit for Construction Activities would be required for construction activities within the SPSP area, including but not limited to discharge of surface runoff from disturbed areas as well as discharge from dewatering associated with underground excavations, as regulated by the state's Regional Water Quality Control Board.

The quality of surface runoff could be impacted as a result of pollutants from industrial activities. A NPDES Permit for Industrial Activities could potentially be required for comparable activities within the SPSP area.

The Drainage Master Plan would need to consider requirements of the Habitat Conservation Plan for the Natomas Basin to ensure compatibility between the two plans.

V. STORM DRAINAGE AND WATER QUALITY DESIGN CRITERIA AND STANDARDS

A. General

All drainage from the SPSP would be directed first through facilities under the jurisdiction of the Sutter County, but would be stored and pumped into the RD 1000 system, which in turn is pumped into the Natomas Cross Canal and the Sacramento River. Therefore no single standard is applicable for all drainage considerations related to the SPSP. A combination of applicable standards would be utilized accordingly.

B. Sutter County

Since the 2001 Drainage Master Plan for this area was completed, Sutter County continues to develop and adopt new Storm Drainage Design Standards, which can be easily reviewed on their Website at:

www.co.sutter.ca.us

Wood Rodgers considered utilizing a mixture of Sacramento County, Sutter County, and basin-specific standards for sizing on-site storm drains within the SPSP area. Sutter County currently requires 10-year peak flow be used to size on-site storm drain systems. Sacramento County currently allows the use of both the Nolte and Sacramento Methods design charts for sizing storm drains, both of which have been determined to estimate flows at less than 10-year magnitude. However, the Sacramento County precipitation depth-duration tables dictate slightly higher precipitation for the same average annual rainfall when compared to Sutter County depth-duration tables for a 10-year event. Therefore, Wood Rodgers would apply the 10-year recurrence storm utilizing Sacramento County precipitation values for sizing storm drains within the Plan Area.

Pipe and channel roughness coefficients and all other conveyance system design parameters would otherwise be based upon current Sutter County Standards at the time of final design. For purposes of this report Wood Rodgers utilized StormCAD and EPA SWMM programs for hydraulic calculations, and utilized the SACCalc program developed through Sacramento County for hydrology. For planning purposes channels were typically configured with 3H:1V sideslopes and roughness coefficients of 0.05, with access roads and fencing as required by Sutter County, while detention basins were typically configured with 4H:1V sideslopes and pump station facilities to move water into the RD 1000 system. Final side slopes for the detention basins and the drainage channels may vary between 2:1 and 5:1 due to final joint use considerations, and fencing will be typically required on slopes 3:1 or steeper.

Preliminary storm water quality treatment configurations utilized currently accepted treatment methodologies as shown in the Storm Water Quality Manual for the Sacramento and South Placer Regions (May 2007), which Sutter County temporarily has accepted as a guideline for treatment measures in addressing urban runoff. Wet and dry basin water quality treatment measures will be incorporated within the proposed detention basins. Where "make-up" water is required to maintain wet basins, and/or proposed lakes, the make-up water may be provided by the "nuisance runoff" (typically identified as landscape irrigation run-off and groundwater. Nuisance run-off is estimated to be 0.0015 acre-feet per day per acre for the Sacramento region. The nuisance run-off is typically adequate to provide make-up water for wet basins. Lakes typically require a groundwater well to augment the nuisance run-off to maintain desired water levels.

C. RD 1000 and Sacramento County

Consultations with Sutter County staff confirmed that the drainage plan for the SPSP area, to be consistent with the Natomas Basin, should utilize the standards utilized by RD 1000, which are based upon Sacramento County standards for storm definition (precipitation), when dealing with quantifying impacts to the regional drainage system. This requires the SPSP to remain consistent with all other evaluations within the Natomas Basin. RD 1000 oversees the regional drainage and flood control issues within the Natomas Basin and has adopted the use of Sacramento County definitions for storm recurrence, duration and distribution of precipitation. All areas within the SPSP Area would be required to drain through RD 1000 facilities before being pumped into the Sacramento River, therefore the drainage design must consider such standards utilized by RD 1000 to satisfy RD 1000 that their facilities are properly sized to accommodate SPSP development.

The Sacramento County hydrology manual provides extensive detail on the quantity and distribution of precipitation to be applied to a watershed, however, once the rain has reached the ground RD 1000's drainage consultant (Mead & Hunt) has determined that infiltration losses into the soil are overestimated using Sacramento County standards. RD 1000 has stipulated using an infiltration of 0.003 inches/hour to represent rainfall losses into the soil during a design storm. Sutter County has verified the appropriateness of utilizing this infiltration rate. This infiltration value was verified by Mead & Hunt by evaluating past storm precipitation and pumping records. The use of this parameter effectively overrides the use of soil, land use and imperviousness influences on runoff. With such a low infiltration capacity, the volume of runoff from existing conditions is maximized, leaving little room for increase due to development activities. RD 1000 and its consultants are continually updating their models and this Drainage Master Plan recognizes that the final drainage facilities may need to be adjusted prior to actual construction.

D. FEMA Considerations

The Federal Emergency Management Agency (FEMA) is responsible for administering the National Flood Insurance Program (NFIP) for the Federal Government, identifying areas of known flood hazard and providing local communities with the tools necessary to regulate development and/or other activities within potentially flooded areas. FEMA cannot enforce standards and criteria other than by simply denying acceptance of any municipality into the NFIP. Communities must provide convincing technical data to substantiate their own studies for FEMA review or voluntarily subject themselves to the technical standards that are acceptable to FEMA, which include hydrologic and hydraulic methods of computation as well as structural parameters for facilities designed for flood control purposes. The relationship is intended to be a cooperative effort, by quantifying/defining flood hazards and offering residences and businesses with a means of assistance should a catastrophic flood occur.

There are several areas where FEMA would be involved regarding the planned development within the SPSP area. The flooding within the Sutter County portion of the Natomas Basin must be defined accurately in order to construct anticipated development and associated flood control facilities as well as map the residual floodplain on the FEMA maps. Therefore, existing conditions modeling and mapping performed by RD 1000 is presumed to be made fully available to FEMA as the basis for establishing the elevations and quantity of flooding on FEMA's maps.

VI. PROJECT-SPECIFIC CONSTRAINTS AND OPPORTUNITIES

A. Constraints and Potential Solutions

There are several constraints for designing storm drain facilities for the development of the SPSP area. The character of existing flooding conditions shows that the SPSP area provides flood attenuating storage capacity as well as conveyance pathways for existing flood waters, originating from direct precipitation as well as from spilling from adjacent watersheds. As such, the benefits that the current land use provides for controlling flooding in the area must be maintained or replaced, without negative impacts to areas within or outside of the plan area. Specifically, the Sankey Gap overflow travels through the Sutter County portion of the Natomas Basin and is temporarily stored within the floodplain before being pumped out by RD 1000 facilities. Likewise, the rain falling directly on the watershed also is stored to some degree within the floodplain before being pumped.

It is not desirable to purposely maintain residential or employment-generating development interests within an area subject to flooding from the Sankey Gap. Therefore, the purpose of this Drainage Master Plan is to recommend solutions that replace the current storage and conveyance with more controlled storage and conveyance in a confined portion of the plan area. To mimic the manner in which local runoff water enters the RD 1000 system would require a pumped (metered) discharge from lands within the SPSP area into RD 1000's channels.

For the portion of the SPSP area within the existing floodplain, it is be necessary to construct levees or raised ground areas to prevent adjacent flooding from entering the plan area.

The SPSP area is approximately 7,500 acres and has groundwater levels that are generally 8 to 14 feet below existing ground elevations. With sufficient area and depth available the use of excavated detention storage is a proven and effective way to replace and confine flood control facilities within a developed area. By deepening flooded water levels within the plan area, on-site storm drains can be designed with sufficient slope to keep pipe sizes manageable, while also allowing a focused catchment of overland runoff through streets, in excess of storm drain capacities. By attenuating runoff within detention basins, outlet pumping can be sized to preclude the need for downstream system improvements. Flood control storage can generally be configured above maximum groundwater levels and prevent nuisance groundwater pumping will draining, storing and pumping surface runoff. Groundwater levels in the immediate project area are heavily influenced by the current practice of flood irrigation of agricultural fields and the limited drainage facilities in the area. Groundwater levels are expected to be lower when the plan area is developed due to the plan area no longer being agricultural land that is flood irrigated and the installation of urban drainage systems that direct the rainfall to the proposed detention basins. The groundwater levels in the Natomas basin within the

City of Sacramento dropped by approximately 5 to 10 feet during development of that area.

The Sankey Gap overflow is manageable due to the configuration of the existing levee separating the Pleasant Grove Creek Canal from the Natomas Basin. With a focused location of the spill itself it is relatively straightforward to capture this water in a channel and convey it to storage areas designed to replace existing floodplain storage.

B. Opportunities

Currently, there are several regional projects being served by RD 1000 and SAFCA that are under design. Improvements to portions of these facilities that are part of this plan could be coordinated with regional work to more efficiently accomplish the goals of the SPSP and the regional projects. For instance, the excavated material from on-site detention basins could be a potential source of material for regional levee improvement projects. Also, pumping plant expansions could be more easily accommodated during larger scale reconstruction efforts.

VII. PROPOSED LAND USE AND DEVELOPMENT PHASING

The proposed land use plan (Figure 6) was provided by EDAW, with Wood Rodgers providing input regarding the location and sizing of detention and conveyance facilities. Phasing of development has been defined by EDAW with input from the landowners, and is given careful consideration under this plan. While each area may have its own drainage facilities directly serving it, each area is nonetheless affected differently by development of lands adjacent to it. To the extent that new development displaces floodplain storage and/or impedes the drainage of floodwater, the size and configuration of new facilities offered as flood control solutions will be impacted.

Land use phasing is shown on Figure 7. There are eight phases that include: Phase 1, Phase A, Phase 2, Phase B, Phase 3, Phase C, Phase 4, and Phase D. Phasing would be evaluated on the basis that each phase is completed before a subsequent phase is initiated. For example, from a drainage analysis perspective, Phase 3 reflects development of areas labeled as Phase 3, Phase B, Phase 2, Phase A, and Phase 1. Phasing would only be evaluated for Alternative 1. Alternative 2 and Alternative 3 would be evaluated at build out only.

VIII. DRAINAGE ALTERNATIVES

There are three main alternatives being proposed/evaluated under this Drainage Master Plan. They are all similar in that they propose to add detention and pumping facilities to mitigate for displaced floodplain storage and overland conveyance. Each of these three plans differs very little from the other, with differences mostly relating to the location of flood control storage intended to control the runoff specifically from the Sankey Gap overflow (spill). Each of the on-site detention basins would be configured to hold low-flow water quality treatment storage as well as flood control storage. It is anticipated that each of the pumping systems for on-site facilities would be sized to outflow at a rate no greater than 0.067 cfs/acre. Subbasin maps for each of the scenarios are presented on Figure 8 and Figure 9.

For all of the alternatives, the majority of land within the SPSP along Highway 99 would be subject to off-site runoff entering the SPSP, unless land is raised to prevent this from occurring. All alternatives would be configured to "isolate" the plan area from outside flooding influences by using excavated material from the detention ponds to raise perimeter areas, through grading, above existing floodplain elevations. The widths of these areas should be wide enough so they are not considered levees, but instead become part of the land form.

Alternative 1

Alternative 1 is focused entirely "on-site" by providing detention storage for both local development increases as well as the Sankey Gap overflow, entirely within the boundary of the SPSP area. Refer to Figure 10 for a layout of on-site detention storage as well as pumping locations/quantities and recommended channel conveyance to move the water through the plan area both into and away from detention basins for this alternative. Figure 11 depicts a more detailed schematic representation of the capturing and conveying of the Sankey Gap overflow into the two designated storage areas. The southern storage area would receive flow first through two pipes under Sankey Road. Once the system approaches peak conditions, the northern basin would receive flow over a weir structure. Once the storm system recedes, and there is room in the RD 1000 system to receive the water, these two basins would be allowed to drain by gravity as much as possible and then dewatered slowly with dewatering pumps. It is not anticipated that the Sankey Gap overflow would be occurring twice consecutively without being considered greater than a 100-year combined event.

Even though there is infrequency of flooding within the northern cell of the proposed Sankey Gap overflow storage, any roads proposed to cross this detention area would be constructed high enough to prevent road flooding during a 100-year event. Local storms should produce very little inflow to this area requiring very small low-flow culvert connections; however, creating multiple cells that must act as one pond during the larger design flood event will require larger culvert crossings to equalize water surface elevations during filling. Estimates for how long the overflow would be stored are

anticipated to be no more than 2-3 weeks. It is anticipated that RD 1000 would provide coordination/direction on the appropriate injection of spill volume into its channel and pumping system when there is capacity.

Phasing of Alternative 1 is generally achieved incrementally, with land use in each phase initiating new drainage facilities or extending previously identified conveyance improvements within each drainage shed. In general, wherever a detention basin and pump station are initiated under a particular phase, the entire basin volume and pump station capacity is considered installed. Once detailed design begins, and more site-specific subsurface information is gathered, phasing of detentions may be considered at a future date, but not for purposes of this study. On-site conveyance systems would be sized for ultimate development and could be installed only far enough to connect new phases of development to detention basins as they are constructed. Typical sections of proposed on-site detention facilities and open channels are shown on Figure 12 and Figure 13, respectively.

Alternative 2

Alternative 2 is the most different from the other two alternatives in that it proposes to develop replacement storage outside of the Natomas Basin for the Sankey Gap overflow (Figure 14). This requires the excavation of enough storage below ground to capture the volume identified by Mead & Hunt (3,740 acre-feet) as well as the displaced floodplain storage that results from any such dedicated detention basin footprint. Two properties were identified as being potentially available for such a purpose. They are shown on Figure 15 (plan) and Figure 16 (sections). The concept provides an area preserved to receive the equivalent of the Sankey Gap overflow volume with a hydraulic spilling weir, constructed at the elevation of Sankey Road spill crest. This first cell would be located to the north (Barosso Property) and constructed with a berm around it, thereby preserving it. However, this area currently provides floodplain storage, therefore the current storage it provides in the 100-year flood would be displaced in serving to capture the Sankey Gap overflow. A second storage location (Lutz property) would need to be configured to replace the displaced storage of the first basin. By excavating the second cell below existing grade, and allowing storm flow that overtops the banks of Curry Creek to spill into this area, this site mitigates the impacts of the first site. These two complimentary storage areas could also be constructed to enhance habitat and wetlands benefits and provide borrow material for other areas needing to be raised out of the floodplain within the SPSP area.

Utilizing berm systems can raise concerns regarding underseepage. This issue warrants consideration during the design and implementation phase. We believe that underseepage problems are not likely at this location, although detailed geotechnical analysis has not been performed. Therefore, we did not include measures to address underseepage as part of the current plan or cost opinions.

It is also important to note that any considerations for modifying the Sankey Gap hydraulics will need to be coordinated with designs of others for levee improvements, particularly SAFCA, to ensure that impacts are not worsened for greater events than the design event. These types of issues are intended to be addressed during design and may require that higher events still overflow into the Natomas Basin, to prevent adverse impacts to properties outside of the basin.

Alternative 3

The layout for Alternative 3 (Figure 17 and Figure 18) would maintain the same layout of on-site detention facilities from Alternative 2, except the Sankey Gap overflow would be directed into a channel flowing westward along the Sankey Road corridor, crossing under Sankey Road and crossing under Highway 99 to be stored at a location outside of the SPSP area, but still within the Natomas Basin. This alternative would require channels with raised grading (possibly levees depending upon site constraints) on the east side of Highway 99, to maintain enough pressure to drive the flow under Highway 99 within a reasonably efficient hydraulic structure. The Sankey Gap overflow volume would have to commingle with pumped on-site flows until reaching Highway 99 where a splitting structure would maintain on-site flows southward, while spilling the higher Sankey Gap overflow to the dedicated storage to the west of Highway 99. The intent is to limit the flow entering the RD 1000 system to the south. If the Sankey Gap overflow were to occur when no storm was occurring within the Natomas Basin, then a portion of the Sankey Gap overflow would be allowed to enter the RD 1000 directly, and be pumped into the Sacramento River. The area to receive the overflow may also be used as habitat under the Natomas Basin HCP.

IX. EVALUATION OF DRAINAGE ALTERNATIVES

A. On-Site and Off-Site Facilities

Alternative 1

The sizes and dimensions of the detention basins for each of the subbasins associated with the Alternative 1 Conceptual Plan (Figure 10) are depicted in Table 1. The proposed areas within the SPSP that must be raised to prevent existing exterior flooding from impacting the proposed development are also shown on Figure 10. The on-site detention storage basins required for Phases 1, A, 2, B, 3, C, and 4 are shown on Figure 19 through Figure 25, respectively, with phased facilities data depicted in Table 2 through Table 8. Consolidation of pumping facilities for on-site detention were considered wherever feasible, but siphoning below existing facilities, such as RD 1000 channels, to connect separated detention cells was avoided. Information shown on Tables 1 through 8 identifies preliminary estimates of groundwater and where shallow groundwater depths may intrude into the planned detention basins. Site specific groundwater studies will be performed for each detention basin, and if groundwater is identified as a concern, a native clay liner or other impermeable material will be utilized to keep groundwater from entering the detention basin. The clay liner will also maintain a separation between groundwater and surface water. Native clay liners of 1 to 2 feet have been designed and constructed in the Natomas basin within the City of Sacramento to address high groundwater conditions. Native clays with low permeability are generally found in the top 3 to 10 feet of soils in the Natomas basin. It is feasibly and economical to stockpile the clay material during detention basin excavation and place the material on the bottom of the basin.

The use of wet basins and lakes has become common in the Natomas Basin and the Central Valley to provide water quality treatment. The primary function of the wet basins and lakes are drainage, flood control and water quality, and the wet basins and lakes can also provide open space/recreational amenities to communities. The maintenance activities are usually divided with the NPDES water quality and drainage/flood control responsibilities being maintained by the public works agency, and the open space/recreation amenity responsibilities being maintained by either a landscape district or a home owners association. It is anticipated that wet basins and lakes will require special design and maintenance procedures to address submerged pipe systems, access, vegetation, algae and vector control. Special design considerations include isolation gates to allow dewatering and extensions to submerged pipe systems, access and fencing, planting of vegetation, erosion control/headwalls, liner systems and provisions for make-up water. Wet basins and lakes require maintenance and management planning. A lake management plan will be prepared to identify the special design features, functions, management and maintenance requirements as well as who will be responsible for maintenance and funding.

With wet basins and lakes the potential for creating environmental habitat for endangered/protected species will be considered. Prior to final approvals or construction the appropriate agencies (USFWS, USACE, CDFG) will be consulted and appropriate agreements (Safe Harbor and maintenance) will be obtained to ensure that maintenance practices can continue and the proposed basins can operate as intended. Such general considerations for onsite detention and wet basin design should carry through for all alternatives considered.

It is understood that environmental mitigation credit for detention basins where wet conditions are designed is discouraged by the County. Where higher levels of maintenance are required it is generally infeasible to provide environmental mitigation for sensitive or endangered species, however, where little or no maintenance is required the potential for some level of joint use of facilities and environmental mitigation is still considered a possibility.

In general the onsite detention proposed under Alternative 1 (and other alternatives) receives direct subbasin runoff directing this runoff through a single cell detention storage before being pumped to RD 1000 channels. However, in the southeast portion of the plan the proposed system consists of a chained and stepped detention configuration with a single pumping facility at the downstream end of the detention string, such as in Subbasins 7 and 12, where proposed lake amenities contain a layer of flow-through detention storage are being utilized. The storage located where pumping is co-located at the downstream ends of such systems are operating more like a sump and in order to avoid excessive cycling of pumping facilities are recommended to operate with a higher pump turn-on elevation than single cell systems in other basins.

Alternative 2

The sizes and dimensions of the detention basins for each of the subbasins associated with the Alternative 2 Conceptual Plan (Figure 14) are depicted in Table 9. The proposed areas within the SPSP that must be raised to prevent existing exterior flooding from impacting the proposed development are also shown on Figure 14.

Alternative 3

The sizes and dimensions of the detention basins for each of the subbasins associated with the Alternative 3 Conceptual Plan (Figure 17) are also depicted in Table 9. The proposed areas within the SPSP that must be raised to prevent existing exterior flooding from impacting the proposed development are also shown on Figure 17.

Sankey Detention Volume

The sizes of the Sankey Spill storage cells are summarized in Table 10 for all three alternatives considered. The location of detention cells noted for Alternative 1 in Table 10 is depicted on Figure 11. For clarification, all runoff entering the Sankey Detention Volume from off site also included precipitation falling directly upon the ponds themselves. The dewatering of each of the Sankey Detention Alternatives within the Natomas Basin were able to drain by gravity with controlled (gated) outlets to allow for RD 1000 to control inflow and outflow of their entire system. The only alternative which requires dewatering of storage below channel inverts is Alternative 2, and these dewatering pumping stations are shown on Figure 15.

RD 1000

Off-site improvements within the RD 1000 system were determined in close coordination with RD 1000. RD 1000 concluded that approximately three miles of channel improvements are required to convey the post-project storm water runoff through the Natomas Basin while mitigating increases in flood stage (Figure 26). Interpreting Mead & Hunt's report, these channel improvements are required for all three alternatives considered. It is important to reiterate that all uses of RD 1000's system by the proposed development will require a negotiated agreement that will spell out what system improvements are required by RD 1000 to accommodate urban runoff.

B. Cost Opinions

Wood Rodgers has developed a preliminary opinion of probable cost for each major alternative (Ultimate Conditions for Alternatives 1, 2, and 3), and phased developments for Alternative 1, consistent with previous descriptions and figures. Table 11 through Table 83 describe these costs for construction and include land acquisition costs (provided by others) consistent with other planning efforts for the area, and include rough estimates for interior grading and placing fill for non-drainage structures generated by drainage excavation.

X. FINDINGS AND RECOMMENDATIONS

In formulating this Drainage Master Plan for the SPSP area, Wood Rodgers formulated particular findings and recommendations. These findings and recommendations are presented below.

A. Findings

1. Technically feasible measures can be implemented to protect development within the SPSP area, to mitigate the impact of development on drainage/ flooding outside the SPSP.

2. Improvements to RD 1000 drainage facilities are required for development of Alternative 1.

3. Utilizing detention for managing the Sankey Gap overflow affords Sutter County control and flexibility on the timing and scheduling of drainage infrastructure improvements for development within the SPSP area.

B. Recommendations

1. Sutter County should continue to coordinate its planning and implementation of drainage improvements with RD 1000, NCMWC, and SAFCA.

2. The landowners within the SPSP should coordinate with SAFCA and RD 1000 to facilitate levee and pumping plant improvements to coincide with regional projects for more efficient construction.

XI. REFERENCES

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FEMA Flood Insurance Study, July 6, 1998.

FEMA "Guidelines for Specifications for Flood Hazard Mapping Partners," dated February 2002.

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"Reclamation District 1000 Proposed Interior Drainage Plan and Procedures," dated August 1993

"Sacramento City/County Drainage Manual Volume 2: Hydrology Standards," dated December 1996

"Sacramento City North Natomas Drainage Design and Procedures Manual," dated July 1998,

SAFCA, "Draft Subsequent Environmental Impact Report SAFCA Local Project Pleasant Grove Flood Control Plan," dated April 5, 1995.

Schaaf & Wheeler, Consulting Civil Engineers, "Assessment of a Possible Nexus Between Lower Sacramento River Stage and Flooding Conditions in Sutter and Placer Counties," prepared for the Sacramento Area Flood Control Agency, August 2002.

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Sutter County General Plan, 1996.

"Sutter County Department of Public Works Design Standards," dated November 2005.

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U.S. Department of Agriculture National Resource Conservation Service entitled, "Soil Survey of Sutter County, California," dated 1988.

TABLE 1

SUTTER POINT SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1

Detention Basin Data	Subbasin Number											
	1	2	3	4	5	6	7*	8	9	10	11	12*
Approximate Basin Footprint (ac)	31.9	10.2	13.6	33.6	44.5	50.9	28.6	22.0	42.4	21.1	24.5	22.6
Land Use	Industrial	Industrial	Residential	Residential and Commercial	Industrial	Residential and Commercial	Residential and Commercial	Industrial	Industrial and Commercial	Industrial	Industrial	Reisdential and Commerical
Contributing Shed Area	461.7	152.5	225.8	447.5	644.5	917.4	1800.5	314.6	707.0	236.6	400.4	754.6
% Impervious	85	85	70	74	86	72	72	85	86	85	85	73
Existing Ground (Average)	19	24.5	28.5	18.5	28	16.5	varies	17	16	17	17	varies
Spring Groundwater Elevation (Estimated Range)	12.5 to 15.5	7.5 to 11.5	7.5 to 11.5	12.5 to 15.5	12.5 to 15.5	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	14	17.5	21.5	12	22	11	7	11.5	8.5	12.5	12	7
Groundwater Intrustion into Flood Control Zone	1.5	0	0	3.5	0	0	0	3.5	6.5	2.5	3	0
Potential Basin Type	Wet Basin	Dry Basin	Dry Basin	Wet Basin	Dry Basin	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	31	10	15	30	43	61	106	21	47	16	27	51
Pump #1	15.3 cfs on @ El. 14.5	5.7 cfs on @ El. 18	7.7 cfs on @ El. 22	14.9 cfs on @ El. 12.5	21.5 cfs on @ El.22.5	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	10.3 cfs on @ El. 12	23.7 cfs on @ El. 9	8 cfs on @ El. 13	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	15.3 cfs on @ El. 15	5.7 cfs on @ El. 18.5	7.7 cfs on @ El. 22.5	14.9 cfs on @ El. 13	21.5 cfs on @ El. 23	30.6cfs on @ El. 12	53 cfs on @ El. 13	10.3 cfs on @ El. 12.5	23.7 cfs on @ El. 9.5	8 cfs on @ El. 13.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	16.8	20.3	24.5	14.4	24.4	13.9	8.0	14.1	11.3	14.5	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	18.6	22.0	26.5	15.9	26.0	15.8	8.4	15.7	13.0	15.8	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	119	37	57	116	167	233	81	82	181	62	75	132
100-year, 10-day Pool Elevation (ft)	18.9	22.3	26.7	16.1	26.2	16.0	14.2	15.9	13.3	16.0	15.7	14.1
Average Bottom El. (Water Quality, ft)	8	11.5	15.5	6	16	5	-3.5	5.5	2.5	6.5	6	0
Water Quality Volume (ac-ft)	87.7	29.0	30.3	64.9	93.5	133.0	261.1	59.8	134.3	45.0	76.1	110.2
Water Quality Pool El. (ft)	14	17.5	21.5	12	22	11	7	11.5	8.5	12.5	12	7
Average Water Quality Depth (ft)	6	6	6	6	6	6	10.5	6	6	6	6	7

Notes:

1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect most downstream detention cells only.
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 2

SUTTER POINT SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE 1

Detention Basin Data			
	6	**7***	**12***
Approximate Basin Footprint (ac)	50.9	28.6	22.6
Land Use	Residential and Commercial	Residential and Commercial	Reisdential and Commerical
Contributing Shed Area	917.4	1800.5	754.6
% Impervious	72	72	73
Existing Ground (Average)	16.5	varies	varies
Spring Groundwater Elevation (Estimated Range)	5 to 9	varies, generally -10 to 5	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	11	7	7
Groundwater Intrustion into Flood Control Zone	0	0	0
Potential Basin Type	Dry Basin	Dry Basin, Lake	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	61	106	51
Pump #1	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	30.6cfs on @ El. 12	53 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	13.9	8.0	10.8
100-year, 24-hour Pool Elevation (ft)	15.8	8.4	13.4
100-year, 10-day Flood Control Volume (ac-ft)	233	81	132
100-year, 10-day Pool Elevation (ft)	16.0	14.2	14.1
Average Bottom El. (Water Quality, ft)	5	-3.5	0
Water Quality Volume (ac-ft)	133.0	261.1	110.2
Water Quality Pool El. (ft)	11	7	7
Average Water Quality Depth (ft)	6	10.5	7

Notes:

1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect most downstream detention cells only.

2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 3

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE A

Detention Basin Data					
	6	**7***	**9**	**11**	**12***
Approximate Basin Footprint (ac)	50.9	28.6	42.4	24.5	22.6
Land Use	Residential and Commercial	Residential and Commercial	Industrial and Commercial	Industrial	Reisdential and Commerical
Contributing Shed Area	917.4	1800.5	707.0	400.4	754.6
% Impervious	72	72	86	85	73
Existing Ground (Average)	16.5	varies	16	17	varies
Spring Groundwater Elevation (Estimated Range)	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	11	7	8.5	12	7
Groundwater Intrustion into Flood Control Zone	0	0	6.5	3	0
Potential Basin Type	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	61	106	47	27	51
Pump #1	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	23.7 cfs on @ El. 9	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	30.6cfs on @ El. 12	53 cfs on @ El. 13	23.7 cfs on @ El. 9.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	13.9	8.0	11.3	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	15.8	8.4	13.0	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	233	81	181	75	132
100-year, 10-day Pool Elevation (ft)	16.0	14.2	13.3	15.7	14.1
Average Bottom El. (Water Quality, ft)	5	-3.5	2.5	6	0
Water Quality Volume (ac-ft)	133.0	261.1	134.3	76.1	110.2
Water Quality Pool El. (ft)	11	7	8.5	12	7
Average Water Quality Depth (ft)	6	10.5	6	6	7

Notes:

1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect most downstream detention cells only.
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 4

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE 2

Detention Basin Data					
	6	**7***	**9**	**11**	**12***
Approximate Basin Footprint (ac)	50.9	28.6	42.4	24.5	22.6
Land Use	Residential and Commercial	Residential and Commercial	Industrial and Commercial	Industrial	Reisdential and Commerical
Contributing Shed Area	917.4	1800.5	707.0	400.4	754.6
% Impervious	72	72	86	85	73
Existing Ground (Average)	16.5	varies	16	17	varies
Spring Groundwater Elevation (Estimated Range)	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	11	7	8.5	12	7
Groundwater Intrustion into Flood Control Zone	0	0	6.5	3	0
Potential Basin Type	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	61	106	47	27	51
Pump #1	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	23.7 cfs on @ El. 9	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	30.6cfs on @ El. 12	53 cfs on @ El. 13	23.7 cfs on @ El. 9.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	13.9	8.0	11.3	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	15.8	8.4	13.0	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	233	81	181	75	132
100-year, 10-day Pool Elevation (ft)	16.0	14.2	13.3	15.7	14.1
Average Bottom El. (Water Quality, ft)	5	-3.5	2.5	6	0
Water Quality Volume (ac-ft)	133.0	261.1	134.3	76.1	110.2
Water Quality Pool El. (ft)	11	7	8.5	12	7
Average Water Quality Depth (ft)	6	10.5	6	6	7

Notes:
1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 5

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE B

Detention Basin Data	Subbasin Number					
	5	6	7*	9	11	12*
Approximate Basin Footprint (ac)	44.5	50.9	28.6	42.4	24.5	22.6
Land Use	Industrial	Residential and Commercial	Residential and Commercial	Industrial and Commercial	Industrial	Reisdential and Commerical
Contributing Shed Area	644.5	917.4	1800.5	707.0	400.4	754.6
% Impervious	86	72	72	86	85	73
Existing Ground (Average)	28	16.5	varies	16	17	varies
Spring Groundwater Elevation (Estimated Range)	12.5 to 15.5	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	22	11	7	8.5	12	7
Groundwater Intrustion into Flood Control Zone	0	0	0	6.5	3	0
Potential Basin Type	Dry Basin	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	43	61	106	47	27	51
Pump #1	21.5 cfs on @ El.22.5	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	23.7 cfs on @ El. 9	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	21.5 cfs on @ El. 23	30.6cfs on @ El. 12	53 cfs on @ El. 13	23.7 cfs on @ El. 9.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	24.4	13.9	8.0	11.3	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	26.0	15.8	8.4	13.0	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	167	233	81	181	75	132
100-year, 10-day Pool Elevation (ft)	26.2	16.0	14.2	13.3	15.7	14.1
Average Bottom El. (Water Quality, ft)	16	5	-3.5	2.5	6	0
Water Quality Volume (ac-ft)	93.5	133.0	261.1	134.3	76.1	110.2
Water Quality Pool El. (ft)	22	11	7	8.5	12	7
Average Water Quality Depth (ft)	6	6	10.5	6	6	7

Notes:
1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 6

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

Spring Groundwater Elevation (Estimated Range)

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE 3

Detention Basin Data	Subbasin Number						
	4	5	6	7*	9	11	12*
Approximate Basin Footprint (ac)	33.6	44.5	50.9	28.6	42.4	24.5	22.6
Land Use	Residential and Commercial	Industrial	Residential and Commercial	Residential and Commercial	Industrial and Commercial	Industrial	Reisdential and Commerical
Contributing Shed Area	447.5	644.5	917.4	1800.5	707.0	400.4	754.6
% Impervious	74	86	72	72	86	85	73
Existing Ground (Average)	18.5	28	16.5	varies	16	17	varies
Spring Groundwater Elevation (Estimated Range)	12.5 to 15.5	12.5 to 15.5	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	12	22	11	7	8.5	12	7
Groundwater Intrustion into Flood Control Zone	3.5	0	0	0	6.5	3	0
Potential Basin Type	Wet Basin	Dry Basin	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	30	43	61	106	47	27	51
Pump #1	14.9 cfs on @ El. 12.5	21.5 cfs on @ El.22.5	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	23.7 cfs on @ El. 9	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	14.9 cfs on @ El. 13	21.5 cfs on @ El. 23	30.6cfs on @ El. 12	53 cfs on @ El. 13	23.7 cfs on @ El. 9.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	14.4	24.4	13.9	8.0	11.3	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	15.9	26.0	15.8	8.4	13.0	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	116	167	233	81	181	75	132
100-year, 10-day Pool Elevation (ft)	16.1	26.2	16.0	14.2	13.3	15.7	14.1
Average Bottom El. (Water Quality, ft)	6	16	5	-3.5	2.5	6	0
Water Quality Volume (ac-ft)	64.9	93.5	133.0	261.1	134.3	76.1	110.2
Water Quality Pool El. (ft)	12	22	11	7	8.5	12	7
Average Water Quality Depth (ft)	6	6	6	10.5	6	6	7

Notes:

1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 7

SUTTER POINTE PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE C

Detention Basin Data	Subbasin Number								
	4	5	6	7*	8	9	10	11	12*
Approximate Basin Footprint (ac)	33.6	44.5	50.9	28.6	22.0	42.4	21.1	24.5	22.6
Land Use	Residential and Commercial	Industrial	Residential and Commercial	Residential and Commercial	Industrial	Industrial and Commercial	Industrial	Industrial	Reisdential and Commerical
Contributing Shed Area	447.5	644.5	917.4	1800.5	314.6	707.0	236.6	400.4	754.6
% Impervious	74	86	72	72	85	86	85	85	73
Existing Ground (Average)	18.5	28	16.5	varies	17	16	17	17	varies
Spring Groundwater Elevation (Estimated Range)	12.5 to 15.5	12.5 to 15.5	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	12	22	11	7	11.5	8.5	12.5	12	7
Groundwater Intrustion into Flood Control Zone	3.5	0	0	0	3.5	6.5	2.5	3	0
Potential Basin Type	Wet Basin	Dry Basin	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	30	43	61	106	21	47	16	27	51
Pump #1	14.9 cfs on @ El. 12.5	21.5 cfs on @ El.22.5	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	10.3 cfs on @ El. 12	23.7 cfs on @ El. 9	8 cfs on @ El. 13	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	14.9 cfs on @ El. 13	21.5 cfs on @ El. 23	30.6cfs on @ El. 12	53 cfs on @ El. 13	10.3 cfs on @ El. 12.5	23.7 cfs on @ El. 9.5	8 cfs on @ El. 13.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	14.4	24.4	13.9	8.0	14.1	11.3	14.5	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	15.9	26.0	15.8	8.4	15.7	13.0	15.8	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	116	167	233	81	82	181	62	75	132
100-year, 10-day Pool Elevation (ft)	16.1	26.2	16.0	14.2	15.9	13.3	16.0	15.7	14.1
Average Bottom El. (Water Quality, ft)	6	16	5	-3.5	5.5	2.5	6.5	6	0
Water Quality Volume (ac-ft)	64.9	93.5	133.0	261.1	59.8	134.3	45.0	76.1	110.2
Water Quality Pool El. (ft)	12	22	11	7	11.5	8.5	12.5	12	7
Average Water Quality Depth (ft)	6	6	6	10.5	6	6	6	6	7

Notes:
1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect most downstream detention cells only.
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 8

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVE 1, PHASE 4

Detention Basin Data	Subbasin Number									
	3	4	5	6	7*	8	9	10	11	12*
Approximate Basin Footprint (ac)	13.6	33.6	44.5	50.9	28.6	22.0	42.4	21.1	24.5	22.6
Land Use	Residential	Residential and Commercial	Industrial	Residential and Commercial	Residential and Commercial	Industrial	Industrial and Commercial	Industrial	Industrial	Reisdential and Commerical
Contributing Shed Area	225.8	447.5	644.5	917.4	1800.5	314.6	707.0	236.6	400.4	754.6
% Impervious	70	74	86	72	72	85	86	85	85	73
Existing Ground (Average)	28.5	18.5	28	16.5	varies	17	16	17	17	varies
Spring Groundwater Elevation (Estimated Range)	7.5 to 11.5	12.5 to 15.5	12.5 to 15.5	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	21.5	12	22	11	7	11.5	8.5	12.5	12	7
Groundwater Intrustion into Flood Control Zone	0	3.5	0	0	0	3.5	6.5	2.5	3	0
Potential Basin Type	Dry Basin	Wet Basin	Dry Basin	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	15	30	43	61	106	21	47	16	27	51
Pump #1	7.7 cfs on @ El. 22	14.9 cfs on @ El. 12.5	21.5 cfs on @ El.22.5	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	10.3 cfs on @ El. 12	23.7 cfs on @ El. 9	8 cfs on @ El. 13	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	7.7 cfs on @ El. 22.5	14.9 cfs on @ El. 13	21.5 cfs on @ El. 23	30.6cfs on @ El. 12	53 cfs on @ El. 13	10.3 cfs on @ El. 12.5	23.7 cfs on @ El. 9.5	8 cfs on @ El. 13.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	24.5	14.4	24.4	13.9	8.0	14.1	11.3	14.5	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	26.5	15.9	26.0	15.8	8.4	15.7	13.0	15.8	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	57	116	167	233	81	82	181	62	75	132
100-year, 10-day Pool Elevation (ft)	26.7	16.1	26.2	16.0	14.2	15.9	13.3	16.0	15.7	14.1
Average Bottom El. (Water Quality, ft)	15.5	6	16	5	-3.5	5.5	2.5	6.5	6	0
Water Quality Volume (ac-ft)	30.3	64.9	93.5	133.0	261.1	59.8	134.3	45.0	76.1	110.2
Water Quality Pool El. (ft)	21.5	12	22	11	7	11.5	8.5	12.5	12	7
Average Water Quality Depth (ft)	6	6	6	6	10.5	6	6	6	6	7

Notes:

1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect most downstream detention cells only.
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 9

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

DETENTION POND AND PUMP STATION DATA - ALTERNATIVES 2 AND 3

Detention Basin Data	Subbasin Number											
	1	2	3	4	5	6	7*	8	9	10	11	12*
Approximate Basin Footprint (ac)	31.9	10.2	22.4	33.6	59.3	50.9	28.6	22.0	42.4	21.1	24.5	22.6
Land Use	Industrial	Industrial	Residential	Residential and Commercial	Industrial	Residential and Commercial	Residential and Commercial	Industrial	Industrial and Commercial	Industrial	Industrial	Reisdential and Commerical
Contributing Shed Area	461.7	152.5	372.4	447.5	987.95	917.4	1800.5	314.6	707.0	236.6	400.4	760.3
% Impervious	85	85	70	74	86	72	72	85	86	85	85	73
Existing Ground (Average)	19	24.5	28.5	18.5	28	16.5	varies	17	16	17	17	varies
Spring Groundwater Elevation (Estimated Range)	12.5 to 15.5	7.5 to 11.5	7.5 to 11.5	12.5 to 15.5	12.5 to 15.5	5 to 9	varies, generally -10 to 5	9 to 15	9 to 15	9 to 15	9 to 15	varies, generally -10 to 5
Average Bottom El. (Flood Control, ft)	14	17.5	21.5	12	21	11	7	11.5	8.5	12.5	12	7
Groundwater Intrustion into Flood Control Zone	1.5	0	0	3.5	0	0	0	3.5	6.5	2.5	3	0
Potential Basin Type	Wet Basin	Dry Basin	Dry Basin	Wet Basin	Dry Basin	Dry Basin	Dry Basin, Lake	Wet Basin	Wet Basin	Wet Basin	Wet Basin	Dry Basin, Lake
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Pump Station Discharge (cfs)	31	10	25	30	66	61	106	21	47	16	27	51
Pump #1	15.3 cfs on @ El. 14.5	5.7 cfs on @ El. 18	12.4 cfs on @ El. 22	14.9 cfs on @ El. 12.5	32.9 cfs on @ El.22.5	30.6 cfs on @ El. 11.5	53 cfs on @ El. 12.5	10.3 cfs on @ El. 12	23.7 cfs on @ El. 9	8 cfs on @ El. 13	13.3 cfs on @ El. 12.5	25.3 cfs on @ El. 12.5
Pump #2	15.3 cfs on @ El. 15	5.7 cfs on @ El. 18.5	12.4 cfs on @ El. 22.5	14.9 cfs on @ El. 13	32.9 cfs on @ El. 23	30.6cfs on @ El. 12	53 cfs on @ El. 13	10.3 cfs on @ El. 12.5	23.7 cfs on @ El. 9.5	8 cfs on @ El. 13.5	13.3 cfs on @ El. 13	25.3 cfs on @ El. 13
10-year, 24-hour Pool Elevation (ft)	16.8	20.3	24.4	14.4	24.2	13.9	8.0	14.1	11.3	14.5	14.2	10.8
100-year, 24-hour Pool Elevation (ft)	18.6	22.0	26.2	15.9	26.1	15.8	8.4	15.7	13.0	15.8	15.7	13.4
100-year, 10-day Flood Control Volume (ac-ft)	119	37	95	116	300	233	81	82	181	62	75	132
100-year, 10-day Pool Elevation (ft)	18.9	22.3	26.4	16.1	26.6	16.0	14.2	15.9	13.3	16.0	15.7	14.1
Average Bottom El. (Water Quality, ft)	8	11.5	15.5	6	15	5	-3.5	5.5	2.5	6.5	6	0
Water Quality Volume (ac-ft)	87.7	29.0	30.3	64.9	93.5	133.0	261.1	59.8	134.3	45.0	76.1	110.2
Water Quality Pool El. (ft)	14	17.5	21.5	12	21	11	7	11.5	8.5	12.5	12	7
Average Water Quality Depth (ft)	6	6	6	6	6	6	10.5	6	6	6	6	7

Notes:
1. Subbasins 7 and 12 are each served by a multiple cell-tiered detention configuration. SWMM model definitions for each shed are available upon request. Values in table reflect most downstream detention cells only.
2. Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 10

SUTTER POINTE SPECIFIC PLAN
DRAINAGE MASTER PLAN

SANKEY DETENTION SUMMARY

Detention Basin Data	ALTERNATIVE 1 - SANKEY DETENTION BASIN					ALTERNATIVE 2 - SANKEY DETENTION BASIN		ALTERNATIVE 3 - SANKEY DETENTION BASIN
	CELL 1	CELL 2	CELL 3	CELL 4	CELL 5	BARROSSO PROPERTY	LUTZ PROPERTY	8
Approximate Basin Footprint (ac)	135	17	27	156	80	224	95	750
Existing Ground (Average)	28	31	31.5	28	25	35	35	15
Spring Groundwater Elevation (Recorded Range)	7.5 to 11.5	7.5 to 11.5	12.5 to 15.5	12.5 to 15.5	12.5 to 15.5	-14.8 - 11.4	-14.8 - 11.4	1.1 - 15
Average Bottom El. (Flood Control, ft)	18	13	16	16	16	18	9	8.5
Maximum Side Slopes	4:1	4:1	4:1	4:1	4:1	4:1	4:1	4:1
Maximum Dewatering Pump Station Discharge (cfs)	N/A	N/A	N/A	N/A	N/A	32	18	64
Approximate 100-year Flood Control Storage Volume (ac-ft)	1265	211	220	1394	719	3767	1447	3855
100-year Design Water Surface Elevation (ft)	28.2	28.2	26.0	26.0	26.0	41.0	41.0	13.7

Note: Elevations are in National Geodetic Vertical Datum of 1929 (NGVD29).

TABLE 11

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal (Table 12)	10,706,000
2.	Drainage Shed 2 Facilities Subtotal (Table 13)	4,425,000
3.	Drainage Shed 3 Facilities Subtotal (Table 14)	5,399,000
4.	Drainage Shed 4 Facilities Subtotal (Table 15)	9,783,000
5.	Drainage Shed 5 Facilities Subtotal (Table 16)	15,467,000
6.	Drainage Shed 6 Facilities Subtotal (Table 17)	19,695,000
7.	Drainage Shed 7 Facilities Subtotal (Table 18)	35,559,000
8.	Drainage Shed 8 Facilities Subtotal (Table 19)	7,023,000
9.	Drainage Shed 9 Facilities Subtotal (Table 20)	19,638,000
10.	Drainage Shed 10 Facilities Subtotal (Table 21)	5,663,000
11.	Drainage Shed 11 Facilities Subtotal (Table 22)	16,303,000
12.	Drainage Shed 12 Facilities Subtotal (Table 23)	14,923,000
13.	Regional Facilities Subtotal (Table 24)	49,625,000
	Subtotal - Drainage Facilities	**214,209,000**

TABLE 12

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 1

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 1 Facilities				
a. Water Quality/Detention Basin				
· Excavate	422,387	cy	2.50	1,056,000
· Dewatering	30	ac	5,000.00	150,000
· Access Road (6" Aggregate Base)	7,800	sy	5.19	40,500
b. Pump Station				
· Pump Station	31	cfs	60,000.00	1,860,000
c. Open Channel				
· Excavate	42,400	cy	3.00	127,200
· Dewatering	4,972	lf	10.00	49,700
· Access Road (6" Aggregate Base)	8,300	sy	5.19	43,100
- Fence, 6' Chainlink	9,944	lf	16.12	160,300
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	456	cy	508.88	231,800
· Dewatering[1]	240	lf	0.00	0
· Structural Excavation	3,010	cy	5.00	15,052
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	1,500	lf	115.00	172,500
· 42" Diameter Storm Drain	1,600	lf	160.00	256,000
· 48" Diameter Storm Drain	1,000	lf	180.00	180,000
· 54" Diameter Storm Drain	1,200	lf	195.00	234,000
· 60" Diameter Storm Drain	2,700	lf	210.00	567,000
· 66" Diameter Storm Drain	1,800	lf	230.00	414,000
· 72" Diameter Storm Drain	3,700	lf	250.00	925,000
· Dewatering[1]	13,500	lf	0.00	0
· 60" Diameter Manhole	6	ea	4,000.00	24,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	8	ea	15,000.00	120,000
f. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 1 Drainage Facilities				6,824,152
Land Acquisition	40	ac	37,500.00	1,493,700
Construction Contingencies (20%)				1,364,830
Administration, Engineering, and Environmental (15%)				1,023,623
TOTAL SHED 1 DRAINAGE FACILITIES COST				10,706,305

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 13

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 2

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 2 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	136,472	cy	2.50	341,200
		·	Dewatering	9	ac	5,000.00	45,000
		·	Access Road (6" Aggregate Base)	4,300	sy	5.19	22,300
	b.	Pump Station					
		·	Pump Station	11	cfs	60,000.00	684,000
	c.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	0	lf	115.00	0
		·	42" Diameter Storm Drain	500	lf	160.00	80,000
		·	48" Diameter Storm Drain	900	lf	180.00	162,000
		·	54" Diameter Storm Drain	0	lf	195.00	0
		·	60" Diameter Storm Drain	0	lf	210.00	0
		·	66" Diameter Storm Drain	0	lf	230.00	0
		·	72" Diameter Storm Drain	5,900	lf	250.00	1,475,000
		·	Dewatering[1]	7,300	lf	0.00	0
		·	60" Diameter Manhole	1	ea	4,000.00	4,000
		·	72" Diameter Manhole	2	ea	5,000.00	10,000
		·	Saddle Manhole	12	ea	8,000.00	96,000
		·	Outlet Structure at Detention Basin	3	ea	15,000.00	45,000
	d.	Raised Shed Boundary Fill Zone (Material Obtained From On-Site)					
		·	500-ft Fill Corridor (Approximate)	3800	lf	n/a	0
	e.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	29,645.00	29,600
	Subtotal - Shed 2 Drainage Facilities						2,994,100
	Land Acquisition			10	ac	37,500.00	382,500
	Construction Contingencies (20%)						598,820
	Administration, Engineering, and Environmental (15%)						449,115
TOTAL SHED 2 DRAINAGE FACILITIES COST							4,424,535

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 14

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 3

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 3 Facilities				
a. Water Quality/Detention Basin				
· Excavate	171,630	cy	2.50	429,100
· Dewatering	13	ac	5,000.00	65,000
· Access Road (6" Aggregate Base)	5,100	sy	5.19	26,500
b. Pump Station				
· Pump Station	15	cfs	60,000.00	924,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	2,150	lf	160.00	344,000
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	1,800	lf	195.00	351,000
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	5,200	lf	250.00	1,300,000
· Dewatering[1]	9,150	lf	0.00	0
· 60" Diameter Manhole	4	ea	4,000.00	16,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	10	ea	8,000.00	80,000
· Outlet Structure at Detention Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	35,856.00	35,900
Subtotal - Shed 3 Drainage Facilities				3,621,500
Land Acquisition	14	ac	37,500.00	510,000
Construction Contingencies (20%)				724,300
Administration, Engineering, and Environmental (15%)				543,225
TOTAL SHED 3 DRAINAGE FACILITIES COST				5,399,025

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 15

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 4

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 4 Facilities				
a. Water Quality/Detention Basin				
· Excavate	400,220	cy	2.50	1,000,500
· Dewatering	32	ac	5,000.00	160,000
· Access Road (6" Aggregate Base)	8,500	sy	5.19	44,100
b. Pump Station				
· Pump Station	30	cfs	60,000.00	1,800,000
c. Open Channel				
· Excavate	21,590	cy	3.00	64,800
· Dewatering	3,552	lf	10.00	35,500
· Access Road (6" Aggregate Base)	5,920	sy	5.19	30,700
- Fence, 6' Chainlink	7,104	lf	16.12	114,500
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	48	cy	508.88	24,500
· Dewatering [1]	50	lf	0.00	0
· Structural Excavation	237	cy	5.00	1,185
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	3,450	lf	180.00	621,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	7,950	lf	250.00	1,987,500
· Dewatering[1]	11,400	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	7	ea	5,000.00	35,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	5	ea	15,000.00	75,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	8500	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 4 Drainage Facilities				6,172,285
Land Acquisition	39	ac	37,500.00	1,450,000
Construction Contingencies (20%)				1,234,457
Administration, Engineering, and Environmental (15%)				925,843
TOTAL SHED 4 DRAINAGE FACILITIES COST				9,782,585

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 16

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 5

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 5 Facilities				
a. Water Quality/Detention Basin				
· Excavate	538,644	cy	2.50	1,346,600
· Dewatering	42	ac	5,000.00	210,000
· Access Road (6" Aggregate Base)	12,300	sy	5.19	63,800
b. Pump Station				
· Pump Station	43	cfs	60,000.00	2,580,000
c. Open Channel				
· Excavate	8,000	cy	3.00	24,000
· Dewatering[1]	1,292	lf	0.00	0
· Access Road (6" Aggregate Base)	1,900	sy	5.19	9,900
- Fence, 6' Chainlink	2,296	lf	16.12	37,000
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	218	cy	508.88	111,100
· Dewatering[1]	140	lf	0.00	0
· Structural Excavation	1,426	cy	5.00	7,130
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	500	lf	180.00	90,000
· 54" Diameter Storm Drain	200	lf	195.00	39,000
· 60" Diameter Storm Drain	600	lf	210.00	126,000
· 66" Diameter Storm Drain	1,800	lf	230.00	414,000
· 72" Diameter Storm Drain	18,500	lf	250.00	4,625,000
· Dewatering[1]	21,600	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	2	ea	5,000.00	10,000
· Saddle Manhole	42	ea	8,000.00	336,000
· Outlet Structure at Detention Basin or Channel	6	ea	15,000.00	90,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	3400	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 5 Drainage Facilities				10,169,530
Land Acquisition	46	ac	37,500.00	1,737,700
Construction Contingencies (20%)				2,033,906
Administration, Engineering, and Environmental (15%)				1,525,429
TOTAL SHED 5 DRAINAGE FACILITIES COST				15,466,565

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 17

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 6

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 6 Facilities				
a. Water Quality/Detention Basin				
· Excavate	656,788	cy	2.50	1,642,000
· Dewatering	48	ac	5,000.00	240,000
· Access Road (6" Aggregate Base)	12,817	sy	5.19	66,500
b. Pump Station				
· Pump Station	61	cfs	60,000.00	3,660,000
c. Open Channel				
· Excavate	92,980	cy	3.00	278,900
· Dewatering Near Major Road[1]	6,361	lf	0.00	0
· Dewatering	5,754	lf	10.00	57,500
· Access Road (6" Aggregate Base)	20,192	sy	5.19	104,800
- Fence, 6' Chainlink	24,230	lf	16.12	390,600
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	508	cy	508.88	258,600
· Dewatering[1]	300	lf	0.00	0
· Structural Excavation	2,978	cy	5.00	14,889
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	350	lf	160.00	56,000
· 48" Diameter Storm Drain	350	lf	180.00	63,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	20,900	lf	250.00	5,225,000
· Dewatering[1]	21,600	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	1	ea	5,000.00	5,000
· Saddle Manhole	42	ea	8,000.00	336,000
· Outlet Structure at Detention Basin or Channel	15	ea	15,000.00	225,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	11800	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 6 Drainage Facilities				12,677,789
Land Acquisition	69	ac	37,500.00	2,579,600
Construction Contingencies (20%)				2,535,558
Administration, Engineering, and Environmental (15%)				1,901,668
TOTAL SHED 6 DRAINAGE FACILITIES COST				19,694,615

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 18

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 7

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 7 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	1,436,621	cy	2.50	3,591,600
		·	Dewatering	166	ac	5,000.00	828,800
		·	Access Road (6" Aggregate Base)	60,237	sy	5.19	312,600
	b.	Pump Station					
		·	Pump Station	106	cfs	60,000.00	6,360,000
	c.	Open Channel					
		·	Excavate	80,792	cy	3.00	242,400
		·	Dewatering Near Major Road[1]	3,620	lf	0.00	0
		·	Dewatering	6,647	lf	10.00	66,500
		·	Access Road (6" Aggregate Base)	17,112	sy	5.19	88,800
		-	Fence, 6' Chainlink	20,534	lf	16.12	331,000
	d.	Road Crossings (Box Culverts)					
		·	Reinforced Concrete	1,426	cy	508.88	725,500
		·	Dewatering [1]	802	lf	0.00	0
		·	Structural Excavation	6,507	cy	5.00	32,536
	e.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	3,900	lf	115.00	448,500
		·	42" Diameter Storm Drain	4,450	lf	160.00	712,000
		·	48" Diameter Storm Drain	1,700	lf	180.00	306,000
		·	54" Diameter Storm Drain	5,700	lf	195.00	1,111,500
		·	60" Diameter Storm Drain	11,000	lf	210.00	2,310,000
		·	66" Diameter Storm Drain	2,500	lf	230.00	575,000
		·	72" Diameter Storm Drain	6,300	lf	250.00	1,575,000
		·	72" Diameter HDPE Storm Drain	1,400	lf	465.00	651,000
		·	Dewatering[1]	36,950	lf	0.00	0
		·	60" Diameter Manhole	17	ea	4,000.00	68,000
		·	72" Diameter Manhole	15	ea	5,000.00	75,000
		·	Saddle Manhole	43	ea	8,000.00	344,000
		·	Inlet/Outlet Structure at Detention Basin or Channel	18	ea	15,000.00	270,000
	f.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	50,000.00	50,000
	Subtotal - Shed 7 Drainage Facilities						21,075,736
	Land Acquisition			190	ac	37,500.00	7,107,200
	Construction Contingencies (20%)						4,215,147
	Administration, Engineering, and Environmental (15%)						3,161,360
TOTAL SHED 7 DRAINAGE FACILITIES COST							35,559,444

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 19

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 8

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 8 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	269,324	cy	2.50	673,300
		·	Dewatering	21	ac	5,000.00	102,600
		·	Access Road (6" Aggregate Base)	6,933	sy	5.19	36,000
	b.	Pump Station					
		·	Pump Station	21	cfs	60,000.00	1,236,000
	c.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	600	lf	115.00	69,000
		·	42" Diameter Storm Drain	1,200	lf	160.00	192,000
		·	48" Diameter Storm Drain	500	lf	180.00	90,000
		·	54" Diameter Storm Drain	1,200	lf	195.00	234,000
		·	60" Diameter Storm Drain	0	lf	210.00	0
		·	66" Diameter Storm Drain	1400	lf	230.00	322,000
		·	72" Diameter Storm Drain	5550	lf	250.00	1,387,500
		·	Dewatering[1]	10,450	lf	0.00	0
		·	60" Diameter Manhole	4	ea	4,000.00	16,000
		·	72" Diameter Manhole	3	ea	5,000.00	15,000
		·	Saddle Manhole	14	ea	8,000.00	112,000
		·	Outlet Structure at Basin	4	ea	15,000.00	60,000
	d.	Raised Shed Boundary Fill Zone (Material Obtained From On-Site)					
		·	500-ft Fill Corridor (Approximate)	1100	lf	n/a	0
	e.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	45,454.00	45,500
	Subtotal - Shed 8 Drainage Facilities						4,590,900
	Land Acquisition			22	ac	37,500.00	825,000
	Construction Contingencies (20%)						918,180
	Administration, Engineering, and Environmental (15%)						688,635
TOTAL SHED 8 DRAINAGE FACILITIES COST							7,022,715

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 20

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 9

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 9 Facilities				
a. Detention Basin				
· Excavate	655,776	cy	2.50	1,639,400
· Dewatering	41	ac	5,000.00	202,700
· Access Road (6" Aggregate Base)	8,943	sy	5.19	46,400
b. Pump Station				
· Pump Station	47	cfs	60,000.00	2,844,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	1,100	lf	115.00	126,500
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	6,000	lf	180.00	1,080,000
· 54" Diameter Storm Drain	2,200	lf	195.00	429,000
· 60" Diameter Storm Drain	2,700	lf	210.00	567,000
· 66" Diameter Storm Drain	2,200	lf	230.00	506,000
· 72" Diameter Storm Drain	10,600	lf	250.00	2,650,000
· Dewatering[1]	25,400	lf	0.00	0
· 60" Diameter Manhole	3	ea	4,000.00	12,000
· 72" Diameter Manhole	16	ea	5,000.00	80,000
· Saddle Manhole	31	ea	8,000.00	248,000
· Outlet Structure at Basin	3	ea	15,000.00	45,000
d. - Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
· 500-ft Fill Corridor (Approximate)	18000	lf	n/a	0
· Import Material from Off-Site Using Scrapers[2]	686,810	cy	2.50	1,717,000
· Spread topsoil by equipment on site[2]	686,810	cy	1.50	1,030,200
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 9 Drainage Facilities				13,369,200
Land Acquisition	42	ac	37,500.00	1,590,000
Construction Contingencies (20%)				2,673,840
Administration, Engineering, and Environmental (15%)				2,005,380
TOTAL SHED 9 DRAINAGE FACILITIES COST				19,638,420

Notes:
1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 21

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 10

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 10 Facilities				
a. Water Quality/Detention Basin				
· Excavate	210,286	cy	2.50	525,700
· Dewatering	20	ac	5,000.00	98,800
· Access Road (6" Aggregate Base)	6,552	sy	5.19	34,000
b. Pump Station				
· Pump Station	16	cfs	60,000.00	960,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	500	lf	115.00	57,500
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	1,200	lf	180.00	216,000
· 54" Diameter Storm Drain	600	lf	195.00	117,000
· 60" Diameter Storm Drain	1,400	lf	210.00	294,000
· 66" Diameter Storm Drain	1,100	lf	230.00	253,000
· 72" Diameter Storm Drain	3,100	lf	250.00	775,000
· Dewatering[1]	8,500	lf	0.00	0
· 60" Diameter Manhole	2	ea	4,000.00	8,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	11	ea	8,000.00	88,000
· Outlet Structure at Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	35,730.00	35,700
Subtotal - Shed 10 Drainage Facilities				3,608,700
Land Acquisition	21	ac	37,500.00	791,300
Construction Contingencies (20%)				721,740
Administration, Engineering, and Environmental (15%)				541,305
TOTAL SHED 10 DRAINAGE FACILITIES COST				5,663,045

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 22

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 11

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 11 Facilities				
a. Water Quality/Detention Basin				
· Excavate	298,225	cy	2.50	745,600
· Dewatering	23	ac	5,000.00	114,100
· Access Road (6" Aggregate Base)	7,910	sy	5.19	41,100
b. Pump Station				
· Pump Station	27	cfs	60,000.00	1,620,000
c. Open Channel				
· Excavate	27,111	cy	3.00	81,300
· Dewatering[1]	4,325	lf	0.00	0
· Access Road (6" Aggregate Base)	7,208	sy	5.19	37,400
- Fence, 6' Chainlink	8,650	lf	16.12	139,400
d. Road Crossing (two 72" RCPs)				
· Reinforced Concrete	288	cy	508.88	146,400
· Dewatering[1]	160	lf	0.00	0
· Structural Excavation	1,849	cy	5.00	9,244
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	2,400	lf	180.00	432,000
· 54" Diameter Storm Drain	3,200	lf	195.00	624,000
· 60" Diameter Storm Drain	1,200	lf	210.00	252,000
· 66" Diameter Storm Drain	800	lf	230.00	184,000
· 72" Diameter Storm Drain	2,400	lf	250.00	600,000
· Dewatering[1]	10,600	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	11	ea	5,000.00	55,000
· Saddle Manhole	9	ea	8,000.00	72,000
· Outlet Structure at Basin	5	ea	15,000.00	75,000
f. - Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
· 500-ft Fill Corridor (Approximate)	12700	lf	n/a	0
· Haul Material in Trucks from Sankey Regional Detention Site[2]	1,460,240	cy	2.50	3,650,600
· Spread topsoil by equipment on site2	1,460,240	cy	1.50	2,190,400
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 11 Drainage Facilities				11,219,544
Land Acquisition	31	ac	37,500.00	1,157,000
Construction Contingencies (20%)				2,243,909
Administration, Engineering, and Environmental (15%)				1,682,932
TOTAL SHED 11 DRAINAGE FACILITIES COST				16,303,385

Notes:
1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 23

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

SHED 12

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 12 Facilities				
a. Water Quality/Detention Basin				
· Excavate	493,107	cy	2.50	1,232,800
· Dewatering	49	ac	5,000.00	244,600
· Access Road (6" Aggregate Base)	20,000	sy	5.19	103,800
b. Pump Station				
· Pump Station	51	cfs	60,000.00	3,036,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	600	lf	115.00	69,000
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	4,700	lf	195.00	916,500
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	850	lf	230.00	195,500
· 72" Diameter Storm Drain	11,700	lf	250.00	2,925,000
· 72" Diameter HDPE Storm Drain	800	lf	465.00	372,000
· Dewatering[1]	18,050	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	9	ea	5,000.00	45,000
· Saddle Manhole	27	ea	8,000.00	216,000
· Inlet/Outlet Structure at Detention Basin	8	ea	15,000.00	120,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	9400	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Drainage Shed 12 Facilities				9,530,200
Land Acquisition	55	ac	37,500.00	2,057,600
Construction Contingencies (20%)				1,906,040
Administration, Engineering, and Environmental (15%)				1,429,530
TOTAL DRAINAGE SHED 12 FACILITIES COST				14,923,370

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 24

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

REGIONAL FACILITIES

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Regional Facilities						
	a.		Detention Basins - Sankey Spill				
		·	Excavate[1]	7,565,641	cy	2.50	18,914,100
		·	Dewatering	414	ac	3,000.00	1,242,000
		·	Access Road (6" Aggregate Base)	77,972	sy	5.19	404,700
		·	Riprap[2]	12,857	cy	59.40	763,700
	b.		Sankey North Storage Outlet (Cell #1)				
		·	42" Diameter Storm Drain	85	lf	160.00	13,600
		·	Inlet/Outlet Headwall	2	ea	15,000.00	30,000
		·	Dewatering[3]	85	lf	0.00	0
		-	42-inch Canal Gate	1	ea	20,000.00	20,000
	c.		Cross-Connection Between Sankey Basin Cells #1 and #2				
		·	72" Diameter Storm Drain	430	lf	250.00	107,500
		·	Inlet/Outlet Headwall	4	ea	15,000.00	60,000
		·	Dewatering[2]	430	lf	0.00	0
	d.		Internal North-South Cross-Connections Within Sankey Cell #1				
		·	72" Diameter Storm Drain	160	lf	250.00	40,000
		·	Inlet/Outlet Headwall	4	ea	15,000.00	60,000
		·	Dewatering[2]	160	lf	0.00	0
	e.		Downstream Channel Improvements Parallel to Sankey Road and Highway 99				
		·	Excavate	168,747	cy	4.65	784,700
		·	Dewatering[3]	2,040	lf	0.00	0
		·	Access Road (6" Aggregate Base)	1,456	sy	5.19	7,600
		-	Fence, 6' Chainlink	2,040	lf	16.12	32,900
	f.		Sankey South Storage Outlet (Cell #3)				
		·	42" Diameter Storm Drain	760	lf	160.00	121,600
		·	Inlet/Outlet Headwall	2	ea	15,000.00	30,000
		·	Dewatering[3]	760	lf	0.00	0
		·	60" Diameter Manhole	1	ea	4,000.00	4,000
		-	42-inch Canal Gate	1	ea	20,000.00	20,000
	g.		Sankey South Storage Inlet (Cell #3)				
		·	54" Diameter Storm Drain	330	lf	195.00	64,400
		·	Inlet/Outlet Headwall	4	ea	15,000.00	60,000
		·	Dewatering[3]	330	lf	0.00	0

Notes:
1. Excavated volume is assumed to be utilized as on-site fill for project land east of Highway 99.
2. Dewatering cost is embedded in dewatering estimates for adjacent detention basins.
3. Channel Improvements summarized in this table reflect only the improvements necessary to optimize gravity drainage for the Sankey Detention volume after a Sankey Spill event.

TABLE 24

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1

REGIONAL FACILITIES

	Description	Quantity	Unit	Unit Cost, $	Total Cost, $
h.	Cross-Connection Between Sankey Basin Cells #3 and #4				
·	54" Diameter Storm Drain	500	lf	195.00	97,500
·	Inlet/Outlet Headwall	4	ea	15,000.00	60,000
·	Dewatering[3]	500	lf	0.00	0
i.	Cross-Connection Between Sankey Basin Cells #4 and #5				
·	72" Diameter Storm Drain	100	lf	250.00	25,000
·	Inlet/Outlet Headwall	2	ea	15,000.00	30,000
·	Dewatering[3]	100	lf	0.00	0
j.	Sankey Interceptor Channel				
·	Excavate	9,913	cy	3.00	29,700
·	Dewatering[3]	4,570	lf	0.00	0
·	Access Road (6" Aggregate Base)	5,508	sy	5.19	28,600
-	Fence, 6' Chainlink	4,570	lf	16.12	73,700
k.	East Drainage Canal Improvements				
·	Excavate	189,950	cy	4.65	883,300
·	Dewatering	32	ac	5,000.00	159,300
·	Access Road (6" Aggregate Base)	30,845	sy	5.19	160,100
-	Fence, 6' Chainlink	37,014	lf	16.12	596,700
l.	Redundancy Features to RD1000 Pumping Facilities				
-	Backup pumping capacity and power supply	1	ls	TBD	
m.	Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
	Subtotal - Regional Drainage Facilities				24,974,700
	Land Acquisition	424	ac	37,500.00	15,909,100
	Construction Contingencies (20%)				4,994,940
	Administration, Engineering, and Environmental (15%)				3,746,205
TOTAL REGIONAL DRAINAGE FACILITIES COST					49,624,945

Notes:
1. A portion of excavated volume is proposed as import for Sheds 9 and 11, see Tables 20 and 23.
2. Includes Emergency Spillways and Inlet Weir
3. Dewatering cost is embedded in dewatering estimates for adjacent detention basins.
4. Channel Improvements summarized in this table reflect only the improvements necessary to optimize gravity drainage for the Sankey Detention volume after a Sankey Spill event.

TABLE 25

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal (Table 26)	10,706,000
2.	Drainage Shed 2 Facilities Subtotal (Table 27)	4,425,000
3.	Drainage Shed 3 Facilities Subtotal (Table 28)	9,236,000
4.	Drainage Shed 4 Facilities Subtotal (Talbe 29)	9,783,000
5.	Drainage Shed 5 Facilities Subtotal (Table 30)	22,790,000
6.	Drainage Shed 6 Facilities Subtotal (Table 31)	19,695,000
7.	Drainage Shed 7 Facilities Subtotal (Table 32)	35,559,000
8.	Drainage Shed 8 Facilities Subtotal (Table 33)	7,023,000
9.	Drainage Shed 9 Facilities Subtotal (Table 34)	19,638,000
10.	Drainage Shed 10 Facilities Subtotal (Table 35)	5,663,000
11.	Drainage Shed 11 Facilities Subtotal (Table 36)	16,303,000
12.	Drainage Shed 12 Facilities Subtotal (Table 37)	14,923,000
13.	Regional Facilities Subtotal (Table 38)	49,926,000
	Subtotal - Drainage Facilities	**225,670,000**

TABLE 26

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 1

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 1 Facilities				
a. Water Quality/Detention Basin				
· Excavate	422,387	cy	2.50	1,056,000
· Dewatering	30	ac	5,000.00	150,000
· Access Road (6" Aggregate Base)	7,800	sy	5.19	40,500
b. Pump Station				
· Pump Station	31	cfs	60,000.00	1,860,000
c. Open Channel				
· Excavate	42,400	cy	3.00	127,200
· Dewatering	4,972	lf	10.00	49,700
· Access Road (6" Aggregate Base)	8,300	sy	5.19	43,100
- Fence, 6' Chainlink	9,944	lf	16.12	160,300
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	456	cy	508.88	231,800
· Dewatering[1]	240	lf	0.00	0
· Structural Excavation	3,010	cy	5.00	15,052
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	1,500	lf	115.00	172,500
· 42" Diameter Storm Drain	1,600	lf	160.00	256,000
· 48" Diameter Storm Drain	1,000	lf	180.00	180,000
· 54" Diameter Storm Drain	1,200	lf	195.00	234,000
· 60" Diameter Storm Drain	2,700	lf	210.00	567,000
· 66" Diameter Storm Drain	1,800	lf	230.00	414,000
· 72" Diameter Storm Drain	3,700	lf	250.00	925,000
· Dewatering[1]	13,500	lf	0.00	0
· 60" Diameter Manhole	6	ea	4,000.00	24,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	8	ea	15,000.00	120,000
f. - Raised Grading (Material Obtained from Off-Site)				
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 1 Drainage Facilities				6,824,152
Land Acquisition	40	ac	37,500.00	1,493,700
Construction Contingencies (20%)				1,364,830
Administration, Engineering, and Environmental (15%)				1,023,623
TOTAL SHED 1 DRAINAGE FACILITIES COST				10,706,305

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from Sankey (Regional) excavation necessary for providing a positive gradient for on-site drainage.

TABLE 27

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 2

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 2 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	136,472	cy	2.50	341,200
		·	Dewatering	9	ac	5,000.00	45,000
		·	Access Road (6" Aggregate Base)	4,300	sy	5.19	22,300
	b.	Pump Station					
		·	Pump Station	11	cfs	60,000.00	684,000
	c.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	0	lf	115.00	0
		·	42" Diameter Storm Drain	500	lf	160.00	80,000
		·	48" Diameter Storm Drain	900	lf	180.00	162,000
		·	54" Diameter Storm Drain	0	lf	195.00	0
		·	60" Diameter Storm Drain	0	lf	210.00	0
		·	66" Diameter Storm Drain	0	lf	230.00	0
		·	72" Diameter Storm Drain	5,900	lf	250.00	1,475,000
		·	Dewatering[1]	7,300	lf	0.00	0
		·	60" Diameter Manhole	1	ea	4,000.00	4,000
		·	72" Diameter Manhole	2	ea	5,000.00	10,000
		·	Saddle Manhole	12	ea	8,000.00	96,000
		·	Outlet Structure at Detention Basin	3	ea	15,000.00	45,000
	d.	Raised Shed Boundary Fill Zone (Material Obtained From On-Site)					
		·	500-ft Fill Corridor (Approximate)	3800	lf	n/a	0
	e.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	29,645.00	29,600
	Subtotal - Shed 2 Drainage Facilities						2,994,100
	Land Acquisition			10	ac	37,500.00	382,500
	Construction Contingencies (20%)						598,820
	Administration, Engineering, and Environmental (15%)						449,115
TOTAL SHED 2 DRAINAGE FACILITIES COST							4,424,535

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 28

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 3

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 3 Facilities				
a. Water Quality/Detention Basin				
· Excavate	295,543	cy	2.50	738,900
· Dewatering	21	ac	5,000.00	105,000
· Access Road (6" Aggregate Base)	6,700	sy	5.19	34,800
b. Pump Station	3			
· Pump Station	25	cfs	60,000.00	1,500,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	2,150	lf	160.00	344,000
· 48" Diameter Storm Drain	2,001	lf	180.00	360,180
· 54" Diameter Storm Drain	1,800	lf	195.00	351,000
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	7,500	lf	250.00	1,875,000
· Dewatering[1]	13,451	lf	0.00	0
· 60" Diameter Manhole	4	ea	4,000.00	16,000
· 72" Diameter Manhole	8	ea	5,000.00	40,000
· Saddle Manhole	15	ea	8,000.00	120,000
· Outlet Structure at Detention Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (5%)	1	ls	275,744.00	275,700
Subtotal - Shed 3 Drainage Facilities				5,790,580
Land Acquisition	22	ac	37,500.00	840,000
Construction Contingencies (20%)				1,158,116
Administration, Engineering, and Environmental (15%)				1,447,645
TOTAL SHED 3 DRAINAGE FACILITIES COST				9,236,341

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 29

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 4

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 4 Facilities				
a. Water Quality/Detention Basin				
· Excavate	400,220	cy	2.50	1,000,500
· Dewatering	32	ac	5,000.00	160,000
· Access Road (6" Aggregate Base)	8,500	sy	5.19	44,100
b. Pump Station				
· Pump Station	30	cfs	60,000.00	1,800,000
c. Open Channel				
· Excavate	21,590	cy	3.00	64,800
· Dewatering	3,552	lf	10.00	35,500
· Access Road (6" Aggregate Base)	5,920	sy	5.19	30,700
- Fence, 6' Chainlink	7,104	lf	16.12	114,500
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	48	cy	508.88	24,500
· Dewatering[1]	50	lf	0.00	0
· Structural Excavation	237	cy	5.00	1,185
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	3,450	lf	180.00	621,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	7,950	lf	250.00	1,987,500
· Dewatering[1]	11,400	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	7	ea	5,000.00	35,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	5	ea	15,000.00	75,000
f. Raised Shed Boundary Fill Zone (Material Obtained From Off-Site)				
· 500-ft Fill Corridor (Approximate)	8500	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 4 Drainage Facilities				6,172,285
Land Acquisition	39	ac	37,500.00	1,450,000
Construction Contingencies (20%)				1,234,457
Administration, Engineering, and Environmental (15%)				925,843
TOTAL SHED 4 DRAINAGE FACILITIES COST				9,782,585

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 30

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 5

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 5 Facilities				
a. Water Quality/Detention Basin				
· Excavate	752,862	cy	2.50	1,882,200
· Dewatering	56	ac	5,000.00	280,000
· Access Road (6" Aggregate Base)	14,800	sy	5.19	76,800
b. Pump Station				
· Pump Station	66	cfs	60,000.00	3,960,000
c. Open Channel				
· Excavate	8,000	cy	3.00	24,000
· Dewatering[1]	1,292	lf	0.00	0
· Access Road (6" Aggregate Base)	1,900	sy	5.19	9,900
- Fence, 6' Chainlink	2,296	lf	16.12	37,000
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	218	cy	508.88	111,100
· Dewatering[1]	140	lf	0.00	0
· Structural Excavation	1,426	cy	5.00	7,130
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	500	lf	180.00	90,000
· 54" Diameter Storm Drain	500	lf	195.00	97,500
· 60" Diameter Storm Drain	600	lf	210.00	126,000
· 66" Diameter Storm Drain	1,457	lf	230.00	335,100
· 72" Diameter Storm Drain	29,937	lf	250.00	7,484,250
· Dewatering[1]	32,994	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	2	ea	5,000.00	10,000
· Saddle Manhole	64	ea	8,000.00	512,000
· Outlet Structure at Detention Basin or Channel	6	ea	15,000.00	90,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	3400	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 5 Drainage Facilities				15,182,980
Land Acquisition	61	ac	37,500.00	2,292,700
Construction Contingencies (20%)				3,036,596
Administration, Engineering, and Environmental (15%)				2,277,447
TOTAL SHED 5 DRAINAGE FACILITIES COST				22,789,723

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 31

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 6

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 6 Facilities				
a. Water Quality/Detention Basin				
· Excavate	656,788	cy	2.50	1,642,000
· Dewatering	48	ac	5,000.00	240,000
· Access Road (6" Aggregate Base)	12,817	sy	5.19	66,500
b. Pump Station				
· Pump Station	61	cfs	60,000.00	3,660,000
c. Open Channel				
· Excavate	92,980	cy	3.00	278,900
· Dewatering Near Major Road[1]	6,361	lf	0.00	0
· Dewatering	5,754	lf	10.00	57,500
· Access Road (6" Aggregate Base)	20,192	sy	5.19	104,800
- Fence, 6' Chainlink	24,230	lf	16.12	390,600
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	508	cy	508.88	258,600
· Dewatering[1]	300	lf	0.00	0
· Structural Excavation	2,978	cy	5.00	14,889
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	350	lf	160.00	56,000
· 48" Diameter Storm Drain	350	lf	180.00	63,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	20,900	lf	250.00	5,225,000
· Dewatering[1]	21,600	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	1	ea	5,000.00	5,000
· Saddle Manhole	42	ea	8,000.00	336,000
· Outlet Structure at Detention Basin or Channel	15	ea	15,000.00	225,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	11800	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 6 Drainage Facilities				12,677,789
Land Acquisition	69	ac	37,500.00	2,579,600
Construction Contingencies (20%)				2,535,558
Administration, Engineering, and Environmental (15%)				1,901,668
TOTAL SHED 6 DRAINAGE FACILITIES COST				19,694,615

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 32

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 7

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 7 Facilities				
a. Water Quality/Detention Basin				
· Excavate	1,436,621	cy	2.50	3,591,600
· Dewatering	166	ac	5,000.00	828,800
· Access Road (6" Aggregate Base)	60,237	sy	5.19	312,600
b. Pump Station				
· Pump Station	106	cfs	60,000.00	6,360,000
c. Open Channel				
· Excavate	80,792	cy	3.00	242,400
· Dewatering Near Major Road[1]	3,620	lf	0.00	0
· Dewatering	6,647	lf	10.00	66,500
· Access Road (6" Aggregate Base)	17,112	sy	5.19	88,800
- Fence, 6' Chainlink	20,534	lf	16.12	331,000
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	1,426	cy	508.88	725,500
· Dewatering[1]	802	lf	0.00	0
· Structural Excavation	6,507	cy	5.00	32,536
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	3,900	lf	115.00	448,500
· 42" Diameter Storm Drain	4,450	lf	160.00	712,000
· 48" Diameter Storm Drain	1,700	lf	180.00	306,000
· 54" Diameter Storm Drain	5,700	lf	195.00	1,111,500
· 60" Diameter Storm Drain	11,000	lf	210.00	2,310,000
· 66" Diameter Storm Drain	2,500	lf	230.00	575,000
· 72" Diameter Storm Drain	6,300	lf	250.00	1,575,000
· 72" Diameter HDPE Storm Drain	1,400	lf	465.00	651,000
· Dewatering[1]	36,950	lf	0.00	0
· 60" Diameter Manhole	17	ea	4,000.00	68,000
· 72" Diameter Manhole	15	ea	5,000.00	75,000
· Saddle Manhole	43	ea	8,000.00	344,000
· Inlet/Outlet Structure at Detention Basin or Channel	18	ea	15,000.00	270,000
f. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 7 Drainage Facilities				21,075,736
Land Acquisition	190	ac	37,500.00	7,107,200
Construction Contingencies (20%)				4,215,147
Administration, Engineering, and Environmental (15%)				3,161,360
TOTAL SHED 7 DRAINAGE FACILITIES COST				35,559,444

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 33

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 8

	Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 8 Facilities				
a.	Detention Basin				
·	Excavate	269,324	cy	2.50	673,300
·	Dewatering	21	ac	5,000.00	102,600
·	Access Road (6" Aggregate Base)	6,933	sy	5.19	36,000
b.	Pump Station				
·	Pump Station	21	cfs	60,000.00	1,236,000
c.	Storm Drainage Pipe System				
·	36" Diameter Storm Drain	600	lf	115.00	69,000
·	42" Diameter Storm Drain	1,200	lf	160.00	192,000
·	48" Diameter Storm Drain	500	lf	180.00	90,000
·	54" Diameter Storm Drain	1,200	lf	195.00	234,000
·	60" Diameter Storm Drain	0	lf	210.00	0
·	66" Diameter Storm Drain	1,400	lf	230.00	322,000
·	72" Diameter Storm Drain	5,550	lf	250.00	1,387,500
·	Dewatering[1]	10,450	lf	0.00	0
·	60" Diameter Manhole	4	ea	4,000.00	16,000
·	72" Diameter Manhole	3	ea	5,000.00	15,000
·	Saddle Manhole	14	ea	8,000.00	112,000
·	Outlet Structure at Basin	4	ea	15,000.00	60,000
d.	- Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
·	500-ft Fill Corridor (Approximate)	18000	lf	n/a	0
e.	Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	45,454.00	45,500
	Subtotal - Shed 9 Drainage Facilities				4,590,900
	Land Acquisition	22	ac	37,500.00	825,000
	Construction Contingencies (20%)				918,180
	Administration, Engineering, and Environmental (15%)				688,635
TOTAL SHED 9 DRAINAGE FACILITIES COST					7,022,715

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 34

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 9

	Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 9 Facilities				
a.	Detention Basin				
·	Excavate	655,776	cy	2.50	1,639,400
·	Dewatering	41	ac	5,000.00	202,700
·	Access Road (6" Aggregate Base)	8,943	sy	5.19	46,400
b.	Pump Station				
·	Pump Station	47	cfs	60,000.00	2,844,000
c.	Storm Drainage Pipe System				
·	36" Diameter Storm Drain	1,100	lf	115.00	126,500
·	42" Diameter Storm Drain	600	lf	160.00	96,000
·	48" Diameter Storm Drain	6,000	lf	180.00	1,080,000
·	54" Diameter Storm Drain	2,200	lf	195.00	429,000
·	60" Diameter Storm Drain	2,700	lf	210.00	567,000
·	66" Diameter Storm Drain	2,200	lf	230.00	506,000
·	72" Diameter Storm Drain	10,600	lf	250.00	2,650,000
·	Dewatering[1]	25,400	lf	0.00	0
·	60" Diameter Manhole	3	ea	4,000.00	12,000
·	72" Diameter Manhole	16	ea	5,000.00	80,000
·	Saddle Manhole	31	ea	8,000.00	248,000
·	Outlet Structure at Basin	3	ea	15,000.00	45,000
d.	- Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
·	500-ft Fill Corridor (Approximate)	18000	lf	n/a	0
·	Haul Material in Scrapers from Off-Site[2]	686,810	cy	2.50	1,717,000
·	Spread topsoil by equipment on site[2]	686,810	cy	1.50	1,030,200
e.	Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
	Subtotal - Shed 9 Drainage Facilities				13,369,200
	Land Acquisition	42	ac	37,500.00	1,590,000
	Construction Contingencies (20%)				2,673,840
	Administration, Engineering, and Environmental (15%)				2,005,380
TOTAL SHED 9 DRAINAGE FACILITIES COST					19,638,420

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 35

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 10

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 10 Facilities				
a. Water Quality/Detention Basin				
· Excavate	210,286	cy	2.50	525,700
· Dewatering	20	ac	5,000.00	98,800
· Access Road (6" Aggregate Base)	6,552	sy	5.19	34,000
b. Pump Station				
· Pump Station	16	cfs	60,000.00	960,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	500	lf	115.00	57,500
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	1,200	lf	180.00	216,000
· 54" Diameter Storm Drain	600	lf	195.00	117,000
· 60" Diameter Storm Drain	1,400	lf	210.00	294,000
· 66" Diameter Storm Drain	1,100	lf	230.00	253,000
· 72" Diameter Storm Drain	3,100	lf	250.00	775,000
· Dewatering[1]	8,500	lf	0.00	0
· 60" Diameter Manhole	2	ea	4,000.00	8,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	11	ea	8,000.00	88,000
· Outlet Structure at Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	35,730.00	35,700
Subtotal - Shed 10 Drainage Facilities				3,608,700
Land Acquisition	21	ac	37,500.00	791,300
Construction Contingencies (20%)				721,740
Administration, Engineering, and Environmental (15%)				541,305
TOTAL SHED 10 DRAINAGE FACILITIES COST				5,663,045

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 36

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 11

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 11 Facilities				
a. Water Quality/Detention Basin				
· Excavate	298,225	cy	2.50	745,600
· Dewatering	23	ac	5,000.00	114,100
· Access Road (6" Aggregate Base)	7,910	sy	5.19	41,100
b. Pump Station				
· Pump Station	27	cfs	60,000.00	1,620,000
c. Open Channel				
· Excavate	27,111	cy	3.00	81,300
· Dewatering[1]	4,325	lf	0.00	0
· Access Road (6" Aggregate Base)	7,208	sy	5.19	37,400
- Fence, 6' Chainlink	8,650	lf	16.12	139,400
d. Road Crossing (two 72" RCPs)				
· Reinforced Concrete	288	cy	508.88	146,400
· Dewatering[1]	160	lf	0.00	0
· Structural Excavation	1,849	cy	5.00	9,244
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	2,400	lf	180.00	432,000
· 54" Diameter Storm Drain	3,200	lf	195.00	624,000
· 60" Diameter Storm Drain	1,200	lf	210.00	252,000
· 66" Diameter Storm Drain	800	lf	230.00	184,000
· 72" Diameter Storm Drain	2,400	lf	250.00	600,000
· Dewatering[1]	10,600	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	11	ea	5,000.00	55,000
· Saddle Manhole	9	ea	8,000.00	72,000
· Outlet Structure at Basin	5	ea	15,000.00	75,000
f. - Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
· 500-ft Fill Corridor (Approximate)	12700	lf	n/a	0
· Haul Material in Scrapers from Off-Site[2]	1,460,240	cy	2.50	3,650,600
· Spread topsoil by equipment on site[2]	1,460,240	cy	1.50	2,190,400
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 11 Drainage Facilities				11,219,544
Land Acquisition	31	ac	37,500.00	1,157,000
Construction Contingencies (20%)				2,243,909
Administration, Engineering, and Environmental (15%)				1,682,932
TOTAL SHED 11 DRAINAGE FACILITIES COST				16,303,385

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 37

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

SHED 12

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 12 Facilities				
a. Water Quality/Detention Basin				
· Excavate	493,107	cy	2.50	1,232,800
· Dewatering	49	ac	5,000.00	244,600
· Access Road (6" Aggregate Base)	20,000	sy	5.19	103,800
b. Pump Station				
· Pump Station	51	cfs	60,000.00	3,036,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	600	lf	115.00	69,000
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	4,700	lf	195.00	916,500
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	850	lf	230.00	195,500
· 72" Diameter Storm Drain	11,700	lf	250.00	2,925,000
· 72" Diameter HDPE Storm Drain	800	lf	465.00	372,000
· Dewatering[1]	18,650	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	9	ea	5,000.00	45,000
· Saddle Manhole	27	ea	8,000.00	216,000
· Inlet/Outlet Structure at Detention Basin	8	ea	15,000.00	120,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	9400	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Drainage Shed 12 Facilities				9,530,200
Land Acquisition	55	ac	37,500.00	2,057,600
Construction Contingencies (20%)				1,906,040
Administration, Engineering, and Environmental (15%)				1,429,530
TOTAL DRAINAGE SHED 12 FACILITIES COST				14,923,370

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 38

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 2

REGIONAL FACILITIES

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Regional Facilities				
a. Detention Basin - Barosso Property				
· Excavate	4,451,348	cy	2.50	11,128,400
· Dewatering	175	ac	5,000.00	872,500
· Access Road (6" Aggregate Base)	27,243	sy	5.19	141,400
· Riprap	38,256	cy	59.40	2,272,400
- Compacted Perimeter Levee	607,264	cy	2.91	1,767,138
- Finish Grading	1,301,280	sy	0.21	273,269
- Outlet Headwalls	2	ea	25,000.00	50,000
· 72" Diameter Storm Drain	300	lf	250.00	75,000
b. Detention Basin - Lutz Property				
· Excavate	2,285,771	cy	2.50	5,714,400
· Dewatering	48	ac	5,000.00	241,500
· Access Road (6" Aggregate Base)	17,383	sy	5.19	90,200
· Riprap	38	cy	59.40	2,200
- Outlet Headwalls	2	ea	25,000.00	50,000
· Cross-Drain Headwalls	2	ea	15,000.00	30,000
- 48" Diameter Storm Drain	268	lf	180.00	48,240
· 72" Diameter Storm Drain	200	lf	250.00	50,000
· Inlet/Outlet Structure at Detention Basin	2	ea	15,000.00	30,000
c. Dewatering Pump Stations				
· Pump Station - Barosso Property	32	cfs	60,000.00	1,920,000
· Pump Station - Lutz Property	18	cfs	60,000.00	1,080,000
d. East Drainage Canal Improvements				
· Excavate	189,950	cy	4.65	883,300
· Dewatering	150	ac	5,000.00	750,000
· Access Road (6" Aggregate Base)	30	sy	5.19	200
- Fence, 6' Chainlink	37,014	lf	16.12	596,700
e. Redundancy Features to RD1000 Pumping Facilities				
- Backup pumping capacity and power supply	1	ls	TBD	
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Regional Drainage Facilities				28,116,847
Land Acquisition	319	ac	37,500.00	11,968,600
Construction Contingencies (20%)				5,623,369
Administration, Engineering, and Environmental (15%)				4,217,527
TOTAL REGIONAL DRAINAGE FACILITIES COST				49,926,344

Note: 1. Excavated volume is proposed to be placed as fill within the plan area, east of Highway 99.

TABLE 39

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal (Table 40)	11,232,000
2.	Drainage Shed 2 Facilities Subtotal (Table 41)	4,425,000
3.	Drainage Shed 3 Facilities Subtotal (Table 42)	9,236,000
4.	Drainage Shed 4 Facilities Subtotal (Table 43)	14,553,000
5.	Drainage Shed 5 Facilities Subtotal (Table 44)	31,311,000
6.	Drainage Shed 6 Facilities Subtotal (Table 45)	48,301,000
7.	Drainage Shed 7 Facilities Subtotal (Table 46)	35,559,000
8.	Drainage Shed 8 Facilities Subtotal (Table 47)	7,023,000
9.	Drainage Shed 9 Facilities Subtotal (Table 48)	15,930,000
10.	Drainage Shed 10 Facilities Subtotal (Table 49)	5,663,000
11.	Drainage Shed 11 Facilities Subtotal (Table 50)	8,418,000
12.	Drainage Shed 12 Facilities Subtotal (Table 51)	19,292,000
13.	Regional Facilities Subtotal (Table 52)	73,406,335
	Subtotal - Drainage Facilities	**284,349,335**

TABLE 40

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 1

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 1 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	422,387	cy	2.50	1,056,000
		·	Dewatering	30	ac	5,000.00	150,000
		·	Access Road (6" Aggregate Base)	7,800	sy	5.19	40,500
	b.	Pump Station					
		·	Pump Station	31	cfs	60,000.00	1,860,000
	c.	Open Channel					
		·	Excavate	42,400	cy	3.00	127,200
		·	Dewatering	4,972	lf	10.00	49,700
		·	Access Road (6" Aggregate Base)	8,300	sy	5.19	43,100
		-	Fence, 6' Chainlink	9,944	lf	16.12	160,300
	d.	Road Crossings (Box Culverts)					
		·	Reinforced Concrete	456	cy	508.88	231,800
		·	Dewatering[1]	240	lf	0.00	0
		·	Structural Excavation	3,010	cy	5.00	15,052
	e.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	1,500	lf	115.00	172,500
		·	42" Diameter Storm Drain	1,600	lf	160.00	256,000
		·	48" Diameter Storm Drain	1,000	lf	180.00	180,000
		·	54" Diameter Storm Drain	1,200	lf	195.00	234,000
		·	60" Diameter Storm Drain	2,700	lf	210.00	567,000
		·	66" Diameter Storm Drain	1,800	lf	230.00	414,000
		·	72" Diameter Storm Drain	3,700	lf	250.00	925,000
		·	Dewatering[1]	13,500	lf	0.00	0
		·	60" Diameter Manhole	6	ea	4,000.00	24,000
		·	72" Diameter Manhole	4	ea	5,000.00	20,000
		·	Saddle Manhole	16	ea	8,000.00	128,000
		·	Outlet Structure at Detention Basin or Channel	8	ea	15,000.00	120,000
	f.	-	Raised Grading (Material Obtained from Off-Site)				
		·	Haul Material in Trucks from Off-Site[2]	33,883	cy	10.00	338,800
		·	Spread topsoil by equipment on site[2]	33,883	cy	1.50	50,800
	g.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	50,000.00	50,000
	Subtotal - Shed 1 Drainage Facilities						7,213,752
	Land Acquisition			40	ac	37,500.00	1,493,700
	Construction Contingencies (20%)						1,442,750
	Administration, Engineering, and Environmental (15%)						1,082,063
TOTAL SHED 1 DRAINAGE FACILITIES COST							11,232,265

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

2. Haul and Spread Quantities reflect import material from Sankey (Regional) excavation necessary for providing a positive gradient for on-site drainage.

TABLE 41

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 2

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 2 Facilities				
a. Water Quality/Detention Basin				
· Excavate	136,472	cy	2.50	341,200
· Dewatering	9	ac	5,000.00	45,000
· Access Road (6" Aggregate Base)	4,300	sy	5.19	22,300
b. Pump Station				
· Pump Station	11	cfs	60,000.00	684,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	500	lf	160.00	80,000
· 48" Diameter Storm Drain	900	lf	180.00	162,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	5,900	lf	250.00	1,475,000
· Dewatering[1]	7,300	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	2	ea	5,000.00	10,000
· Saddle Manhole	12	ea	8,000.00	96,000
· Outlet Structure at Detention Basin	3	ea	15,000.00	45,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	3800	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	29,645.00	29,600
Subtotal - Shed 2 Drainage Facilities				2,994,100
Land Acquisition	10	ac	37,500.00	382,500
Construction Contingencies (20%)				598,820
Administration, Engineering, and Environmental (15%)				449,115
TOTAL SHED 2 DRAINAGE FACILITIES COST				4,424,535

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 42

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 3

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 3 Facilities				
a. Water Quality/Detention Basin				
· Excavate	295,543	cy	2.50	738,900
· Dewatering	21	ac	5,000.00	105,000
· Access Road (6" Aggregate Base)	6,700	sy	5.19	34,800
b. Pump Station	3			
· Pump Station	25	cfs	60,000.00	1,500,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	2,150	lf	160.00	344,000
· 48" Diameter Storm Drain	2,001	lf	180.00	360,180
· 54" Diameter Storm Drain	1,800	lf	195.00	351,000
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	7,500	lf	250.00	1,875,000
· Dewatering[1]	13,451	lf	0.00	0
· 60" Diameter Manhole	4	ea	4,000.00	16,000
· 72" Diameter Manhole	8	ea	5,000.00	40,000
· Saddle Manhole	15	ea	8,000.00	120,000
· Outlet Structure at Detention Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (5%)	1	ls	275,744.00	275,700
Subtotal - Shed 3 Drainage Facilities				5,790,580
Land Acquisition	22	ac	37,500.00	840,000
Construction Contingencies (20%)				1,158,116
Administration, Engineering, and Environmental (15%)				1,447,645
TOTAL SHED 3 DRAINAGE FACILITIES COST				9,236,341

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 43

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 4

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 4 Facilities				
a. Water Quality/Detention Basin				
· Excavate	400,220	cy	2.50	1,000,500
· Dewatering	32	ac	5,000.00	160,000
· Access Road (6" Aggregate Base)	8,500	sy	5.19	44,100
b. Pump Station				
· Pump Station	30	cfs	60,000.00	1,800,000
c. Open Channel				
· Excavate	21,590	cy	3.00	64,800
· Dewatering	3,552	lf	10.00	35,500
· Access Road (6" Aggregate Base)	5,920	sy	5.19	30,700
- Fence, 6' Chainlink	7,104	lf	16.12	114,500
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	48	cy	508.88	24,500
· Dewatering[1]	50	lf	0.00	0
· Structural Excavation	237	cy	5.00	1,185
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	3,450	lf	180.00	621,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	7,950	lf	250.00	1,987,500
· Dewatering[1]	11,400	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	7	ea	5,000.00	35,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	5	ea	15,000.00	75,000
f. Raised Shed Boundary Fill Zone (Material Obtained From Off-Site)				
· 500-ft Fill Corridor (Approximate)	8500	lf	n/a	0
· Haul Material in Trucks from Off-Site[2]	307,255	cy	10.00	3,072,600
· Spread topsoil by equipment on site[2]	307,255	cy	1.50	460,900
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 4 Drainage Facilities				9,705,785
Land Acquisition	39	ac	37,500.00	1,450,000
Construction Contingencies (20%)				1,941,157
Administration, Engineering, and Environmental (15%)				1,455,868
TOTAL SHED 4 DRAINAGE FACILITIES COST				14,552,810

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from Sankey (Regional) excavation necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage.

TABLE 44

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 5

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 5 Facilities				
a. Water Quality/Detention Basin				
· Excavate	752,862	cy	2.50	1,882,200
· Dewatering	56	ac	5,000.00	280,000
· Access Road (6" Aggregate Base)	14,800	sy	5.19	76,800
· Land Acquisition		ac	TBD	
b. Pump Station				
· Pump Station	66	cfs	60,000.00	3,960,000
c. Open Channel				
· Excavate	8,000	cy	3.00	24,000
· Dewatering[1]	1,292	lf	0.00	0
· Access Road (6" Aggregate Base)	1,900	sy	5.19	9,900
- Fence, 6' Chainlink	2,296	lf	16.12	37,000
· Land Acquisition		ac	TBD	
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	218	cy	508.88	111,100
· Dewatering[1]	140	lf	0.00	0
· Structural Excavation	1,426	cy	5.00	7,130
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	500	lf	180.00	90,000
· 54" Diameter Storm Drain	500	lf	195.00	97,500
· 60" Diameter Storm Drain	600	lf	210.00	126,000
· 66" Diameter Storm Drain	1,457	lf	230.00	335,100
· 72" Diameter Storm Drain	29,937	lf	250.00	7,484,250
· Dewatering[1]	32,994	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	2	ea	5,000.00	10,000
· Saddle Manhole	64	ea	8,000.00	512,000
· Outlet Structure at Detention Basin or Channel	6	ea	15,000.00	90,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	3400	lf	n/a	0
· Haul Material in Trucks from Off-Site[2]	548,857	cy	10.00	5,488,600
· Spread topsoil by equipment on site[2]	548,857	cy	1.50	823,300
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 5 Drainage Facilities				21,494,880
Land Acquisition	61	ac	37,500.00	2,292,700
Construction Contingencies (20%)				4,298,976
Administration, Engineering, and Environmental (15%)				3,224,232
TOTAL SHED 5 DRAINAGE FACILITIES COST				31,310,788

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from Sankey (Regional) excavation necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage.

TABLE 45

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 6

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 6 Facilities				
a. Water Quality/Detention Basin				
· Excavate	656,788	cy	2.50	1,642,000
· Dewatering	48	ac	5,000.00	240,000
· Access Road (6" Aggregate Base)	12,817	sy	5.19	66,500
b. Pump Station				
· Pump Station	61	cfs	60,000.00	3,660,000
c. Open Channel				
· Excavate	92,980	cy	3.00	278,900
· Dewatering Near Major Road[1]	6,361	lf	0.00	0
· Dewatering	5,754	lf	10.00	57,500
· Access Road (6" Aggregate Base)	20,192	sy	5.19	104,800
- Fence, 6' Chainlink	24,230	lf	16.12	390,600
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	508	cy	508.88	258,600
· Dewatering[1]	300	lf	0.00	0
· Structural Excavation	2,978	cy	5.00	14,889
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	350	lf	160.00	56,000
· 48" Diameter Storm Drain	350	lf	180.00	63,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	20,900	lf	250.00	5,225,000
· Dewatering[1]	21,600	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	1	ea	5,000.00	5,000
· Saddle Manhole	42	ea	8,000.00	336,000
· Outlet Structure at Detention Basin or Channel	15	ea	15,000.00	225,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	11800	lf	n/a	0
· Haul Material in Trucks from Off-Site[2]	1,842,602	cy	10.00	18,426,000
· Spread topsoil by equipment on site[2]	1,842,602	cy	1.50	2,763,900
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 6 Drainage Facilities				33,867,689
Land Acquisition	69	ac	37,500.00	2,579,600
Construction Contingencies (20%)				6,773,538
Administration, Engineering, and Environmental (15%)				5,080,153
TOTAL SHED 6 DRAINAGE FACILITIES COST				48,300,980

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from Sankey (Regional) excavation necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage.

TABLE 46

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 7

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 7 Facilities				
a. Water Quality/Detention Basin				
· Excavate	1,436,621	cy	2.50	3,591,600
· Dewatering	166	ac	5,000.00	828,800
· Access Road (6" Aggregate Base)	60,237	sy	5.19	312,600
b. Pump Station				
· Pump Station	106	cfs	60,000.00	6,360,000
c. Open Channel				
· Excavate	80,792	cy	3.00	242,400
· Dewatering Near Major Road[1]	3,620	lf	0.00	0
· Dewatering	6,647	lf	10.00	66,500
· Access Road (6" Aggregate Base)	17,112	sy	5.19	88,800
- Fence, 6' Chainlink	20,534	lf	16.12	331,000
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	1,426	cy	508.88	725,500
· Dewatering[1]	802	lf	0.00	0
· Structural Excavation	6,507	cy	5.00	32,536
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	3,900	lf	115.00	448,500
· 42" Diameter Storm Drain	4,450	lf	160.00	712,000
· 48" Diameter Storm Drain	1,700	lf	180.00	306,000
· 54" Diameter Storm Drain	5,700	lf	195.00	1,111,500
· 60" Diameter Storm Drain	11,000	lf	210.00	2,310,000
· 66" Diameter Storm Drain	2,500	lf	230.00	575,000
· 72" Diameter Storm Drain	6,300	lf	250.00	1,575,000
· 72" Diameter HDPE Storm Drain	1,400	lf	465.00	651,000
· Dewatering[1]	36,950	lf	0.00	0
· 60" Diameter Manhole	17	ea	4,000.00	68,000
· 72" Diameter Manhole	15	ea	5,000.00	75,000
· Saddle Manhole	43	ea	8,000.00	344,000
· Inlet/Outlet Structure at Detention Basin or Channel	18	ea	15,000.00	270,000
f. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 7 Drainage Facilities				21,075,736
Land Acquisition	190	ac	37,500.00	7,107,200
Construction Contingencies (20%)				4,215,147
Administration, Engineering, and Environmental (15%)				3,161,360
TOTAL SHED 7 DRAINAGE FACILITIES COST				35,559,444

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 47

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 8

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 8 Facilities						
	a.	Detention Basin					
		·	Excavate	269,324	cy	2.50	673,300
		·	Dewatering	21	ac	5,000.00	102,600
		·	Access Road (6" Aggregate Base)	6,933	sy	5.19	36,000
	b.	Pump Station					
		·	Pump Station	21	cfs	60,000.00	1,236,000
	c.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	600	lf	115.00	69,000
		·	42" Diameter Storm Drain	1,200	lf	160.00	192,000
		·	48" Diameter Storm Drain	500	lf	180.00	90,000
		·	54" Diameter Storm Drain	1,200	lf	195.00	234,000
		·	60" Diameter Storm Drain	0	lf	210.00	0
		·	66" Diameter Storm Drain	1,400	lf	230.00	322,000
		·	72" Diameter Storm Drain	5,550	lf	250.00	1,387,500
		·	Dewatering[1]	10,450	lf	0.00	0
		·	60" Diameter Manhole	4	ea	4,000.00	16,000
		·	72" Diameter Manhole	3	ea	5,000.00	15,000
		·	Saddle Manhole	14	ea	8,000.00	112,000
		·	Outlet Structure at Basin	4	ea	15,000.00	60,000
	d.	-	Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
		·	500-ft Fill Corridor (Approximate)	1100	lf	n/a	0
	e.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	45,454.00	45,500
	Subtotal - Shed 9 Drainage Facilities						4,590,900
	Land Acquisition			22	ac	37,500.00	825,000
	Construction Contingencies (20%)						918,180
	Administration, Engineering, and Environmental (15%)						688,635
TOTAL SHED 9 DRAINAGE FACILITIES COST							7,022,715

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 48

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 9

	Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 9 Facilities				
a.	Detention Basin				
·	Excavate	655,776	cy	2.50	1,639,400
·	Dewatering	41	ac	5,000.00	202,700
·	Access Road (6" Aggregate Base)	8,943	sy	5.19	46,400
b.	Pump Station				
·	Pump Station	47	cfs	60,000.00	2,844,000
c.	Storm Drainage Pipe System				
·	36" Diameter Storm Drain	1,100	lf	115.00	126,500
·	42" Diameter Storm Drain	600	lf	160.00	96,000
·	48" Diameter Storm Drain	6,000	lf	180.00	1,080,000
·	54" Diameter Storm Drain	2,200	lf	195.00	429,000
·	60" Diameter Storm Drain	2,700	lf	210.00	567,000
·	66" Diameter Storm Drain	2,200	lf	230.00	506,000
·	72" Diameter Storm Drain	10,600	lf	250.00	2,650,000
·	Dewatering[1]	25,400	lf	0.00	0
·	60" Diameter Manhole	3	ea	4,000.00	12,000
·	72" Diameter Manhole	16	ea	5,000.00	80,000
·	Saddle Manhole	31	ea	8,000.00	248,000
·	Outlet Structure at Basin	3	ea	15,000.00	45,000
d.	- Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
·	500-ft Fill Corridor (Approximate)	18000	lf	n/a	0
e.	Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
	Subtotal - Shed 9 Drainage Facilities				10,622,000
	Land Acquisition	42	ac	37,500.00	1,590,000
	Construction Contingencies (20%)				2,124,400
	Administration, Engineering, and Environmental (15%)				1,593,300
TOTAL SHED 9 DRAINAGE FACILITIES COST					15,929,700

Notes: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 49

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 10

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 10 Facilities				
a. Water Quality/Detention Basin				
· Excavate	210,286	cy	2.50	525,700
· Dewatering	20	ac	5,000.00	98,800
· Access Road (6" Aggregate Base)	6,552	sy	5.19	34,000
b. Pump Station				
· Pump Station	16	cfs	60,000.00	960,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	500	lf	115.00	57,500
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	1,200	lf	180.00	216,000
· 54" Diameter Storm Drain	600	lf	195.00	117,000
· 60" Diameter Storm Drain	1,400	lf	210.00	294,000
· 66" Diameter Storm Drain	1,100	lf	230.00	253,000
· 72" Diameter Storm Drain	3,100	lf	250.00	775,000
· Dewatering[1]	8,500	lf	0.00	0
· 60" Diameter Manhole	2	ea	4,000.00	8,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	11	ea	8,000.00	88,000
· Outlet Structure at Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	35,730.00	35,700
Subtotal - Shed 10 Drainage Facilities				3,608,700
Land Acquisition	21	ac	37,500.00	791,300
Construction Contingencies (20%)				721,740
Administration, Engineering, and Environmental (15%)				541,305
TOTAL SHED 10 DRAINAGE FACILITIES COST				5,663,045

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 50

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 11

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 11 Facilities				
a. Water Quality/Detention Basin				
· Excavate	298,225	cy	2.50	745,600
· Dewatering	23	ac	5,000.00	114,100
· Access Road (6" Aggregate Base)	7,910	sy	5.19	41,100
b. Pump Station				
· Pump Station	27	cfs	60,000.00	1,620,000
c. Open Channel				
· Excavate	27,111	cy	3.00	81,300
· Dewatering[1]	4,325	lf	0.00	0
· Access Road (6" Aggregate Base)	7,208	sy	5.19	37,400
- Fence, 6' Chainlink	8,650	lf	16.12	139,400
d. Road Crossing (two 72" RCPs)				
· Reinforced Concrete	288	cy	508.88	146,400
· Dewatering[1]	160	lf	0.00	0
· Structural Excavation	1,849	cy	5.00	9,244
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	2,400	lf	180.00	432,000
· 54" Diameter Storm Drain	3,200	lf	195.00	624,000
· 60" Diameter Storm Drain	1,200	lf	210.00	252,000
· 66" Diameter Storm Drain	800	lf	230.00	184,000
· 72" Diameter Storm Drain	2,400	lf	250.00	600,000
· Dewatering[1]	10,600	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	11	ea	5,000.00	55,000
· Saddle Manhole	9	ea	8,000.00	72,000
· Outlet Structure at Basin	5	ea	15,000.00	75,000
f. - Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
· 500-ft Fill Corridor (Approximate)	12700	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 11 Drainage Facilities				5,378,544
Land Acquisition	31	ac	37,500.00	1,157,000
Construction Contingencies (20%)				1,075,709
Administration, Engineering, and Environmental (15%)				806,782
TOTAL SHED 11 DRAINAGE FACILITIES COST				8,418,035

Note: 1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.

TABLE 51

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

SHED 12

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 12 Facilities				
a. Water Quality/Detention Basin				
· Excavate	493,107	cy	2.50	1,232,800
· Dewatering	49	ac	5,000.00	244,600
· Access Road (6" Aggregate Base)	20,000	sy	5.19	103,800
b. Pump Station				
· Pump Station	51	cfs	60,000.00	3,036,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	600	lf	115.00	69,000
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	4,700	lf	195.00	916,500
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	850	lf	230.00	195,500
· 72" Diameter Storm Drain	11,700	lf	250.00	2,925,000
· 72" Diameter HDPE Storm Drain	800	lf	465.00	372,000
· Dewatering[1]	18,650	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	9	ea	5,000.00	45,000
· Saddle Manhole	27	ea	8,000.00	216,000
· Inlet/Outlet Structure at Detention Basin	8	ea	15,000.00	120,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	9400	lf	n/a	0
· Haul Material in Trucks from Off-Site[2]	281,369	cy	10.00	2,813,700
· Spread topsoil by equipment on site[2]	281,369	cy	1.50	422,100
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Drainage Shed 12 Facilities				12,766,000
Land Acquisition	55	ac	37,500.00	2,057,600
Construction Contingencies (20%)				2,553,200
Administration, Engineering, and Environmental (15%)				1,914,900
TOTAL DRAINAGE SHED 12 FACILITIES COST				19,291,700

Notes:
1. Dewatering in vicinity of major roads is embedded in Sewer Estimate.
2. Haul and Spread Quantities reflect import material from Sankey (Regional) excavation necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage.

TABLE 52

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 3

REGIONAL FACILITIES

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Regional Facilities						
	a.	Detention Basin					
		·	Excavate	7,698,210	cy	2.50	19,245,500
		·	Dewatering	741	ac	5,000.00	3,707,000
		·	Access Road (6" Aggregate Base)	41,040	sy	5.19	213,000
	b.	Dewatering Pump Station					
		·	Pump Station	64	cfs	60,000.00	3,840,000
	c.	Sankey Interceptor					
		·	Excavate	109,024	cy	3.00	327,100
		·	Dewatering	22	ac	5,000.00	108,000
		·	Access Road (6" Aggregate Base)	42,447	sy	5.19	220,300
		·	Triple 10'x4' Reinforced Concrete Box Culvert Culvert Crossings	18,400	sf	150.00	2,760,000
		-	Compacted Levee	122,326	cy	2.91	355,968
		-	Finish Grading	1,291,245	sy	0.21	271,161
	d.	Crossing at Highway 99					
		·	Open Shield Jacking, 72" Pipe Under Highway 99	1,500	lf	700.00	1,050,000
		·	Jacking Shaft (Includes Mobilization)	1	ls	480000.00	480,000
		·	Reception Shaft (Includes Mobilization)	1	ls	320000.00	320,000
		·	72" Diameter Storm Drain	1,500	lf	250.00	375,000
	e.	Diversion Structure					
		·	Riprap	444	cy	59.40	26,400
		·	Excavate	4,093	cy	2.50	10,200
		·	Access Road (6" Aggregate Base)	833	sy	5.19	4,300
		·	48" Diameter Storm Drain	200	lf	180.00	36,000
		·	Headwall	2	ea	25,000.00	50,000
	f.	East Drainage Canal Improvements					
		·	Excavate	10,081	cy	2.50	25,200
		·	Dewatering	7	ac	5,000.00	32,900
		·	Access Road (6" Aggregate Base)	6,500	sy	5.19	33,700
	g.	Redundancy Features to RD1000 Pumping Facilities					
		-	Backup pumping capacity and power supply	1	ls	TBD	
	h.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	50,000.00	50,000
	Subtotal - Regional Drainage Facilities						33,541,729
	Land Acquisition			750	ac	37,500.00	28,125,000
	Construction Contingencies (20%)						6,708,346
	Administration, Engineering, and Environmental (15%)						5,031,259
TOTAL REGIONAL DRAINAGE FACILITIES COST							73,406,335

TABLE 53

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 1 SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal	0
6.	Drainage Shed 6 Facilities Subtotal (Table 54)	18,265,000
7.	Drainage Shed 7 Facilities Subtotal (Table 55)	27,678,000
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal	0
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal	0
12.	Drainage Shed 12 Facilities Subtotal (Table 56)	13,067,000
13.	Regional Facilities Subtotal (Table 24)	49,625,000
	Subtotal - Drainage Facilities	**108,635,000**

TABLE 54

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 1 SHED 6

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 6 Facilities				
a. Water Quality/Detention Basin				
· Excavate	656,788	cy	2.50	1,642,000
· Dewatering	48	ac	5,000.00	240,000
· Access Road (6" Aggregate Base)	12,817	sy	5.19	66,500
b. Pump Station				
· Pump Station	61	cfs	60,000.00	3,660,000
c. Open Channel				
· Excavate	92,980	cy	3.00	278,900
· Dewatering Near Major Road[1]	6,361	lf	0.00	0
· Dewatering	5,754	lf	10.00	57,500
· Access Road (6" Aggregate Base)	20,192	sy	5.19	104,800
- Fence, 6' Chainlink	24,230	lf	16.12	390,600
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	508	cy	508.88	258,600
· Dewatering[1]	300	lf	0.00	0
· Structural Excavation	2,978	cy	5.00	14,889
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	350	lf	160.00	56,000
· 48" Diameter Storm Drain	350	lf	180.00	63,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	17,100	lf	250.00	4,275,000
· Dewatering[1]	17,800	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	1	ea	5,000.00	5,000
· Saddle Manhole	34	ea	8,000.00	272,000
· Outlet Structure at Detention Basin or Channel	12	ea	15,000.00	180,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	11800	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 6 Drainage Facilities				11,618,789
Land Acquisition	69	ac	37,500.00	2,579,600
Construction Contingencies (20%)				2,323,758
Administration, Engineering, and Environmental (15%)				1,742,818
TOTAL SHED 6 DRAINAGE FACILITIES COST				18,264,965

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 55

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 1 SHED 7

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 7 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	1,258,388	cy	2.50	3,146,000
		·	Dewatering	127	ac	5,000.00	637,300
		·	Access Road (6" Aggregate Base)	46,688	sy	5.19	242,300
	b.	Pump Station					
		·	Pump Station	106	cfs	60,000.00	6,360,000
	c.	Open Channel					
		·	Excavate	63,187	cy	3.00	189,600
		·	Dewatering Near Major Road[1]	3,620	lf	0.00	0
		·	Dewatering	3,372	lf	10.00	33,700
		·	Access Road (6" Aggregate Base)	11,653	sy	5.19	60,500
		-	Fence, 6' Chainlink	13,984	lf	16.12	225,400
	d.	Road Crossings (Box Culverts)					
		·	Reinforced Concrete	1,426	cy	508.88	725,500
		·	Dewatering[1]	802	lf	0.00	0
		·	Structural Excavation	6,507	cy	5.00	32,536
	e.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	1,600	lf	115.00	184,000
		·	42" Diameter Storm Drain	400	lf	160.00	64,000
		·	48" Diameter Storm Drain	600	lf	180.00	108,000
		·	54" Diameter Storm Drain	3,600	lf	195.00	702,000
		·	60" Diameter Storm Drain	5,700	lf	210.00	1,197,000
		·	66" Diameter Storm Drain	2,500	lf	230.00	575,000
		·	72" Diameter Storm Drain	4,500	lf	250.00	1,125,000
		·	72" Diameter HDPE Storm Drain	800	lf	465.00	372,000
		·	Dewatering[1]	19,700	lf	0.00	0
		·	60" Diameter Manhole	4	ea	4,000.00	16,000
		·	72" Diameter Manhole	9	ea	5,000.00	45,000
		·	Saddle Manhole	27	ea	8,000.00	216,000
		·	Inlet/Outlet Structure at Detention Basin or Channel	8	ea	15,000.00	120,000
	f.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	50,000.00	50,000
	Subtotal - Shed 7 Drainage Facilities						16,426,836
	Land Acquisition			147	ac	37,500.00	5,502,200
	Construction Contingencies (20%)						3,285,367
	Administration, Engineering, and Environmental (15%)						2,464,025
TOTAL SHED 7 DRAINAGE FACILITIES COST							27,678,429

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 56

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 1 SHED 12

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 12 Facilities				
a. Water Quality/Detention Basin				
· Excavate	493,107	cy	2.50	1,232,800
· Dewatering	49	ac	5,000.00	244,600
· Access Road (6" Aggregate Base)	20,000	sy	5.19	103,800
b. Pump Station				
· Pump Station	51	cfs	60,000.00	3,036,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	600	lf	115.00	69,000
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	4,700	lf	195.00	916,500
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	850	lf	230.00	195,500
· 72" Diameter Storm Drain	6,700	lf	250.00	1,675,000
· 72" Diameter HDPE Storm Drain	800	lf	465.00	372,000
· Dewatering[1]	13,650	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	9	ea	5,000.00	45,000
· Saddle Manhole	17	ea	8,000.00	136,000
· Inlet/Outlet Structure at Detention Basin	5	ea	15,000.00	75,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	9400	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Drainage Shed 12 Facilities				8,155,200
Land Acquisition	55	ac	37,500.00	2,057,600
Construction Contingencies (20%)				1,631,040
Administration, Engineering, and Environmental (15%)				1,223,280
TOTAL DRAINAGE SHED 12 FACILITIES COST				13,067,120

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 57

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE A SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal	0
6.	Drainage Shed 6 Facilities Subtotal	0
7.	Drainage Shed 7 Facilities Subtotal	0
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal (Table 58)	17,912,000
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal (Table 59)	14,945,000
12.	Drainage Shed 12 Facilities Subtotal	0
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**32,857,000**

TABLE 58

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE A SHED 9

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 9 Facilities				
a. Detention Basin				
· Excavate	655,776	cy	2.50	1,639,400
· Dewatering	41	ac	5,000.00	202,700
· Access Road (6" Aggregate Base)	8,943	sy	5.19	46,400
b. Pump Station				
· Pump Station	47	cfs	60,000.00	2,844,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	1,100	lf	115.00	126,500
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	3,600	lf	180.00	648,000
· 54" Diameter Storm Drain	1,700	lf	195.00	331,500
· 60" Diameter Storm Drain	1,400	lf	210.00	294,000
· 66" Diameter Storm Drain	1,600	lf	230.00	368,000
· 72" Diameter Storm Drain	9,600	lf	250.00	2,400,000
· Dewatering[1]	19,600	lf	0.00	0
· 60" Diameter Manhole	3	ea	4,000.00	12,000
· 72" Diameter Manhole	11	ea	5,000.00	55,000
· Saddle Manhole	25	ea	8,000.00	200,000
· Outlet Structure at Basin	2	ea	15,000.00	30,000
d. - Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
· 500-ft Fill Corridor (Approximate)	18000	lf	n/a	0
· Import Material from Off-Site Using Scrapers[2]	686,810	cy	2.50	1,717,000
· Spread topsoil by equipment on site[2]	686,810	cy	1.50	1,030,200
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 9 Drainage Facilities				12,090,700
Land Acquisition	42	ac	37,500.00	1,590,000
Construction Contingencies (20%)				2,418,140
Administration, Engineering, and Environmental (15%)				1,813,605
TOTAL SHED 9 DRAINAGE FACILITIES COST				17,912,445

Notes:
1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 59

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE A SHED 11

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 11 Facilities				
a. Water Quality/Detention Basin				
· Excavate	298,225	cy	2.50	745,600
· Dewatering	23	ac	5,000.00	114,100
· Access Road (6" Aggregate Base)	7,910	sy	5.19	41,100
b. Pump Station				
· Pump Station	27	cfs	60,000.00	1,620,000
c. Open Channel				
· Excavate	27,111	cy	3.00	81,300
· Dewatering[1]	4,325	lf	0.00	0
· Access Road (6" Aggregate Base)	7,208	sy	5.19	37,400
- Fence, 6' Chainlink	8,650	lf	16.12	139,400
d. Road Crossing (two 72" RCPs)				
· Reinforced Concrete	288	cy	508.88	146,400
· Dewatering[1]	160	lf	0.00	0
· Structural Excavation	1,849	cy	5.00	9,244
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	1,200	lf	180.00	216,000
· 54" Diameter Storm Drain	3,200	lf	195.00	624,000
· 60" Diameter Storm Drain	600	lf	210.00	126,000
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	1,200	lf	250.00	300,000
· Dewatering[1]	6,200	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	9	ea	5,000.00	45,000
· Saddle Manhole	4	ea	8,000.00	32,000
· Outlet Structure at Basin	3	ea	15,000.00	45,000
f. - Raised Shed Boundary Fill Zone (Material Obtained From both On-Site and Off-Site)				
· 500-ft Fill Corridor (Approximate)	12700	lf	n/a	0
· Haul Material in Trucks from Sankey Regional Detention Site[2]	1,460,240	cy	2.50	3,650,600
· Spread topsoil by equipment on site2	1,460,240	cy	1.50	2,190,400
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 11 Drainage Facilities				10,213,544
Land Acquisition	31	ac	37,500.00	1,157,000
Construction Contingencies (20%)				2,042,709
Administration, Engineering, and Environmental (15%)				1,532,032
TOTAL SHED 11 DRAINAGE FACILITIES COST				14,945,285

Notes:
1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 60

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 2 SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal	0
6.	Drainage Shed 6 Facilities Subtotal (Table 61)	1,478,000
7.	Drainage Shed 7 Facilities Subtotal (Table 62)	6,751,000
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal	0
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal	0
12.	Drainage Shed 12 Facilities Subtotal (Table 63)	633,000
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**8,862,000**

TABLE 61

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 2 SHED 6

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 6 Facilities				
a. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	3,900	lf	250.00	975,000
· Dewatering[1]	3,900	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	0	ea	5,000.00	0
· Saddle Manhole	8	ea	8,000.00	64,000
· Outlet Structure at Detention Basin or Channel	3	ea	15,000.00	45,000
b. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	10,840.00	10,800
Subtotal - Shed 6 Drainage Facilities				1,094,800
Land Acquisition	0	ac	37,500.00	0
Construction Contingencies (20%)				218,960
Administration, Engineering, and Environmental (15%)				164,220
TOTAL SHED 6 DRAINAGE FACILITIES COST				1,477,980

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 62

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 2 SHED 7

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 7 Facilities						
	a.	Water Quality/Detention Basin					
		·	Excavate	178,233	cy	2.50	445,600
		·	Dewatering	38	ac	5,000.00	191,500
		·	Access Road (6" Aggregate Base)	13,548	sy	5.19	70,300
	b.	Open Channel					
		·	Excavate	17,605	cy	3.00	52,800
		·	Dewatering	3,275	lf	10.00	32,800
		·	Access Road (6" Aggregate Base)	5,458	sy	5.19	28,300
		-	Fence, 6' Chainlink	6,550	lf	16.12	105,600
	c.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	1,800	lf	115.00	207,000
		·	42" Diameter Storm Drain	2,950	lf	160.00	472,000
		·	48" Diameter Storm Drain	1,100	lf	180.00	198,000
		·	54" Diameter Storm Drain	1,000	lf	195.00	195,000
		·	60" Diameter Storm Drain	3,600	lf	210.00	756,000
		·	66" Diameter Storm Drain	0	lf	230.00	0
		·	72" Diameter Storm Drain	1,800	lf	250.00	450,000
		·	72" Diameter HDPE Storm Drain	600	lf	465.00	279,000
		·	Dewatering[1]	12,850	lf	0.00	0
		·	60" Diameter Manhole	10	ea	4,000.00	40,000
		·	72" Diameter Manhole	4	ea	5,000.00	20,000
		·	Saddle Manhole	12	ea	8,000.00	96,000
		·	Inlet/Outlet Structure at Detention Basin or Channel	9	ea	15,000.00	135,000
	d.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	37,749.00	37,700
	Subtotal - Shed 7 Drainage Facilities						3,812,600
	Land Acquisition			43	ac	37,500.00	1,604,200
	Construction Contingencies (20%)						762,520
	Administration, Engineering, and Environmental (15%)						571,890
TOTAL SHED 7 DRAINAGE FACILITIES COST							6,751,210

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 63

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 2 SHED 12

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 12 Facilities				
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	1,700	lf	250.00	425,000
· 72" Diameter HDPE Storm Drain	0	lf	465.00	0
· Dewatering[1]	1,700	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	0	ea	5,000.00	0
· Saddle Manhole	3	ea	8,000.00	24,000
· Inlet/Outlet Structure at Detention Basin	1	ea	15,000.00	15,000
b. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	4,640.00	4,600
Subtotal - Drainage Shed 12 Facilities				468,600
Land Acquisition	0	ac	37,500.00	0
Construction Contingencies (20%)				93,720
Administration, Engineering, and Environmental (15%)				70,290
TOTAL DRAINAGE SHED 12 FACILITIES COST				632,610

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 64

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE B SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal (Table 65)	9,452,000
6.	Drainage Shed 6 Facilities Subtotal	0
7.	Drainage Shed 7 Facilities Subtotal	0
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal (Table 66)	1,750,000
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal (Table 67)	1,372,000
12.	Drainage Shed 12 Facilities Subtotal	0
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**12,574,000**

TABLE 65

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE B SHED 5

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 5 Facilities				
a. Water Quality/Detention Basin				
· Excavate	538,644	cy	2.50	1,346,600
· Dewatering	42	ac	5,000.00	210,000
· Access Road (6" Aggregate Base)	12,300	sy	5.19	63,800
b. Pump Station				
· Pump Station	43	cfs	60,000.00	2,580,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	600	lf	210.00	126,000
· 66" Diameter Storm Drain	600	lf	230.00	138,000
· 72" Diameter Storm Drain	4,500	lf	250.00	1,125,000
· Dewatering[1]	5,700	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	0	ea	5,000.00	0
· Saddle Manhole	12	ea	8,000.00	96,000
· Outlet Structure at Detention Basin or Channel	2	ea	15,000.00	30,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	3400	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 5 Drainage Facilities				5,765,400
Land Acquisition	45	ac	37,500.00	1,668,800
Construction Contingencies (20%)				1,153,080
Administration, Engineering, and Environmental (15%)				864,810
TOTAL SHED 5 DRAINAGE FACILITIES COST				9,452,090

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 66

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE B SHED 9

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 9 Facilities				
a. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	2,400	lf	180.00	432,000
· 54" Diameter Storm Drain	500	lf	195.00	97,500
· 60" Diameter Storm Drain	1,300	lf	210.00	273,000
· 66" Diameter Storm Drain	600	lf	230.00	138,000
· 72" Diameter Storm Drain	1,000	lf	250.00	250,000
· Dewatering[1]	5,800	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	6	ea	5,000.00	30,000
· Saddle Manhole	6	ea	8,000.00	48,000
· Outlet Structure at Basin	1	ea	15,000.00	15,000
b. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	12,835.00	12,800
Subtotal - Shed 9 Drainage Facilities				1,296,300
Land Acquisition	0	ac	37,500.00	0
Construction Contingencies (20%)				259,260
Administration, Engineering, and Environmental (15%)				194,445
TOTAL SHED 9 DRAINAGE FACILITIES COST				1,750,005

Notes:
1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 67

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE B SHED 11

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 11 Facilities						
	a.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	0	lf	115.00	0
		·	42" Diameter Storm Drain	600	lf	160.00	96,000
		·	48" Diameter Storm Drain	1,200	lf	180.00	216,000
		·	54" Diameter Storm Drain	0	lf	195.00	0
		·	60" Diameter Storm Drain	600	lf	210.00	126,000
		·	66" Diameter Storm Drain	800	lf	230.00	184,000
		·	72" Diameter Storm Drain	1,200	lf	250.00	300,000
		·	Dewatering[1]	4,400	lf	0.00	0
		·	60" Diameter Manhole	1	ea	4,000.00	4,000
		·	72" Diameter Manhole	2	ea	5,000.00	10,000
		·	Saddle Manhole	5	ea	8,000.00	40,000
		·	Outlet Structure at Basin	2	ea	15,000.00	30,000
	b.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	10,060.00	10,100
	Subtotal - Shed 11 Drainage Facilities						1,016,100
	Land Acquisition			0	ac	37,500.00	0
	Construction Contingencies (20%)			.			203,220
	Administration, Engineering, and Environmental (15%)						152,415
TOTAL SHED 11 DRAINAGE FACILITIES COST							1,371,735

Notes:
1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).
2. Haul and Spread Quantities reflect import material from offsite necessary for raising the shed boundary as well as providing a positive gradient for on-site drainage. Borrow site is assumed to be land located north of plan area, west of Highway 99.

TABLE 68

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 3 SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal (Table 69)	9,783,000
5.	Drainage Shed 5 Facilities Subtotal (Table 70)	4,788,000
6.	Drainage Shed 6 Facilities Subtotal	0
7.	Drainage Shed 7 Facilities Subtotal (Table 71)	1,220,400
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal	0
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal	0
12.	Drainage Shed 12 Facilities Subtotal	0
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**15,791,400**

TABLE 69

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 3 SHED 4

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 4 Facilities				
a. Water Quality/Detention Basin				
· Excavate	400,220	cy	2.50	1,000,500
· Dewatering	32	ac	5,000.00	160,000
· Access Road (6" Aggregate Base)	8,500	sy	5.19	44,100
b. Pump Station				
· Pump Station	30	cfs	60,000.00	1,800,000
c. Open Channel				
· Excavate	21,590	cy	3.00	64,800
· Dewatering	3,552	lf	10.00	35,500
· Access Road (6" Aggregate Base)	5,920	sy	5.19	30,700
- Fence, 6' Chainlink	7,104	lf	16.12	114,500
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	48	cy	508.88	24,500
· Dewatering [1]	50	lf	0.00	0
· Structural Excavation	237	cy	5.00	1,185
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	3,450	lf	180.00	621,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	7,950	lf	250.00	1,987,500
· Dewatering[1]	11,400	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	7	ea	5,000.00	35,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	5	ea	15,000.00	75,000
f. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	8500	lf	n/a	0
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 4 Drainage Facilities				6,172,285
Land Acquisition	39	ac	37,500.00	1,450,000
Construction Contingencies (20%)				1,234,457
Administration, Engineering, and Environmental (15%)				925,843
TOTAL SHED 4 DRAINAGE FACILITIES COST				9,782,585

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 70

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 3 SHED 5

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 5 Facilities						
	a.	Open Channel					
		·	Excavate	8,000	cy	3.00	24,000
		·	Dewatering[1]	1,292	lf	0.00	0
		·	Access Road (6" Aggregate Base)	1,900	sy	5.19	9,900
		-	Fence, 6' Chainlink	2,296	lf	16.12	37,000
	b.	Road Crossings (Box Culverts)					
		·	Reinforced Concrete	218	cy	508.88	111,100
		·	Dewatering[1]	140	lf	0.00	0
		·	Structural Excavation	1,426	cy	5.00	7,130
	c.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	0	lf	115.00	0
		·	42" Diameter Storm Drain	0	lf	160.00	0
		·	48" Diameter Storm Drain	0	lf	180.00	0
		·	54" Diameter Storm Drain	0	lf	195.00	0
		·	60" Diameter Storm Drain	0	lf	210.00	0
		·	66" Diameter Storm Drain	0	lf	230.00	0
		·	72" Diameter Storm Drain	12,200	lf	250.00	3,050,000
		·	Dewatering[1]	12,200	lf	0.00	0
		·	60" Diameter Manhole	0	ea	4,000.00	0
		·	72" Diameter Manhole	0	ea	5,000.00	0
		·	Saddle Manhole	24	ea	8,000.00	192,000
		·	Outlet Structure at Detention Basin or Channel	2	ea	15,000.00	30,000
	d.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	34,611.30	34,600
	Subtotal - Shed 5 Drainage Facilities						3,495,730
	Land Acquisition			2	ac	37,500.00	69,000
	Construction Contingencies (20%)						699,146
	Administration, Engineering, and Environmental (15%)						524,359
TOTAL SHED 5 DRAINAGE FACILITIES COST							4,788,235

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 71

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 3 SHED 7

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 7 Facilities				
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	500	lf	115.00	57,500
· 42" Diameter Storm Drain	1,100	lf	160.00	176,000
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	1,100	lf	195.00	214,500
· 60" Diameter Storm Drain	1,800	lf	210.00	378,000
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	0	lf	250.00	0
· 72" Diameter HDPE Storm Drain	0	lf	465.00	0
· Dewatering[1]	4,500	lf	0.00	0
· 60" Diameter Manhole	3	ea	4,000.00	12,000
· 72" Diameter Manhole	2	ea	5,000.00	10,000
· Saddle Manhole	4	ea	8,000.00	32,000
· Inlet/Outlet Structure at Detention Basin or Channel	1	ea	15,000.00	15,000
f. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	8,950.00	9,000
Subtotal - Shed 7 Drainage Facilities				904,000
Land Acquisition	0	ac	37,500.00	0
Construction Contingencies (20%)				180,800
Administration, Engineering, and Environmental (15%)				135,600
TOTAL SHED 7 DRAINAGE FACILITIES COST				1,220,400

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 72

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE C SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal (Table 73)	419,000
6.	Drainage Shed 6 Facilities Subtotal	0
7.	Drainage Shed 7 Facilities Subtotal	0
8.	Drainage Shed 8 Facilities Subtotal (Table 74)	7,023,000
9.	Drainage Shed 9 Facilities Subtotal	0
10.	Drainage Shed 10 Facilities Subtotal (Table 75)	5,663,000
11.	Drainage Shed 11 Facilities Subtotal	0
12.	Drainage Shed 12 Facilities Subtotal	0
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**13,105,000**

TABLE 73

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE C SHED 5

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 5 Facilities				
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	0	lf	160.00	0
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	1,200	lf	230.00	276,000
· 72" Diameter Storm Drain	0	lf	250.00	0
· Dewatering[1]	1,200	lf	0.00	0
· 60" Diameter Manhole	0	ea	4,000.00	0
· 72" Diameter Manhole	0	ea	5,000.00	0
· Saddle Manhole	2	ea	8,000.00	16,000
· Outlet Structure at Detention Basin or Channel	1	ea	15,000.00	15,000
g. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	3,070.00	3,100
Subtotal - Shed 5 Drainage Facilities				310,100
Land Acquisition	0	ac	37,500.00	0
Construction Contingencies (20%)				62,020
Administration, Engineering, and Environmental (15%)				46,515
TOTAL SHED 5 DRAINAGE FACILITIES COST				418,635

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 74

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE C SHED 8

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 8 Facilities				
a. Water Quality/Detention Basin				
· Excavate	269,324	cy	2.50	673,300
· Dewatering	21	ac	5,000.00	102,600
· Access Road (6" Aggregate Base)	6,933	sy	5.19	36,000
b. Pump Station				
· Pump Station	21	cfs	60,000.00	1,236,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	600	lf	115.00	69,000
· 42" Diameter Storm Drain	1,200	lf	160.00	192,000
· 48" Diameter Storm Drain	500	lf	180.00	90,000
· 54" Diameter Storm Drain	1,200	lf	195.00	234,000
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	1400	lf	230.00	322,000
· 72" Diameter Storm Drain	5550	lf	250.00	1,387,500
· Dewatering[1]	10,450	lf	0.00	0
· 60" Diameter Manhole	4	ea	4,000.00	16,000
· 72" Diameter Manhole	3	ea	5,000.00	15,000
· Saddle Manhole	14	ea	8,000.00	112,000
· Outlet Structure at Basin	4	ea	15,000.00	60,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	1100	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	45,454.00	45,500
Subtotal - Shed 8 Drainage Facilities				4,590,900
Land Acquisition	22	ac	37,500.00	825,000
Construction Contingencies (20%)				918,180
Administration, Engineering, and Environmental (15%)				688,635
TOTAL SHED 8 DRAINAGE FACILITIES COST				7,022,715

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 75

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE C SHED 10

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 10 Facilities				
a. Water Quality/Detention Basin				
· Excavate	210,286	cy	2.50	525,700
· Dewatering	20	ac	5,000.00	98,800
· Access Road (6" Aggregate Base)	6,552	sy	5.19	34,000
b. Pump Station				
· Pump Station	16	cfs	60,000.00	960,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	500	lf	115.00	57,500
· 42" Diameter Storm Drain	600	lf	160.00	96,000
· 48" Diameter Storm Drain	1,200	lf	180.00	216,000
· 54" Diameter Storm Drain	600	lf	195.00	117,000
· 60" Diameter Storm Drain	1,400	lf	210.00	294,000
· 66" Diameter Storm Drain	1,100	lf	230.00	253,000
· 72" Diameter Storm Drain	3,100	lf	250.00	775,000
· Dewatering[1]	8,500	lf	0.00	0
· 60" Diameter Manhole	2	ea	4,000.00	8,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	11	ea	8,000.00	88,000
· Outlet Structure at Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	35,730.00	35,700
Subtotal - Shed 10 Drainage Facilities				3,608,700
Land Acquisition	21	ac	37,500.00	791,300
Construction Contingencies (20%)				721,740
Administration, Engineering, and Environmental (15%)				541,305
TOTAL SHED 10 DRAINAGE FACILITIES COST				5,663,045

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 76

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 4 SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal	0
2.	Drainage Shed 2 Facilities Subtotal	0
3.	Drainage Shed 3 Facilities Subtotal (Table 77)	5,399,000
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal (Table 78)	867,000
6.	Drainage Shed 6 Facilities Subtotal	0
7.	Drainage Shed 7 Facilities Subtotal	0
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal	0
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal	0
12.	Drainage Shed 12 Facilities Subtotal (Table 79)	1,276,000
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**7,542,000**

TABLE 77

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 4 SHED 3

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 3 Facilities				
a. Water Quality/Detention Basin				
· Excavate	171,630	cy	2.50	429,100
· Dewatering	13	ac	5,000.00	65,000
· Access Road (6" Aggregate Base)	5,100	sy	5.19	26,500
b. Pump Station				
· Pump Station	15	cfs	60,000.00	924,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	2,150	lf	160.00	344,000
· 48" Diameter Storm Drain	0	lf	180.00	0
· 54" Diameter Storm Drain	1,800	lf	195.00	351,000
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	5,200	lf	250.00	1,300,000
· Dewatering[1]	9,150	lf	0.00	0
· 60" Diameter Manhole	4	ea	4,000.00	16,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	10	ea	8,000.00	80,000
· Outlet Structure at Detention Basin	2	ea	15,000.00	30,000
d. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	35,856.00	35,900
Subtotal - Shed 3 Drainage Facilities				3,621,500
Land Acquisition	14	ac	37,500.00	510,000
Construction Contingencies (20%)				724,300
Administration, Engineering, and Environmental (15%)				543,225
TOTAL SHED 3 DRAINAGE FACILITIES COST				5,399,025

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 78

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 4 SHED 5

			Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 5 Facilities						
	a.	Storm Drainage Pipe System					
		·	36" Diameter Storm Drain	0	lf	115.00	0
		·	42" Diameter Storm Drain	0	lf	160.00	0
		·	48" Diameter Storm Drain	500	lf	180.00	90,000
		·	54" Diameter Storm Drain	200	lf	195.00	39,000
		·	60" Diameter Storm Drain	0	lf	210.00	0
		·	66" Diameter Storm Drain	0	lf	230.00	0
		·	72" Diameter Storm Drain	1,800	lf	250.00	450,000
		·	Dewatering[1]	2,500	lf	0.00	0
		·	60" Diameter Manhole	0	ea	4,000.00	0
		·	72" Diameter Manhole	2	ea	5,000.00	10,000
		·	Saddle Manhole	4	ea	8,000.00	32,000
		·	Outlet Structure at Detention Basin or Channel	1	ea	15,000.00	15,000
	b.	Mobilization/Demobilization (1%, not to exceed $50,000)		1	ls	6,360.00	6,400
	Subtotal - Shed 5 Drainage Facilities						642,400
	Land Acquisition			0	ac	37,500.00	0
	Construction Contingencies (20%)						128,480
	Administration, Engineering, and Environmental (15%)						96,360
TOTAL SHED 5 DRAINAGE FACILITIES COST							867,240

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 79

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE 4 SHED 12

	Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1.	Drainage Shed 12 Facilities				
	a. Storm Drainage Pipe System				
	· 36" Diameter Storm Drain	0	lf	115.00	0
	· 42" Diameter Storm Drain	0	lf	160.00	0
	· 48" Diameter Storm Drain	0	lf	180.00	0
	· 54" Diameter Storm Drain	0	lf	195.00	0
	· 60" Diameter Storm Drain	0	lf	210.00	0
	· 66" Diameter Storm Drain	0	lf	230.00	0
	· 72" Diameter Storm Drain	3,400	lf	250.00	850,000
	· 72" Diameter HDPE Storm Drain	0	lf	465.00	0
	· Dewatering[1]	3,400	lf	0.00	0
	· 60" Diameter Manhole	0	ea	4,000.00	0
	· 72" Diameter Manhole	0	ea	5,000.00	0
	· Saddle Manhole	7	ea	8,000.00	56,000
	· Inlet/Outlet Structure at Detention Basin	2	ea	15,000.00	30,000
	b. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	9,360.00	9,400
	Subtotal - Drainage Shed 12 Facilities				945,400
	Land Acquisition	0	ac	37,500.00	0
	Construction Contingencies (20%)				189,080
	Administration, Engineering, and Environmental (15%)				141,810
TOTAL DRAINAGE SHED 12 FACILITIES COST					1,276,290

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 80

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE D SUMMARY

	Description	Total Cost, $
1.	Drainage Shed 1 Facilities Subtotal (Table 81)	10,706,000
2.	Drainage Shed 2 Facilities Subtotal (Table 82)	4,425,000
3.	Drainage Shed 3 Facilities Subtotal	0
4.	Drainage Shed 4 Facilities Subtotal	0
5.	Drainage Shed 5 Facilities Subtotal	0
6.	Drainage Shed 6 Facilities Subtotal	0
7.	Drainage Shed 7 Facilities Subtotal	0
8.	Drainage Shed 8 Facilities Subtotal	0
9.	Drainage Shed 9 Facilities Subtotal	0
10.	Drainage Shed 10 Facilities Subtotal	0
11.	Drainage Shed 11 Facilities Subtotal	0
12.	Drainage Shed 12 Facilities Subtotal	0
13.	Regional Facilities Subtotal	0
	Subtotal - Drainage Facilities	**15,131,000**

TABLE 81

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE D SHED 1

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 1 Facilities				
a. Water Quality/Detention Basin				
· Excavate	422,387	cy	2.50	1,056,000
· Dewatering	30	ac	5,000.00	150,000
· Access Road (6" Aggregate Base)	7,800	sy	5.19	40,500
b. Pump Station				
· Pump Station	31	cfs	60,000.00	1,860,000
c. Open Channel				
· Excavate	42,400	cy	3.00	127,200
· Dewatering	4,972	lf	10.00	49,700
· Access Road (6" Aggregate Base)	8,300	sy	5.19	43,100
- Fence, 6' Chainlink	9,944	lf	16.12	160,300
d. Road Crossings (Box Culverts)				
· Reinforced Concrete	456	cy	508.88	231,800
· Dewatering[1]	240	lf	0.00	0
· Structural Excavation	3,010	cy	5.00	15,052
e. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	1,500	lf	115.00	172,500
· 42" Diameter Storm Drain	1,600	lf	160.00	256,000
· 48" Diameter Storm Drain	1,000	lf	180.00	180,000
· 54" Diameter Storm Drain	1,200	lf	195.00	234,000
· 60" Diameter Storm Drain	2,700	lf	210.00	567,000
· 66" Diameter Storm Drain	1,800	lf	230.00	414,000
· 72" Diameter Storm Drain	3,700	lf	250.00	925,000
· Dewatering[1]	13,500	lf	0.00	0
· 60" Diameter Manhole	6	ea	4,000.00	24,000
· 72" Diameter Manhole	4	ea	5,000.00	20,000
· Saddle Manhole	16	ea	8,000.00	128,000
· Outlet Structure at Detention Basin or Channel	8	ea	15,000.00	120,000
f. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	50,000.00	50,000
Subtotal - Shed 1 Drainage Facilities				6,824,152
Land Acquisition	40	ac	37,500.00	1,493,700
Construction Contingencies (20%)				1,364,830
Administration, Engineering, and Environmental (15%)				1,023,623
TOTAL SHED 1 DRAINAGE FACILITIES COST				10,706,305

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

TABLE 82

SOUTH SUTTER SPECIFIC PLAN
DRAINAGE MASTER PLAN

OPINION OF PROBABLE COSTS
ALTERNATIVE 1 PHASING

PHASE D SHED 2

Description	Quantity	Unit	Unit Cost, $	Total Cost, $
1. Drainage Shed 2 Facilities				
a. Water Quality/Detention Basin				
· Excavate	136,472	cy	2.50	341,200
· Dewatering	9	ac	5,000.00	45,000
· Access Road (6" Aggregate Base)	4,300	sy	5.19	22,300
b. Pump Station				
· Pump Station	11	cfs	60,000.00	684,000
c. Storm Drainage Pipe System				
· 36" Diameter Storm Drain	0	lf	115.00	0
· 42" Diameter Storm Drain	500	lf	160.00	80,000
· 48" Diameter Storm Drain	900	lf	180.00	162,000
· 54" Diameter Storm Drain	0	lf	195.00	0
· 60" Diameter Storm Drain	0	lf	210.00	0
· 66" Diameter Storm Drain	0	lf	230.00	0
· 72" Diameter Storm Drain	5,900	lf	250.00	1,475,000
· Dewatering[1]	7,300	lf	0.00	0
· 60" Diameter Manhole	1	ea	4,000.00	4,000
· 72" Diameter Manhole	2	ea	5,000.00	10,000
· Saddle Manhole	12	ea	8,000.00	96,000
· Outlet Structure at Detention Basin	3	ea	15,000.00	45,000
d. Raised Shed Boundary Fill Zone (Material Obtained From On-Site)				
· 500-ft Fill Corridor (Approximate)	3800	lf	n/a	0
e. Mobilization/Demobilization (1%, not to exceed $50,000)	1	ls	29,645.00	29,600
Subtotal - Shed 2 Drainage Facilities				2,994,100
Land Acquisition	10	ac	37,500.00	382,500
Construction Contingencies (20%)				598,820
Administration, Engineering, and Environmental (15%)				449,115
TOTAL SHED 2 DRAINAGE FACILITIES COST				4,424,535

Note: 1. Dewatering in vicinity of major roads is embedded cost opinion in Sewer Master Plan (by others).

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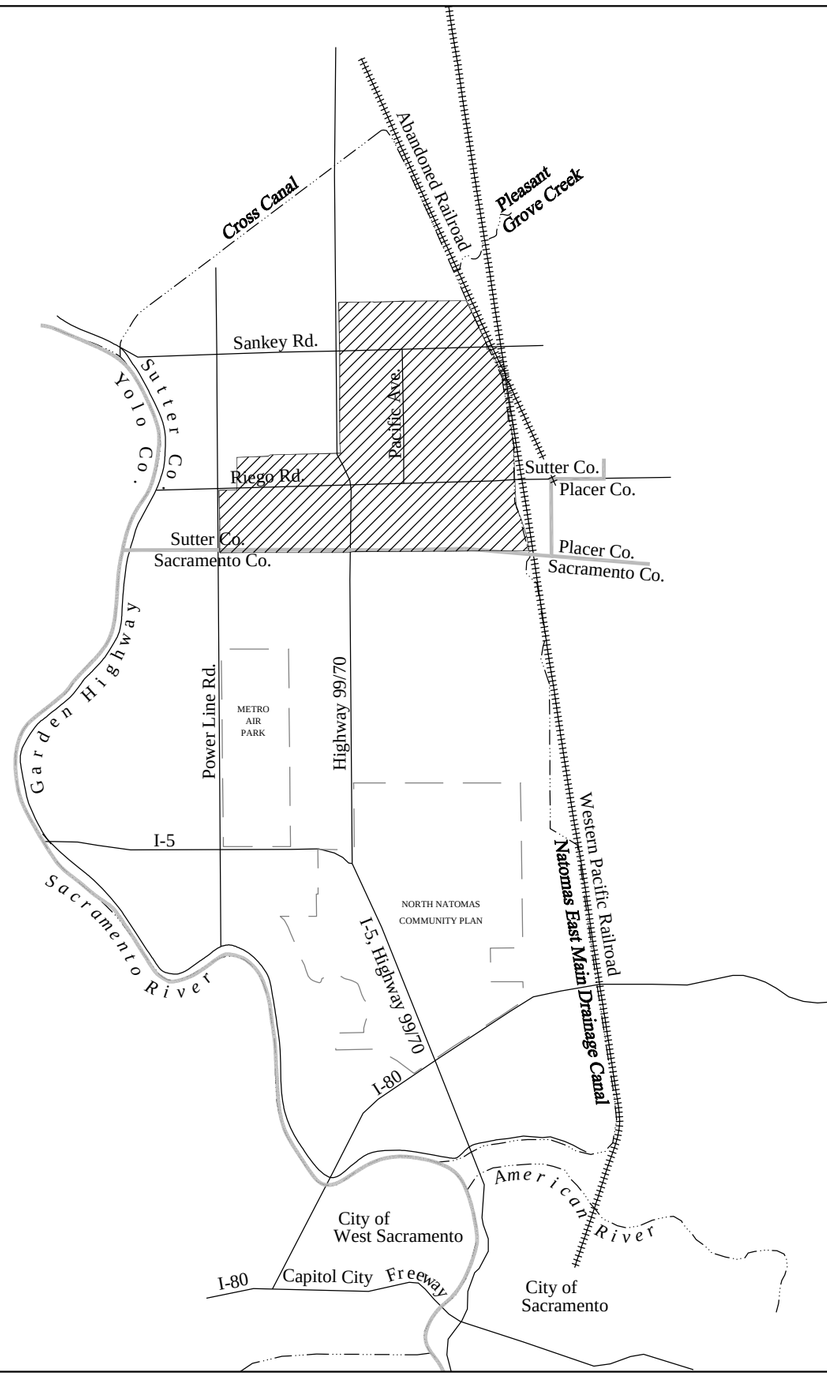


0 6000' 12000'

SCALE: 1" = 12000'

L E G E N D

- County Line
- River/Creek/Canal
- Road
- Railroad
- Sutter Pointe Specific Plan Area
- Other Planning Areas

Source:

"South Sutter County Specific Plan Area - Drainage Master Plan," Borcalli & Associates, Inc., October 2001.

SUTTER POINTE

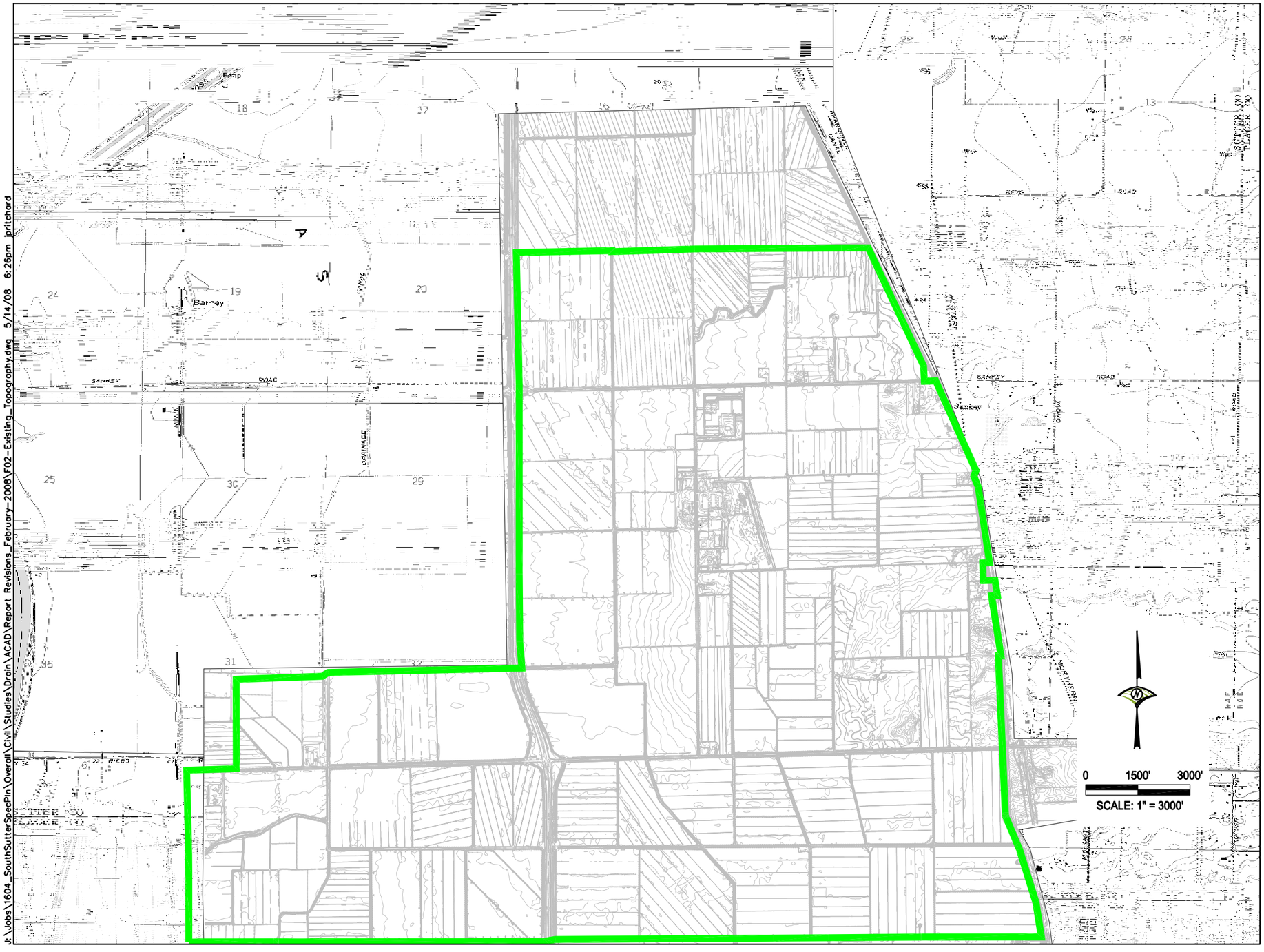
MEASURE "M" GROUP

Figure 1

Location Map

WOOD RODGERS

DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

Sources:

1. USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929(NGVD29).

2. Digital Topographic Mapping performed by Geomaps International, Inc., October 28, 2003 and February 1, 2005. Vertical Datum is NGVD29, Horizontal Datum is North American Datum of 1983 (NAD83), California State Plane II.

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SUTTER POINTE

MEASURE "M" GROUP

Figure 2

Existing Topography

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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PUMPING PLANT #4
RD 1000

RECLAMATION
PLATFORM
PUMPING PLANT #2
RD 1000

EXISTING INDUSTRIAL

0 2500' 5000'
SCALE: 1" = 5000'

L E G E N D

- Sutter Pointe Specific Plan Area
- RD 1000 Drain
- Swainson's Hawk Impact Zone Within Sutter County Portion of the Natomas Basin
- Existing Development Within or Adjacent to Specific Plan
- Existing FEMA 100-Year Floodplain
- Existing FEMA 100-Year Floodplain From Sankey Gap

Sources:

1. USGS 7.5 Minute Series (Topographic Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
2. FEMA FIRM Community Panel Numbers 060394 0305D, 060394 0265D, 060262 0035E, 060262 0055E (All Revised July 6, 1998).
3. RD 1000 map prepared by Mead & Hunt, April 6, 2005.

SUTTER POINTE

MEASURE "M" GROUP

Figure 3
Existing Conditions

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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PUMPING PLANT #4
RD 1000

RECLAMATION
PLATFORM
PUMPING PLANT #2
RD 1000

SACRAMENTO RIVER

RIO JESUS MARIA

SUTTER COUNTY

SACRAMENTO COUNTY

PLACER CO

0 2000' 4000'

SCALE: 1" = 4000'

L E G E N D

- Sutter Pointe Specific Plan Area
- RD 1000 Drain
- RD 1000 Subdrain

Sources:

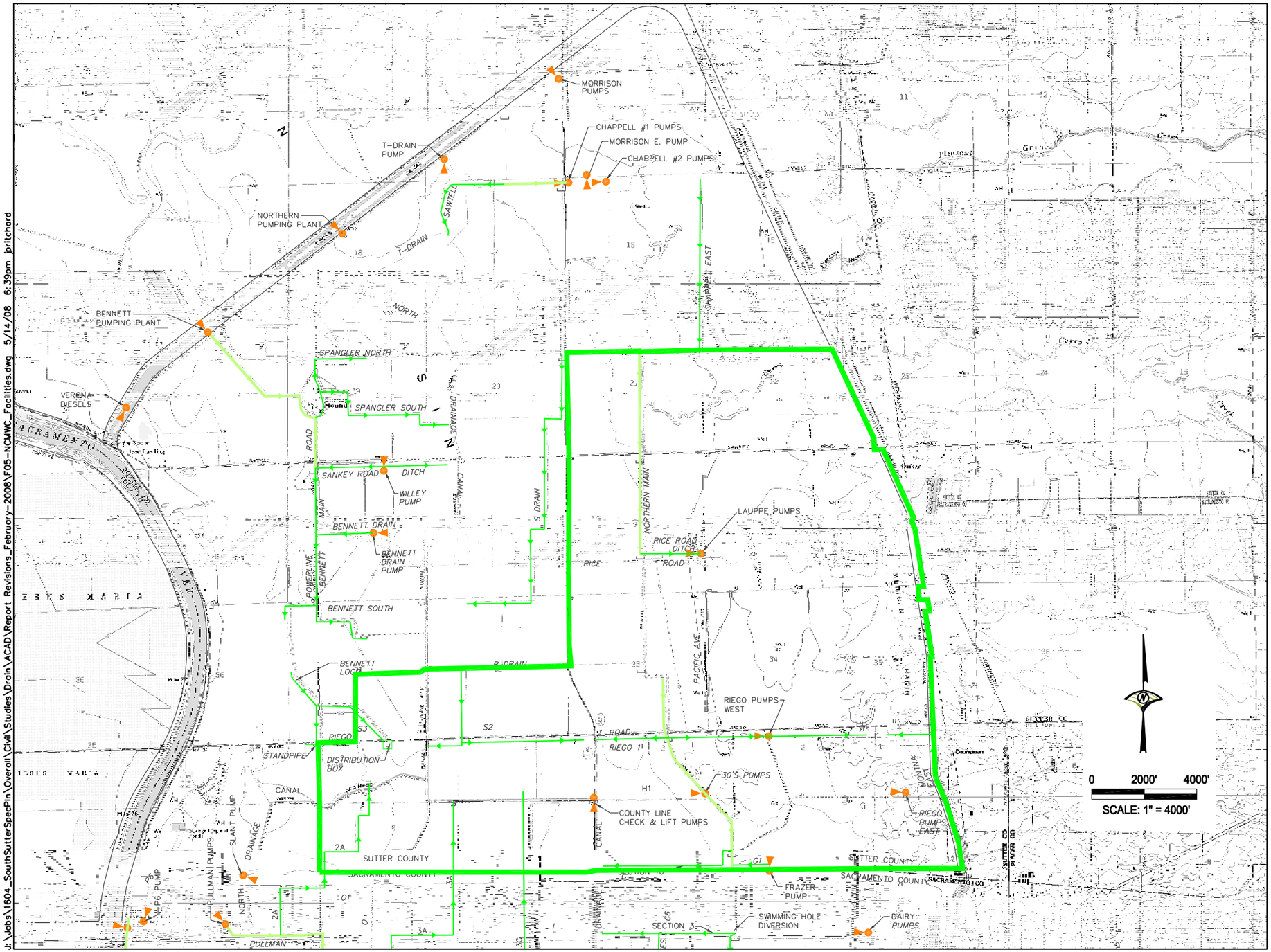
1. USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
2. RD 1000 map prepared by Mead & Hunt, April 6, 2005.

SUTTER POINTE

MEASURE "M" GROUP

Figure 4
RD1000 Facilities

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- NCMWC High Line Ditch
- NCMWC Lateral
- NCMWC Pump Station

Note:

NCMWC is Natomas Central Mutual Water Company.

Sources:

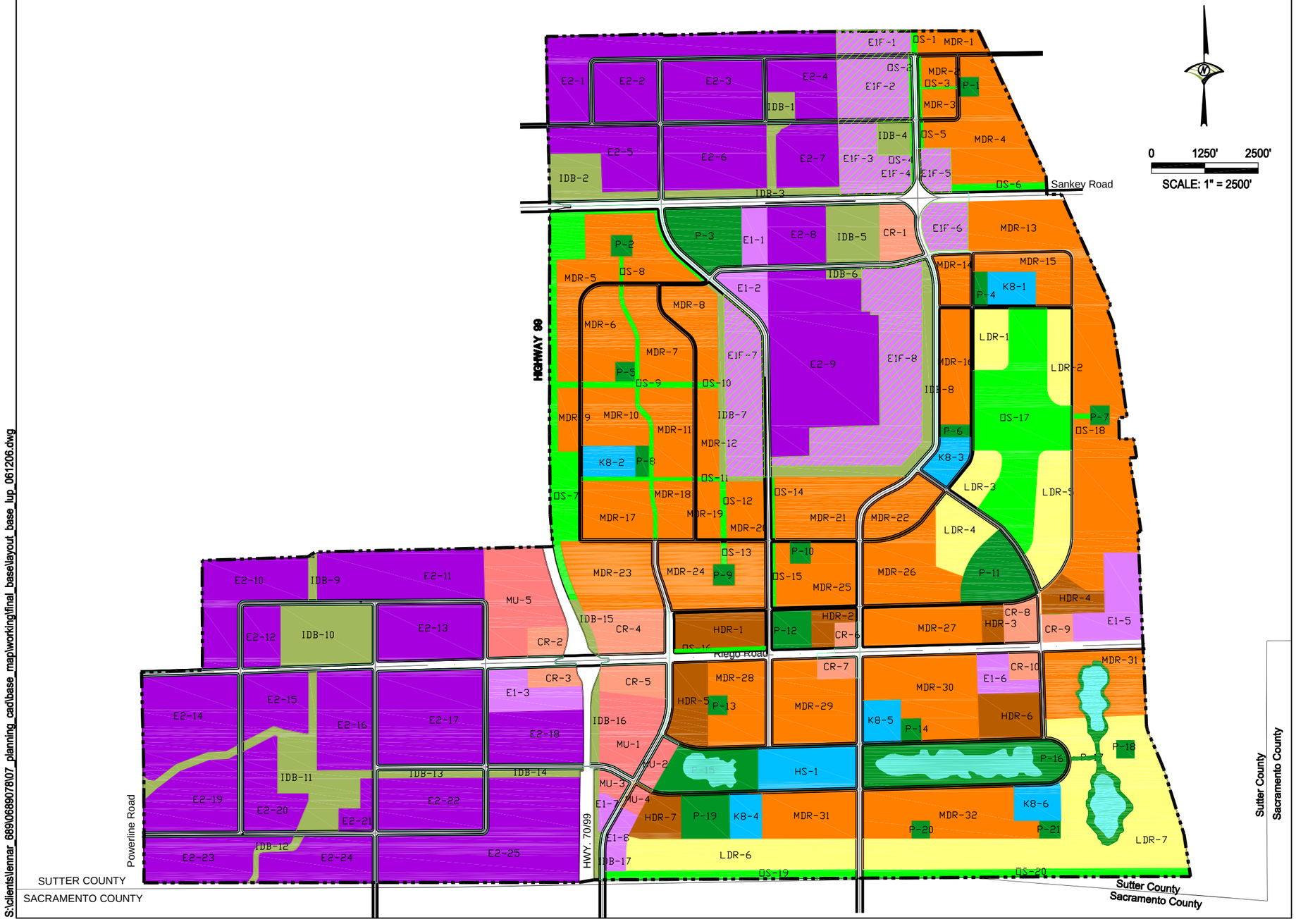
1. USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
2. "South Sutter County Specific Plan Area - Drainage Master Plan," Borcalli & Associates, Inc., October 2001.

SUTTER POINTE

MEASURE "M" GROUP

Figure 5
NCMWC Facilities

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

LAND USE DESIGNATIONS

SYMBOL	LAND USE CATEGORY
LDR	Low Density Residential
MDR	Medium Density Residential
HDR	High Density Residential
E1	Employment 1
E1F	E1 Interim Flood Zone
E2	Employment 2
CR	Commercial Retail
IDB	Industrial Drainage Basin
MU	Mixed Use
POS	Parks & Open Space
NP	Neighborhood Parks
K-8	K-8 School
HS	High School
— · —	SPECIFIC PLAN BOUNDARY

Source:

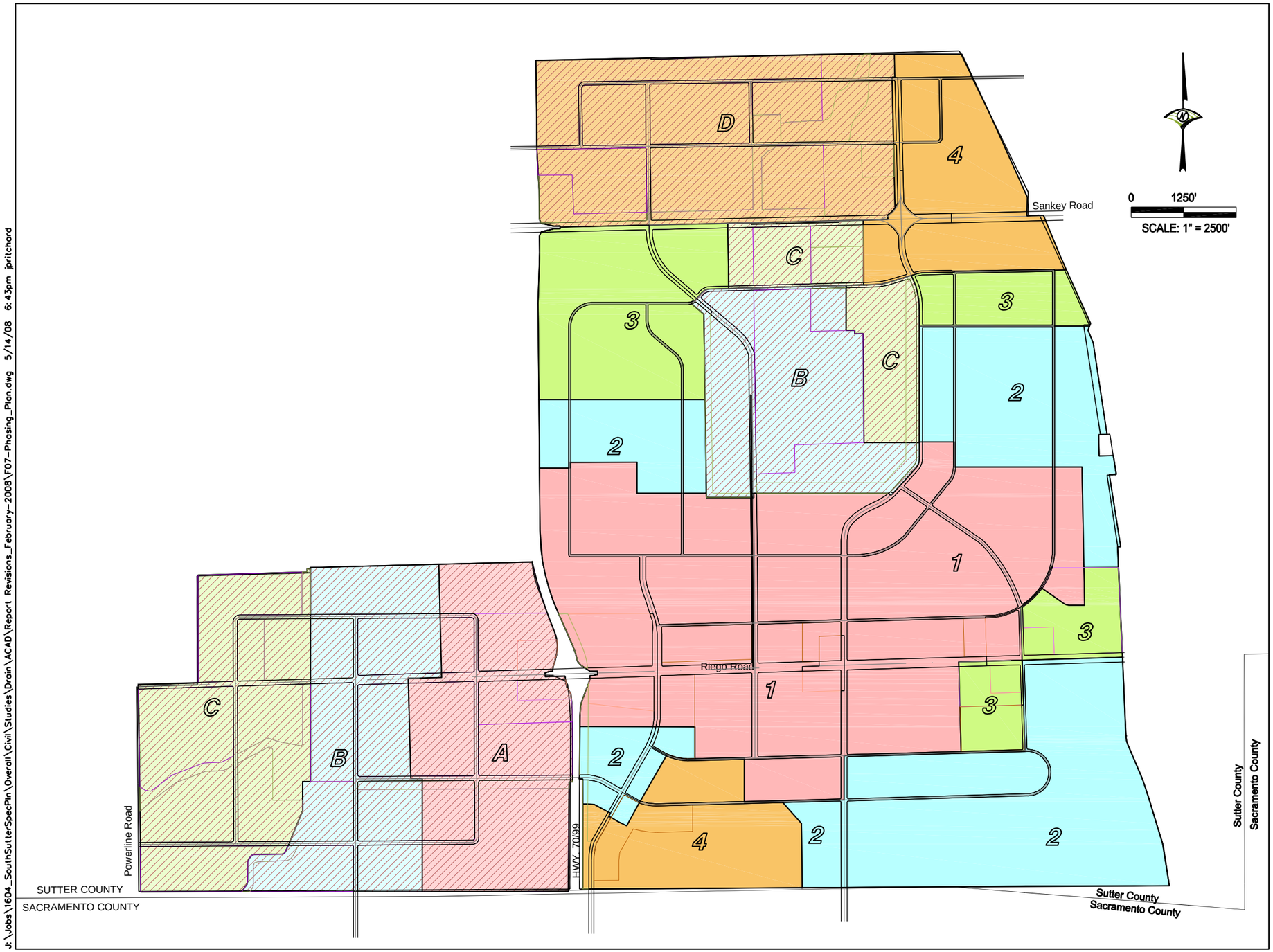
Land Use base map information provided by EDAW, February 2008.

SUTTER POINTE

MEASURE "M" GROUP

Figure 6
Land Use Plan

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Phase 1
- Phase A
- Phase 2
- Phase B
- Phase 3
- Phase C
- Phase 4
- Phase D
- Sutter Pointe Specific Plan Area

Source:

Land Use phasing map information provided by MacKay & Somps, March 2008.

SUTTER POINTE

MEASURE "M" GROUP

Figure 7
Phasing Plan

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

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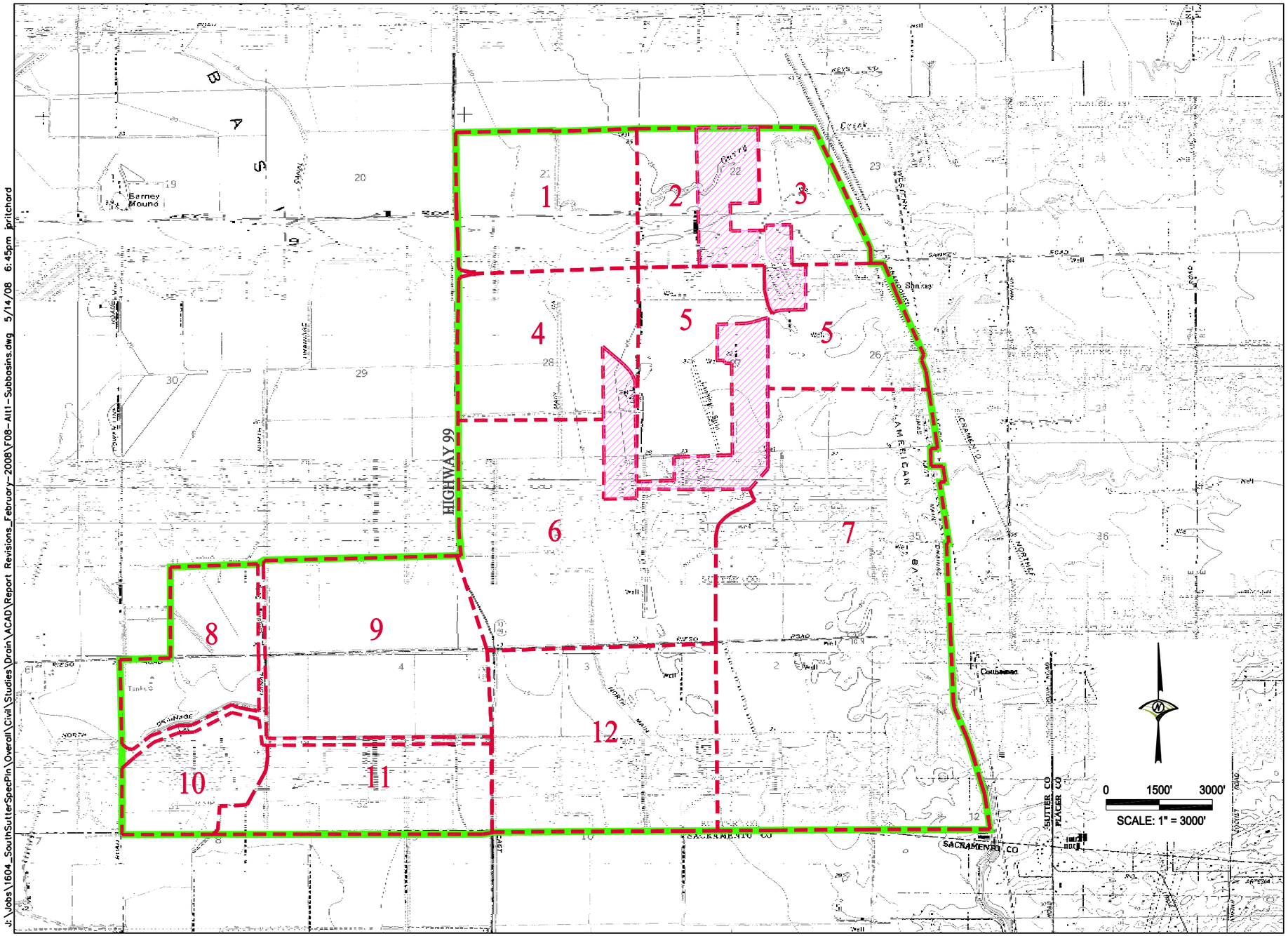


L E G E N D

- Sutter Pointe Specific Plan Area
- Subbasin Boundary
- Detention Storage for Sankey Spill
- 1 — Subbasin Number

Source:

USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).

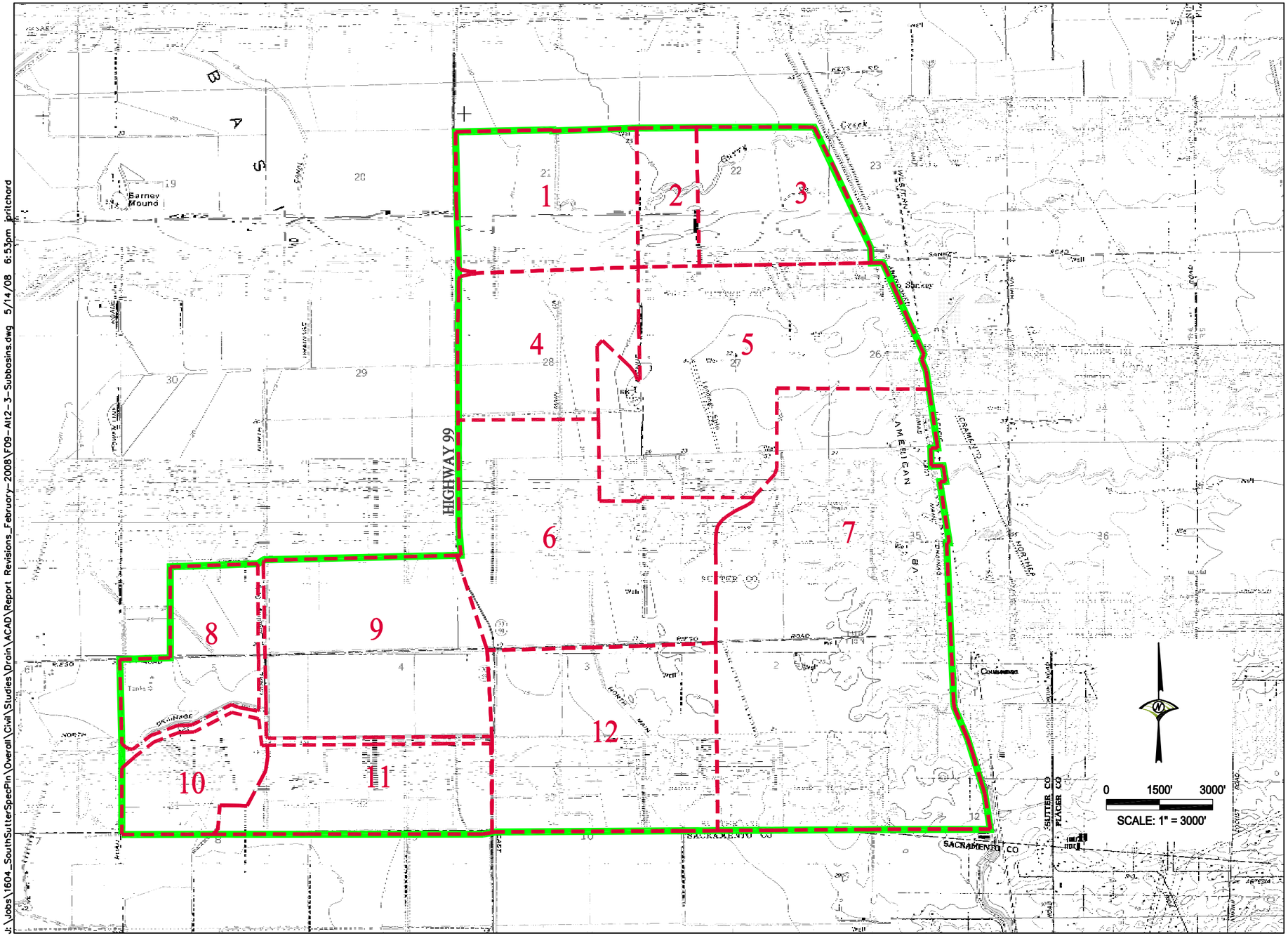
Figure 8

Subbasin Map - Alternative 1
Sankey Spill Mitigated On-Site

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- Subbasin Boundary
- 1 — Subbasin Number

Source:

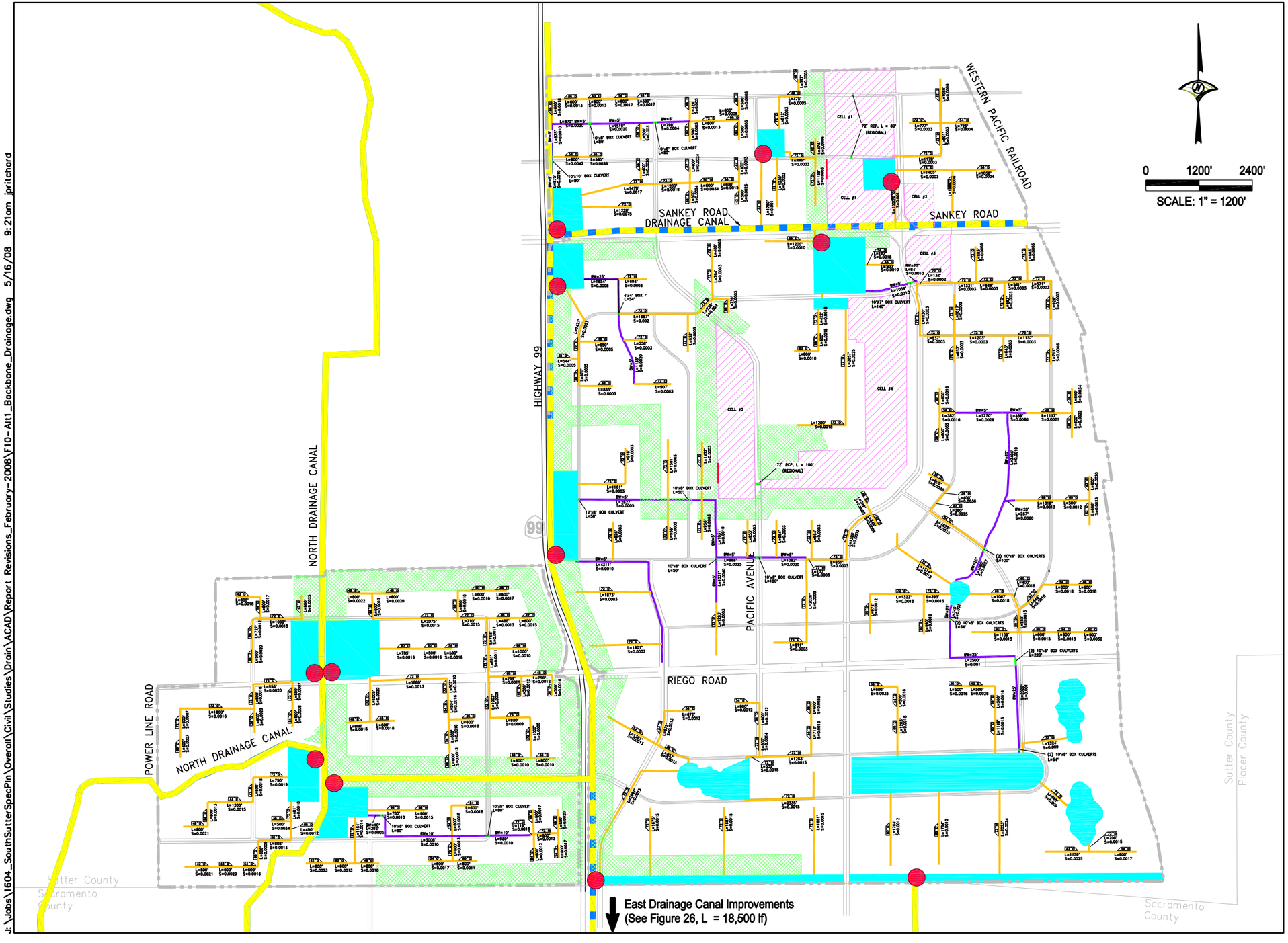
USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).

Figure 9
Subbasin Map - Alternatives 2 & 3
Sankey Spill Mitigated Off-Site

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Improved RD 1000 Facility (Regional)
- RD 1000 Facility (Unimproved)
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Emergency Spillway
- Proposed Culvert
- Proposed Detention Basin for Sankey Spill (Regional)
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Raised Shed Boundary and Shed Grading

Source:

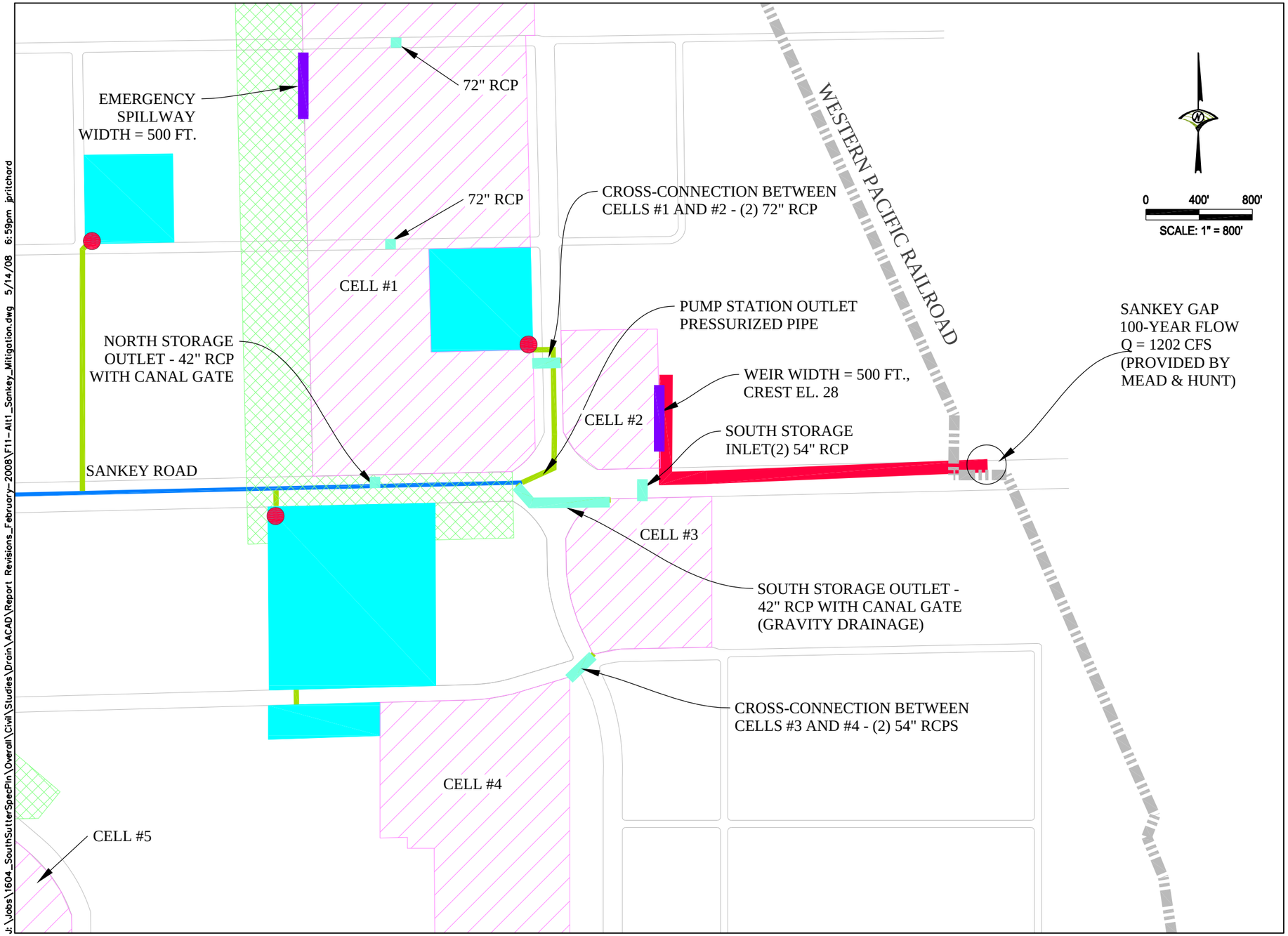
Land Use base map information provided by EDAW, February 2008.

Figure 10
Alternative 1
Conceptual Drainage Plan

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- RD 1000 Facility
- Proposed Sankey Interceptor Channel
- Pump Station Outlet Pipe
- Proposed Weir
- Proposed Culvert Crossing
- Proposed Detention Basin for Sankey Spill (Regional)
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW, February 2008.

Figure 11

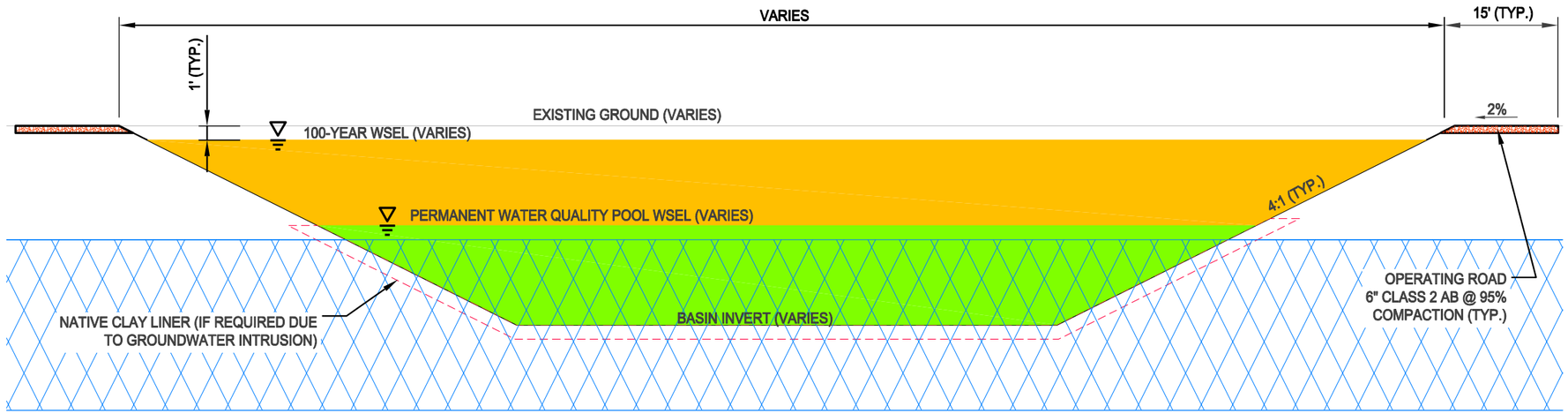
Alternative 1

On-Site Sankey Spill Mitigation

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



WET BASIN - TYPICAL SECTION

N.T.S.

DRY BASIN - TYPICAL SECTION

N.T.S.

L E G E N D

- Flood Control Volume, 5-7.5 Feet Depth Below Existing Grade (Includes 1-Foot Of Freeboard)
- Water Quality Pool, 5-20 Feet Below Existing Grade
- Typical Groundwater Depth, 8-20 Feet Below Existing Grade

Note: Sideslopes may vary 2:1 to 5:1 due to final joint use/design considerations for specific basins.

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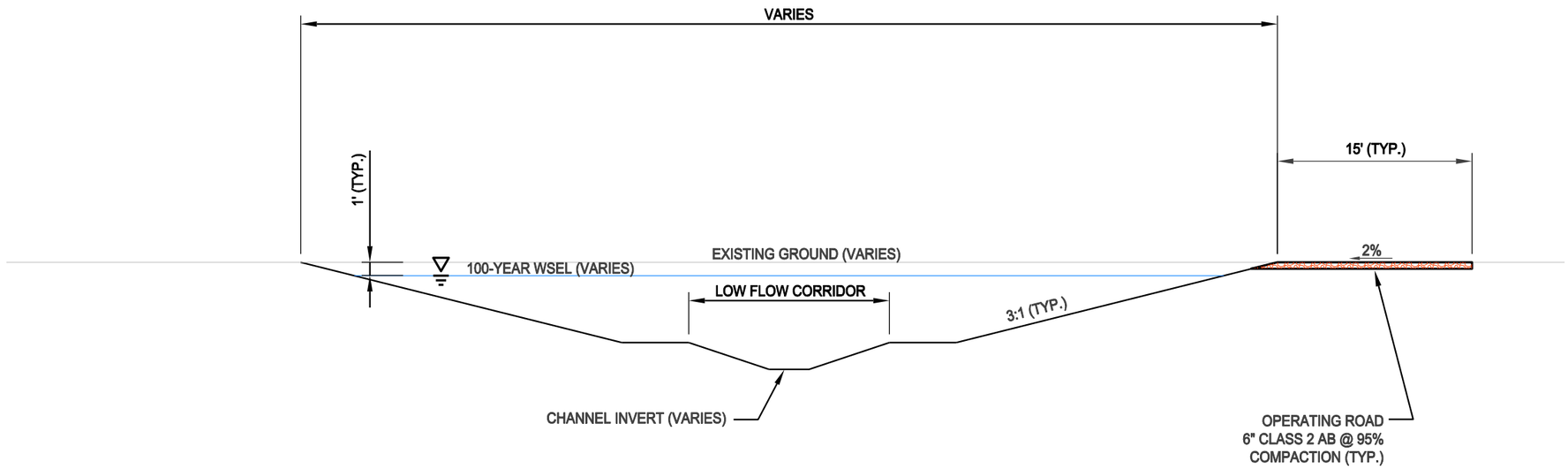
SUTTER POINTE

MEASURE "M" GROUP

Figure 12
Typical Section - On-Site Detention

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



NOTE: 6' HIGH CHAINLINK FENCE SHALL BE PLACED ON BOTH SIDES OF CHANNEL (TYP.)

TYPICAL SECTION

N.T.S.

L E G E N D

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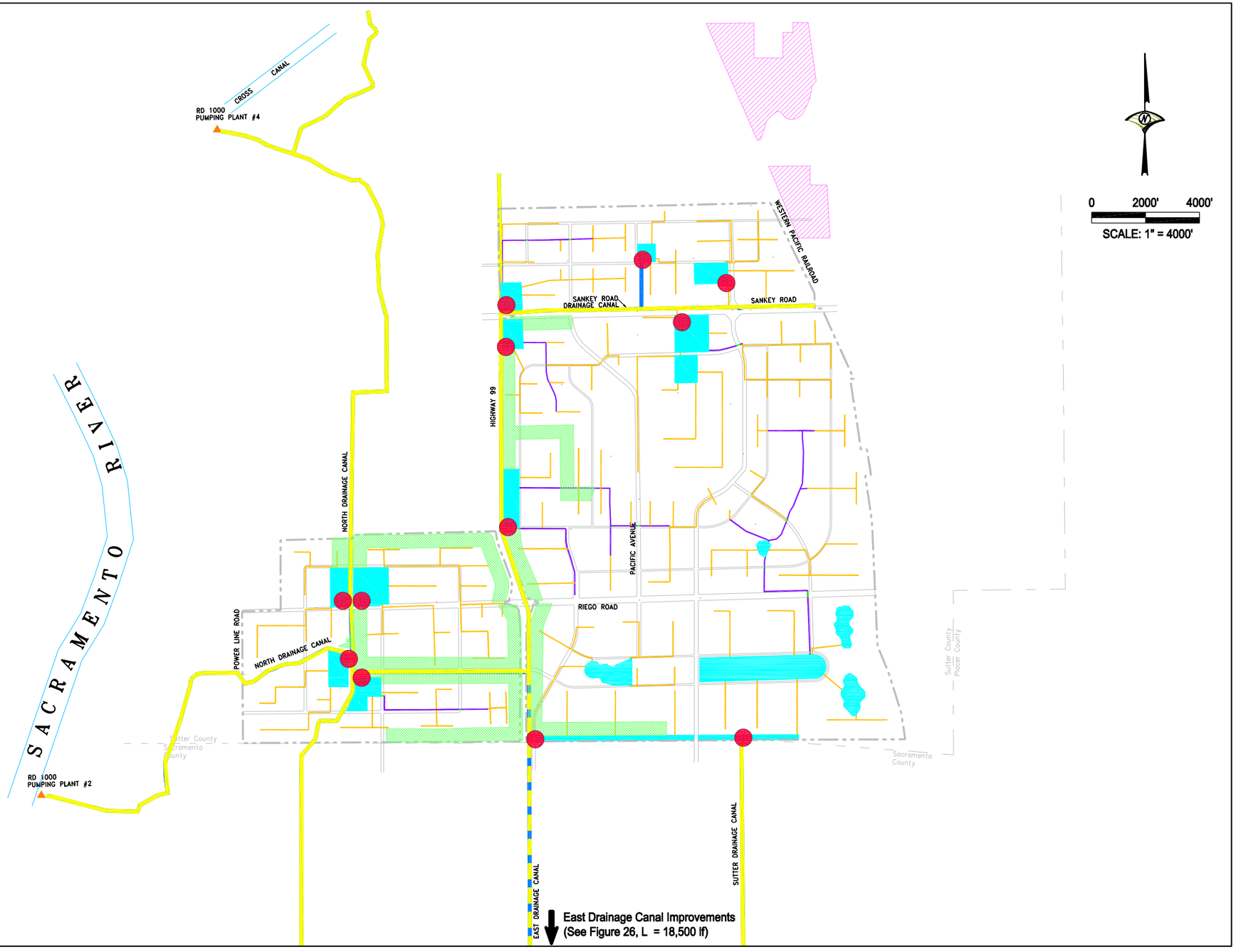
SUTTER POINTE

MEASURE "M" GROUP

Figure 13
Typical Section - Open Channel

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Detention Basins for Sankey Spill (Regional)
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW, February 2008.

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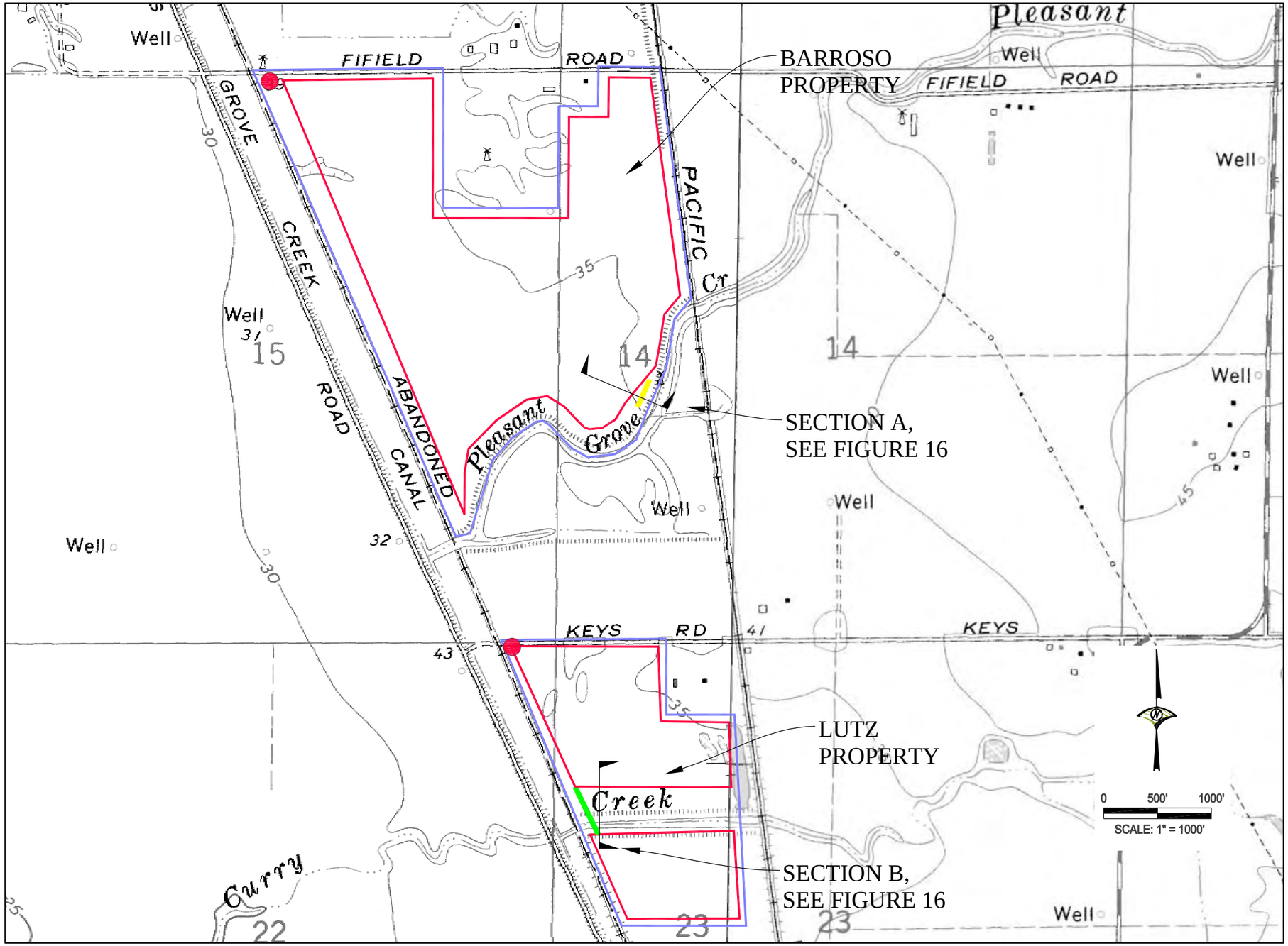
Figure 14
Alternative 2
Conceptual Drainage Plan

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Approximate Property Boundary
- Proposed Detention Basin
- Proposed Low-Flow Siphon
- Proposed Weir (To Mimic Sankey Spill Hydraulics)
- Proposed Dewatering Pump Station

Source:

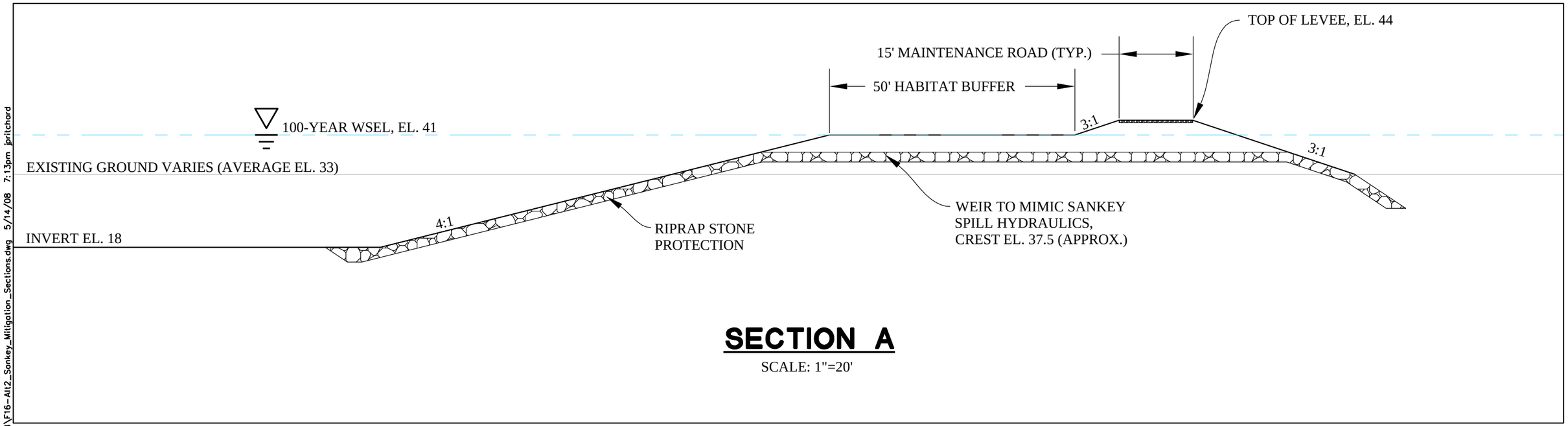
USGS 7.5 Minute Series (Topographic) Quadrangle Mapping. Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).

Figure 15
Alternative 2
Off-Site Sankey Spill Mitigation

SUTTER POINTE

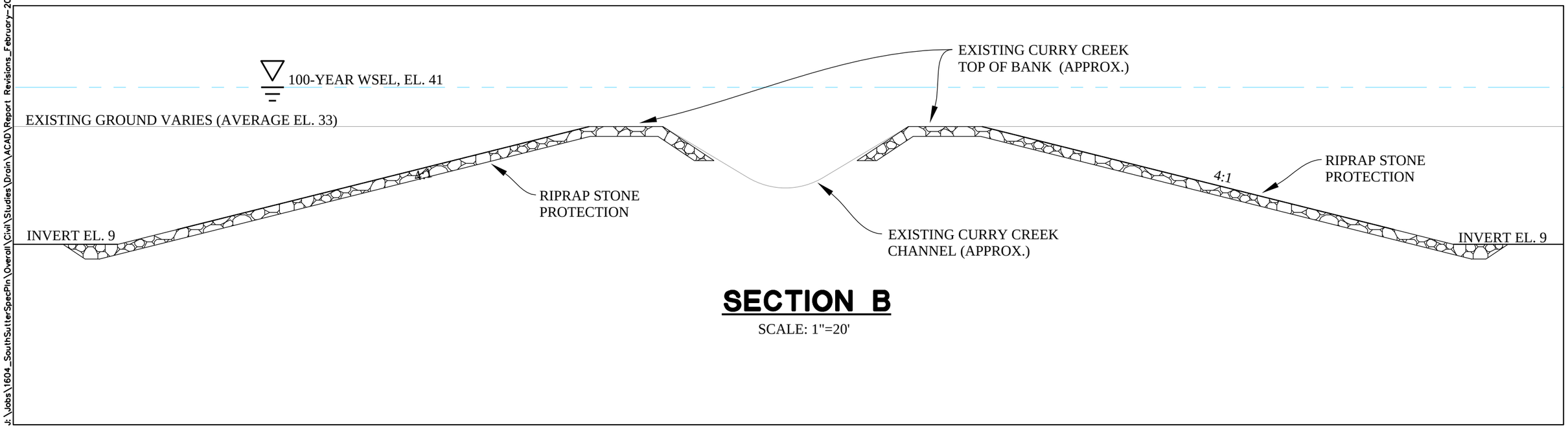
MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



SECTION A

SCALE: 1"=20'



SECTION B

SCALE: 1"=20'

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Figure 16

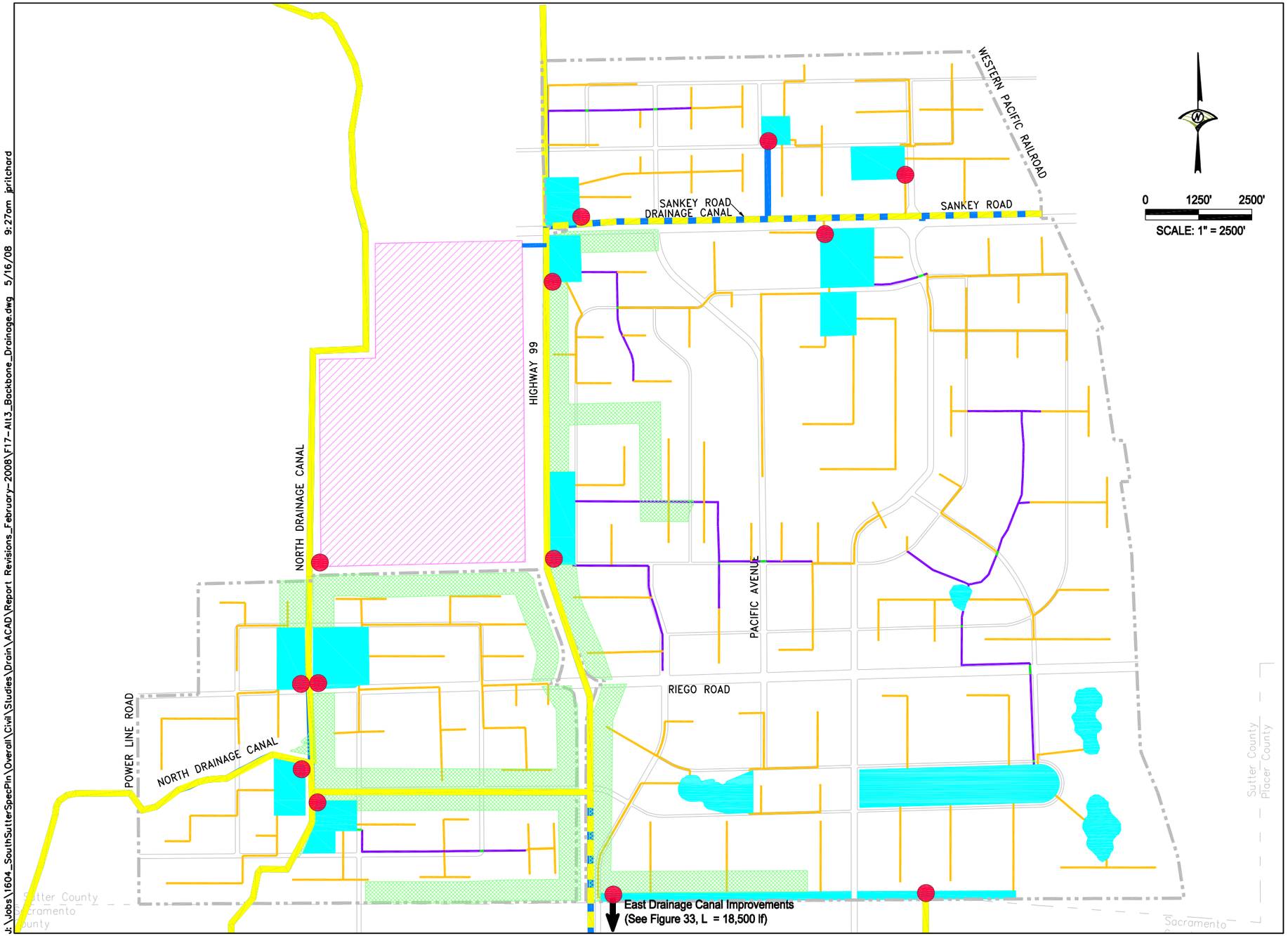
Alternative 2

Off-Site Sankey Spill Mitigation - Sections

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Detention Basin for Sankey Spill (Regional)
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW, February 2008.

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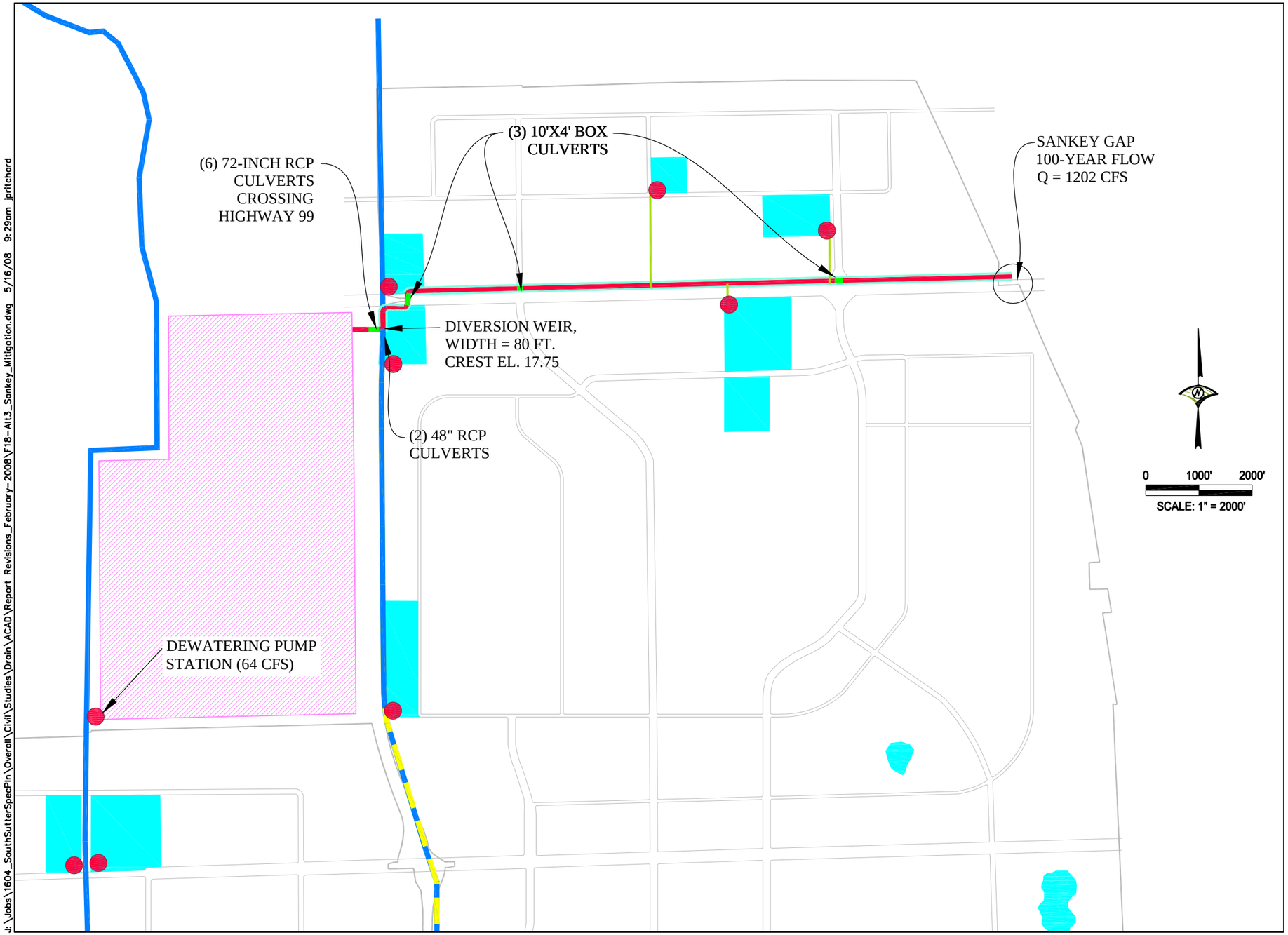
Figure 17
Alternative 3
Conceptual Drainage Plan

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- RD 1000 Facility
- Improved RD 1000 Facility
- Proposed Sankey Interceptor Channel
- Levee
- Pump Station Outlet Pipe
- Proposed Culvert Crossing
- Proposed Detention Basin for Sankey Spill (Regional)
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station

Source:

Land Use base map information provided by EDAW, February 2008.

Figure 18

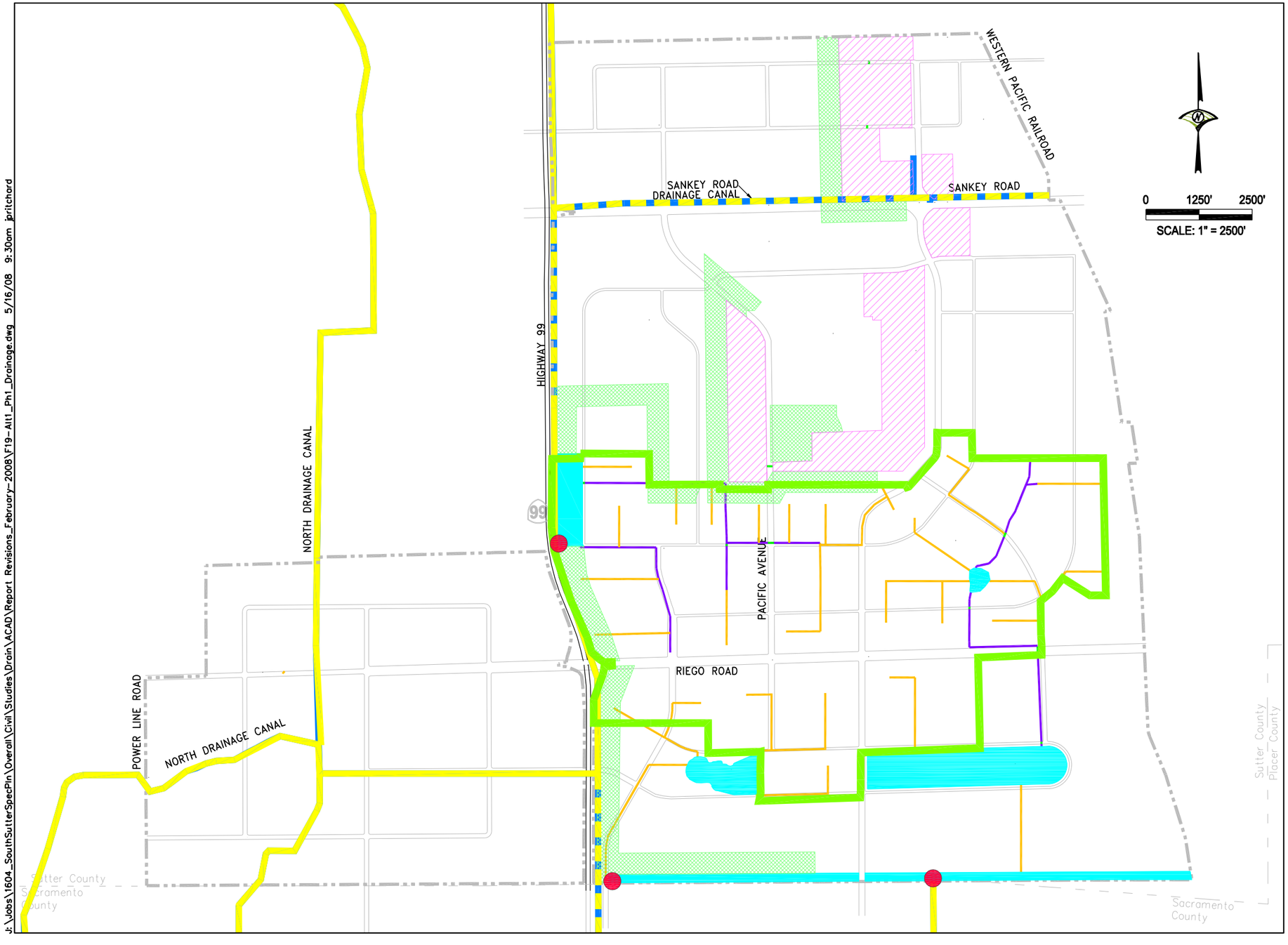
Alternative 3

On-Site Sankey Spill Mitigation

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- Phase 1 Development Area
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

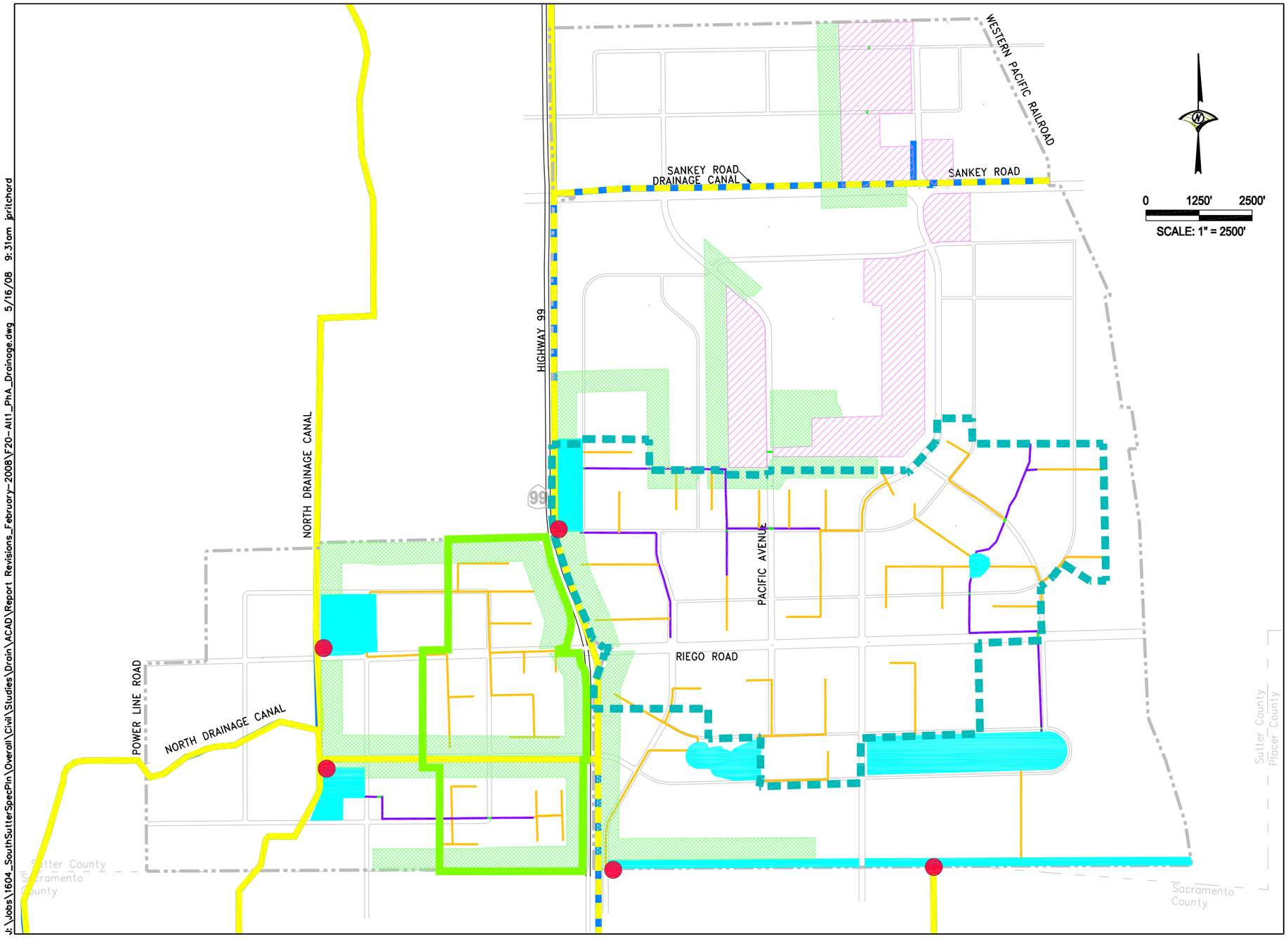
Land Use base map information provided by EDAW.

Figure 19
Alternative 1
Conceptual Drainage Plan - Phase 1

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Phase A Development Area
- Areas Developed in Prior Phases
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW.

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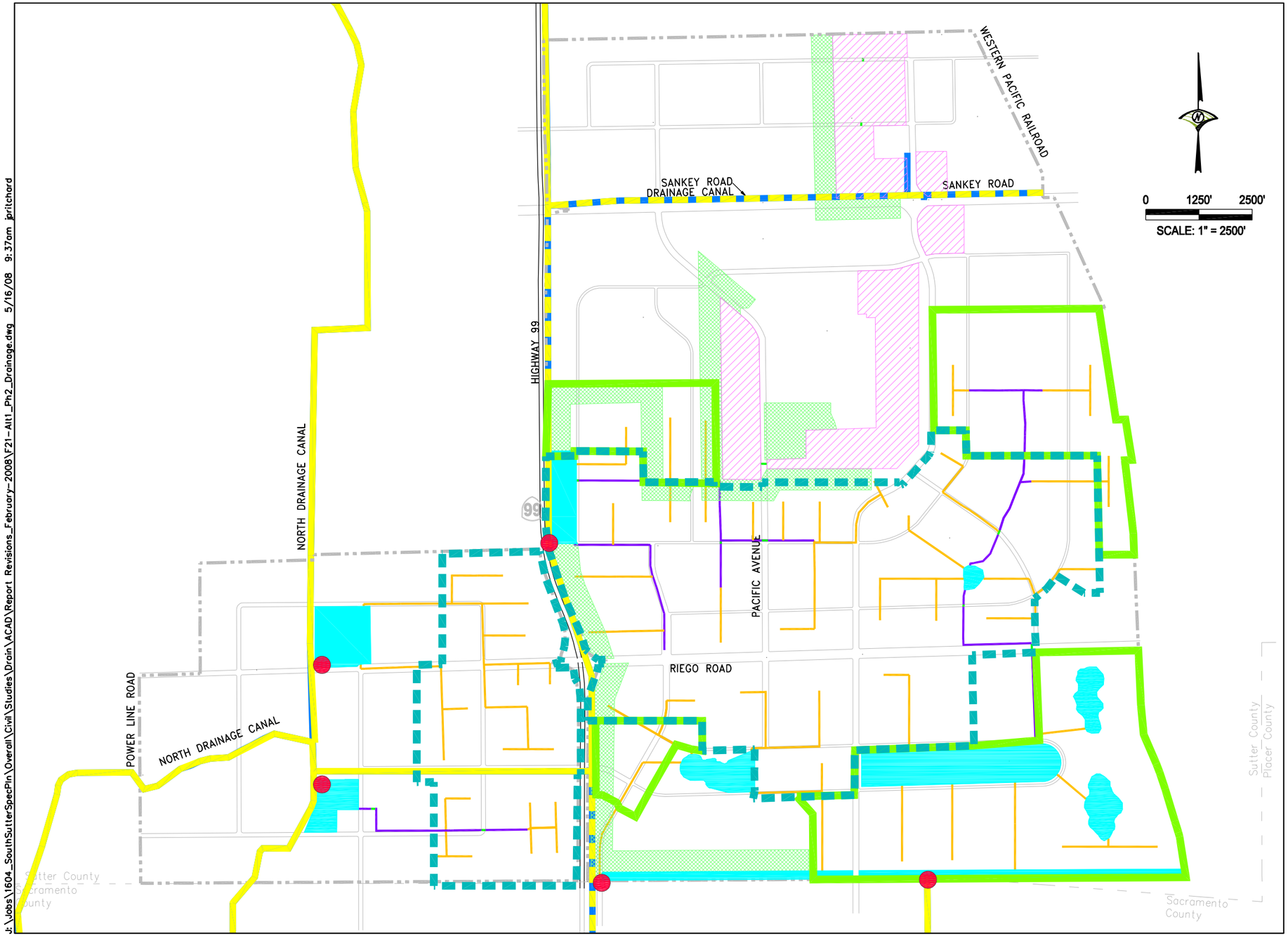
Figure 20
Alternative 1
Conceptual Drainage Plan - Phase A

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- Phase 2 Development Area
- Areas Developed in Prior Phases
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW.

Figure 21

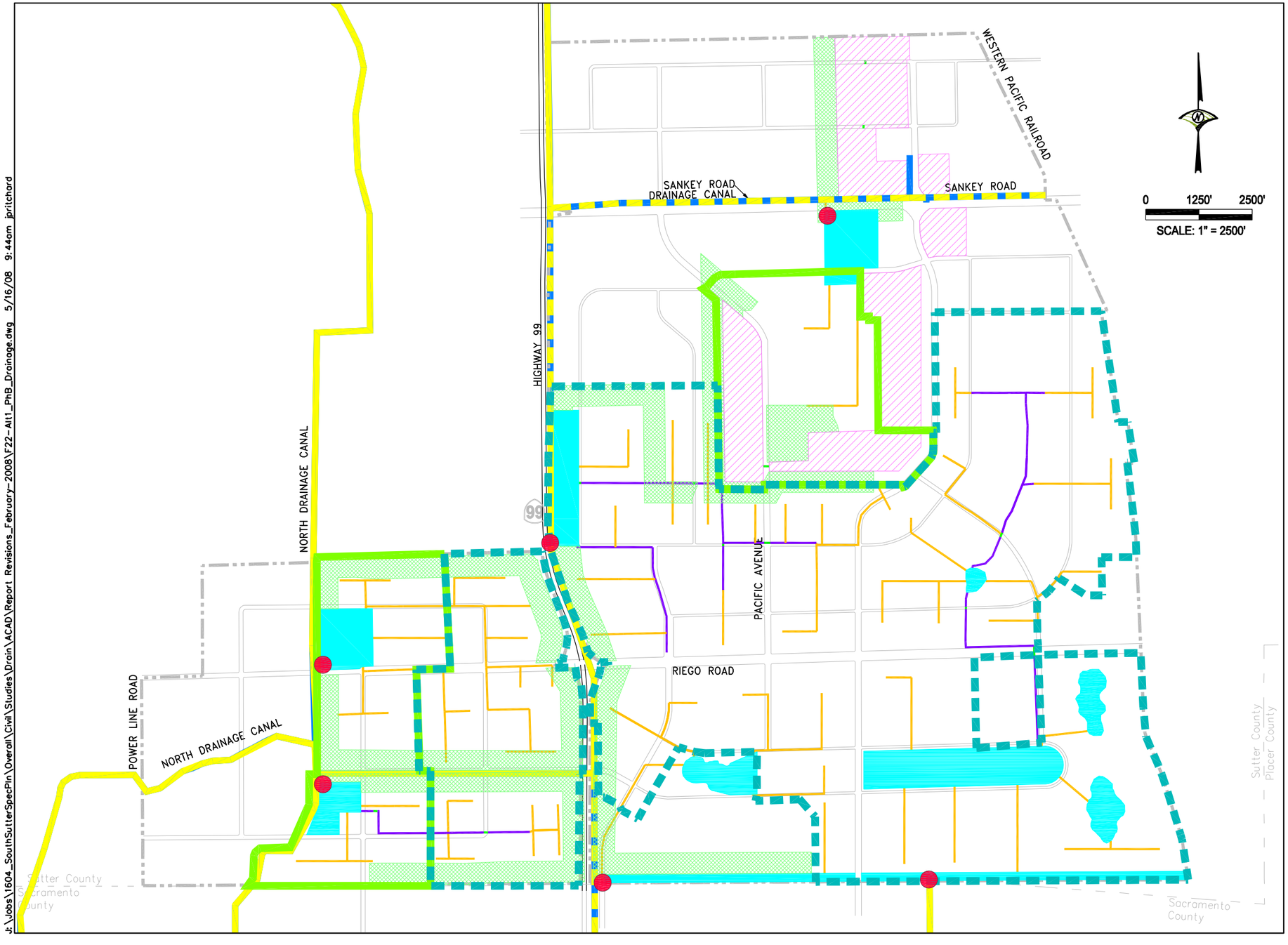
Alternative 1

Conceptual Drainage Plan - Phase 2

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



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L E G E N D

- Sutter Pointe Specific Plan Area
- Phase B Development Area
- Areas Developed in Prior Phases
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

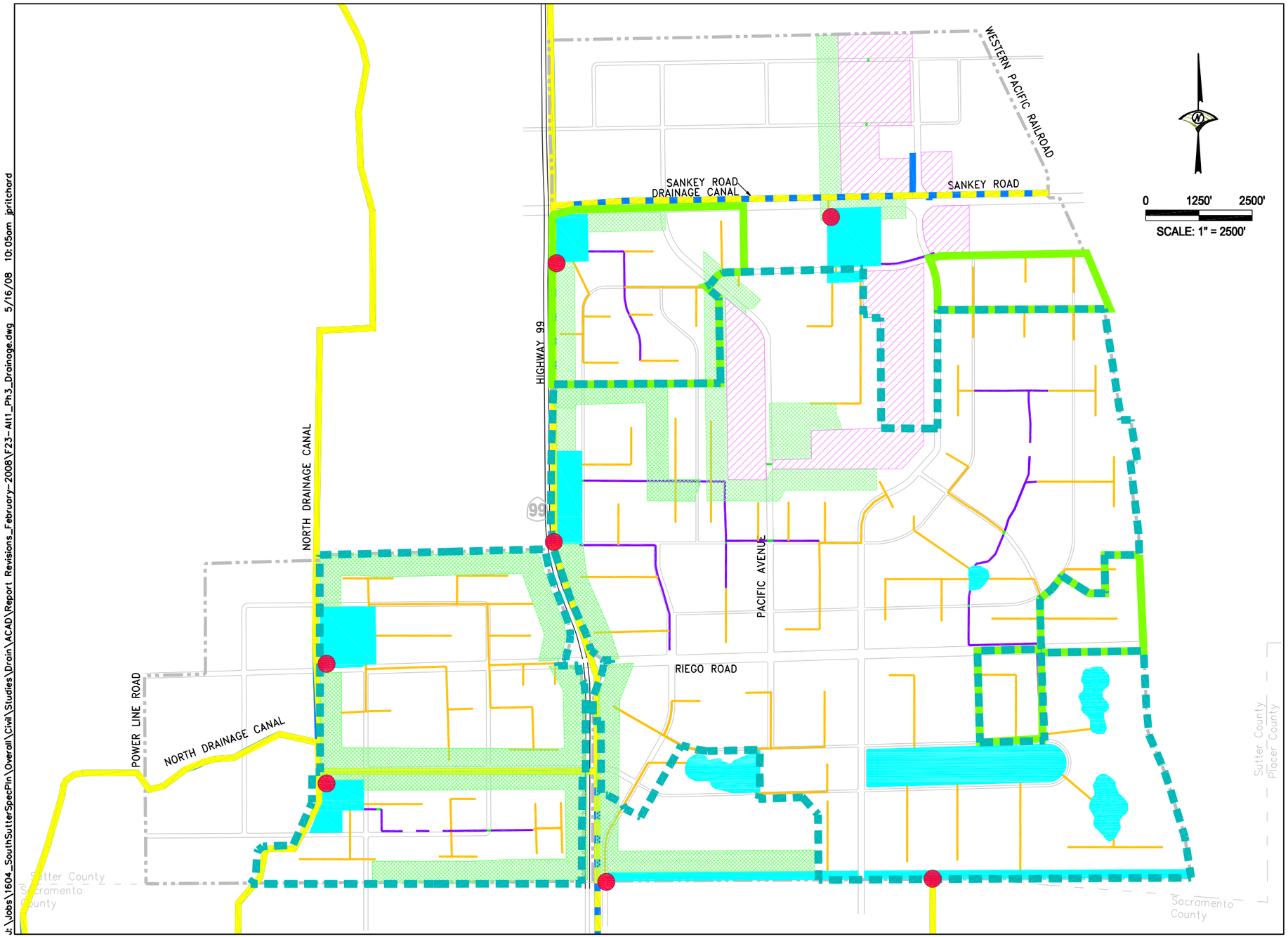
Land Use base map information provided by EDAW.

Figure 22
Alternative 1
Conceptual Drainage Plan - Phase B

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Phase 3 Development Area
- Areas Developed in Prior Phases
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW.

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\F23-Alt1_Ph3_Drainage.dwg 5/16/08 10:05am jpritchard

Figure 23

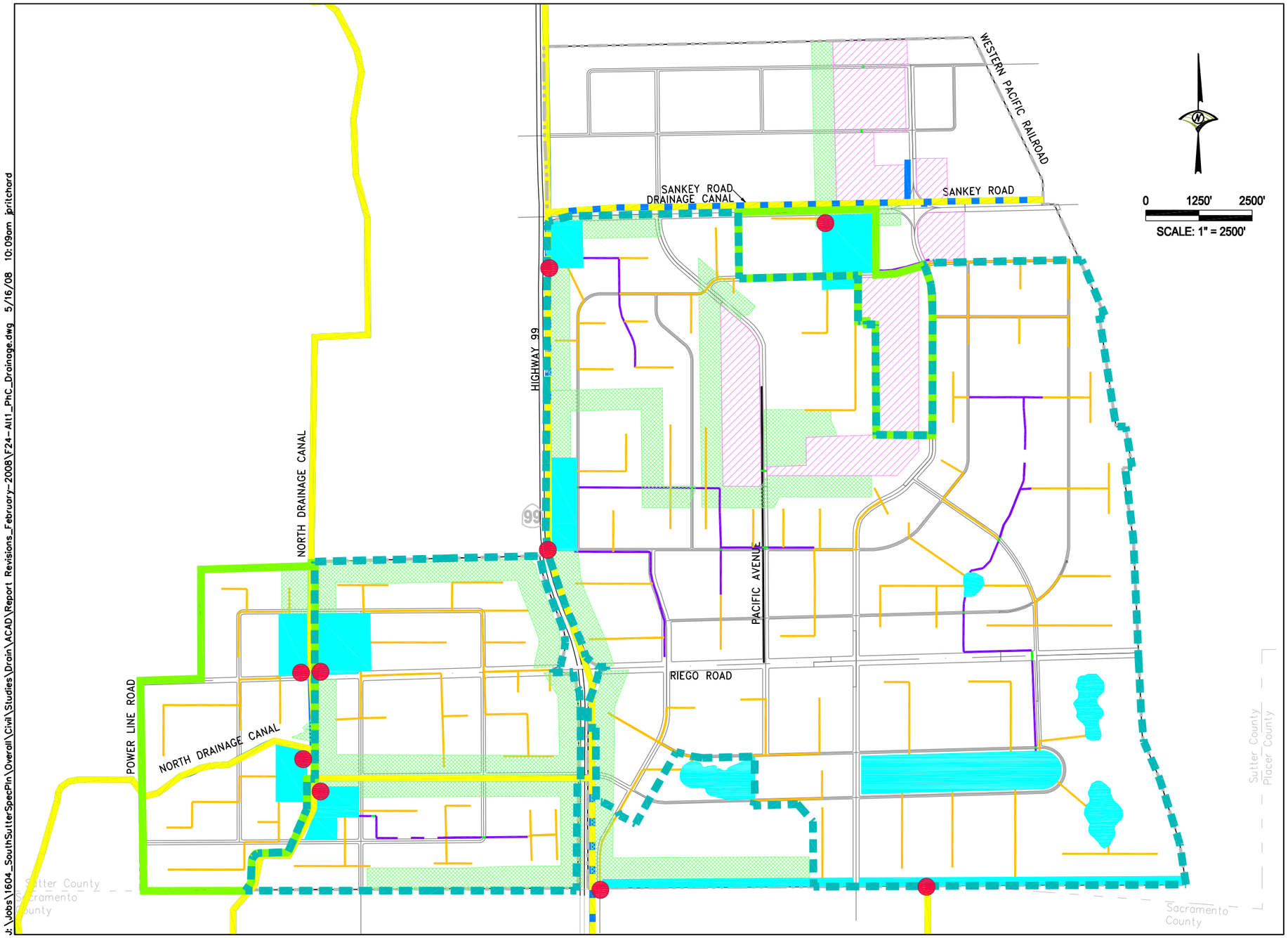
Alternative 1

Conceptual Drainage Plan - Phase 3

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\F24-Alt1_PhC_Drainage.dwg 5/16/08 10:09am jpritchard

L E G E N D

- Sutter Pointe Specific Plan Area
- Phase C Development Area
- Areas Developed in Prior Phases
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

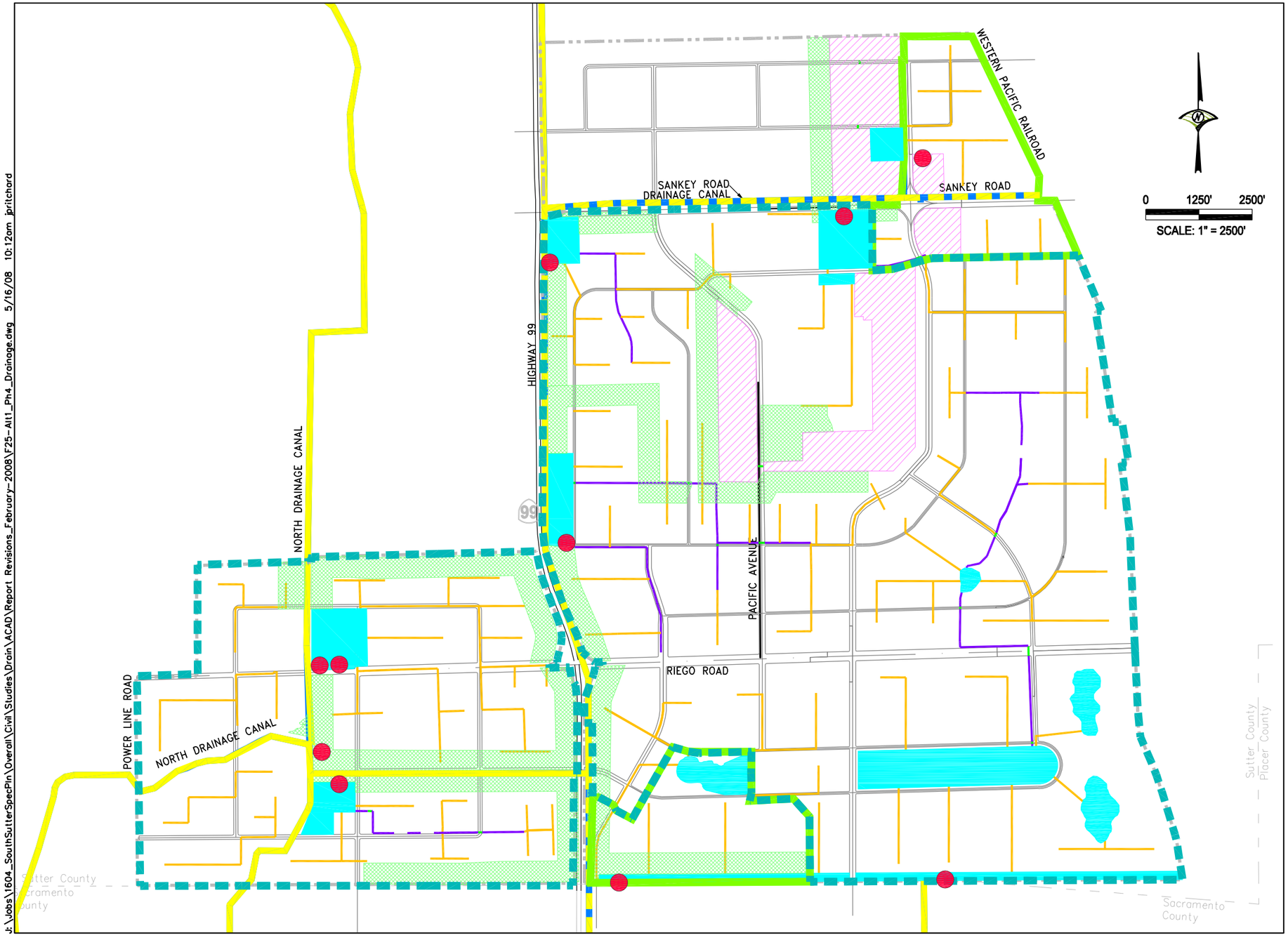
Land Use base map information provided by EDAW.

Figure 24
Alternative 1
Conceptual Drainage Plan - Phase C

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Phase 4 Development Area
- Areas Developed in Prior Phases
- Improved RD 1000 Facility
- RD 1000 Facility
- Regional Drainage Facility
- Proposed Storm Drain
- Proposed Open Channel Corridor
- Proposed Crossing
- Proposed Regional Detention Basin for Sankey Spill
- Proposed Detention Basin for Local Drainage
- Proposed Pump Station
- Areas Requiring Fill to Provide Protection From Off-Site 100-Year Floodplain

Source:

Land Use base map information provided by EDAW.

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\F25-Alt1_Ph4_Drainage.dwg 5/16/08 10:12am jpritchard

Figure 25

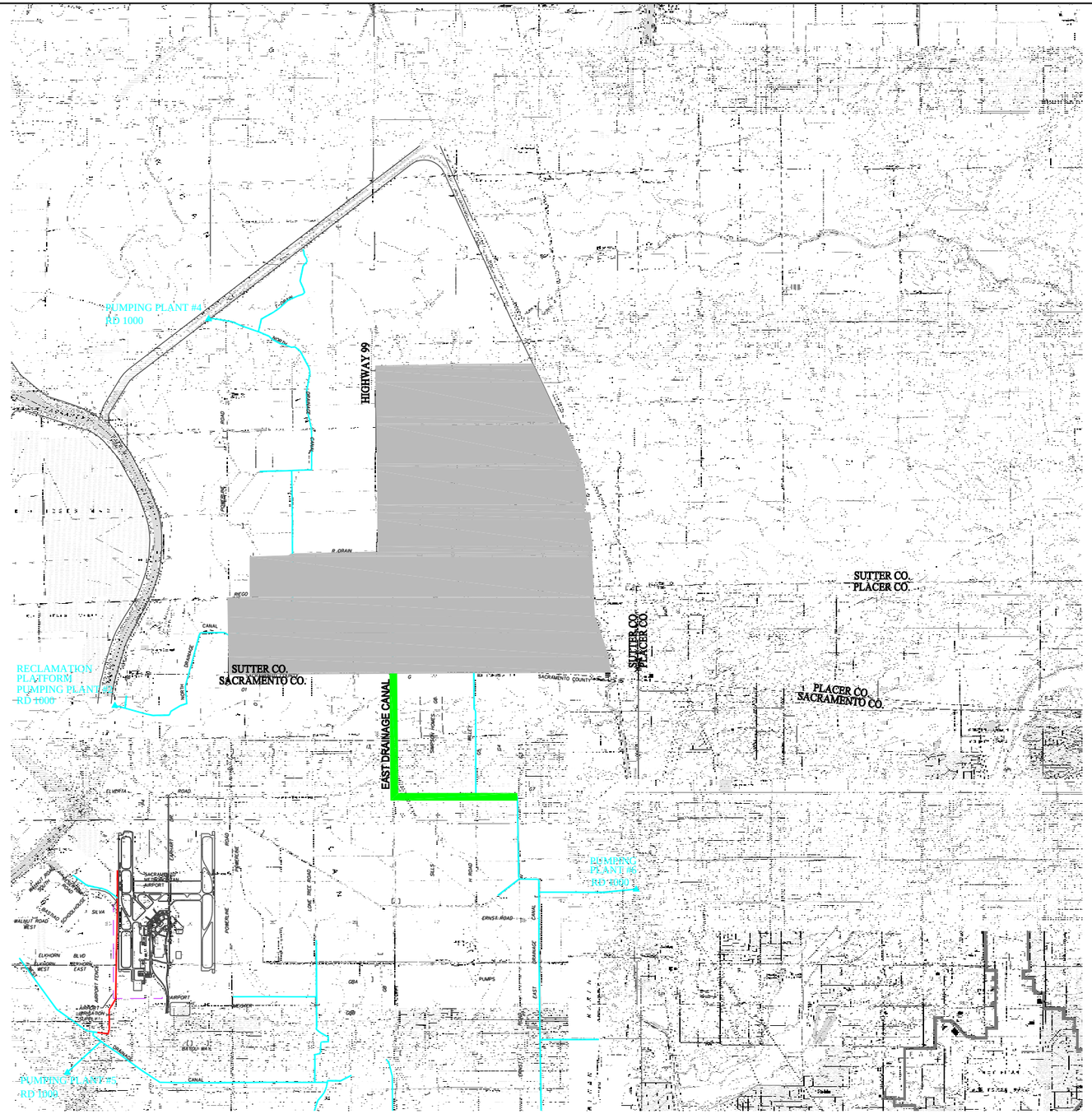
Alternative 1

Conceptual Drainage Plan - Phase 4

SUTTER POINTE

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

- Sutter Pointe Specific Plan Area
- Existing RD 1000 Drain
- Proposed Channel Improvement

Source:

USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\F26-Ext_Backbone_Drainage.dwg 5/14/08 7:31pm jpritchard

SUTTER POINTE

MEASURE "M" GROUP

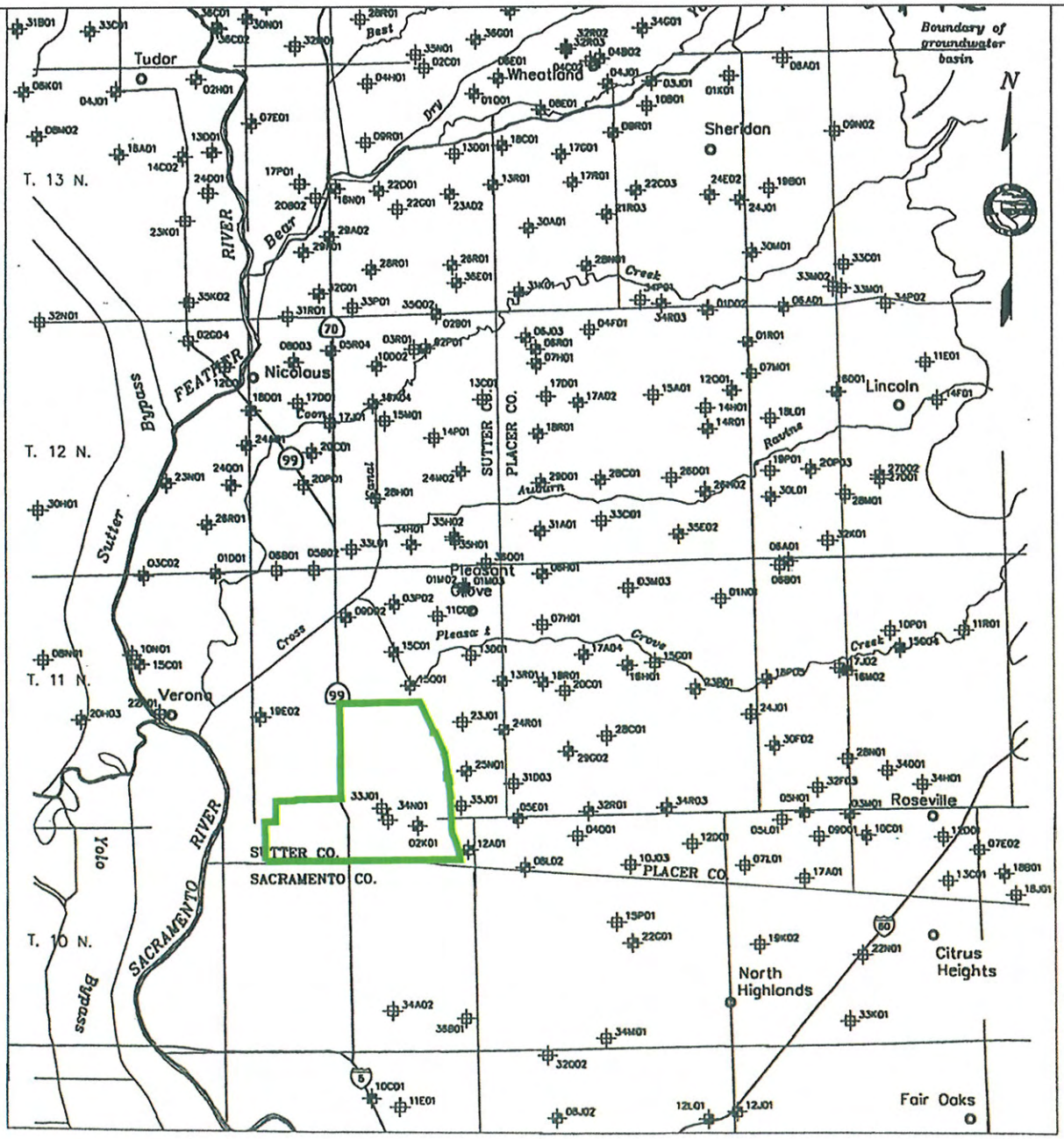
Figure 26

Off-Site Drainage Improvements

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

APPENDIX A1

Groundwater Elevation Contours Reported by DWR
Spring 1950 Through Spring 1992



L E G E N D

Sutter Pointe Specific Plan Area

32R01 — Location of groundwater level monitoring well, showing section, tract and sequence number of the State Well Number. Combine with township and range to determine entire State Well Number.

0 2 4

SCALE: 1" = 4 MILES

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure22.dwg 4/10/08 1:19pm jbuchanan

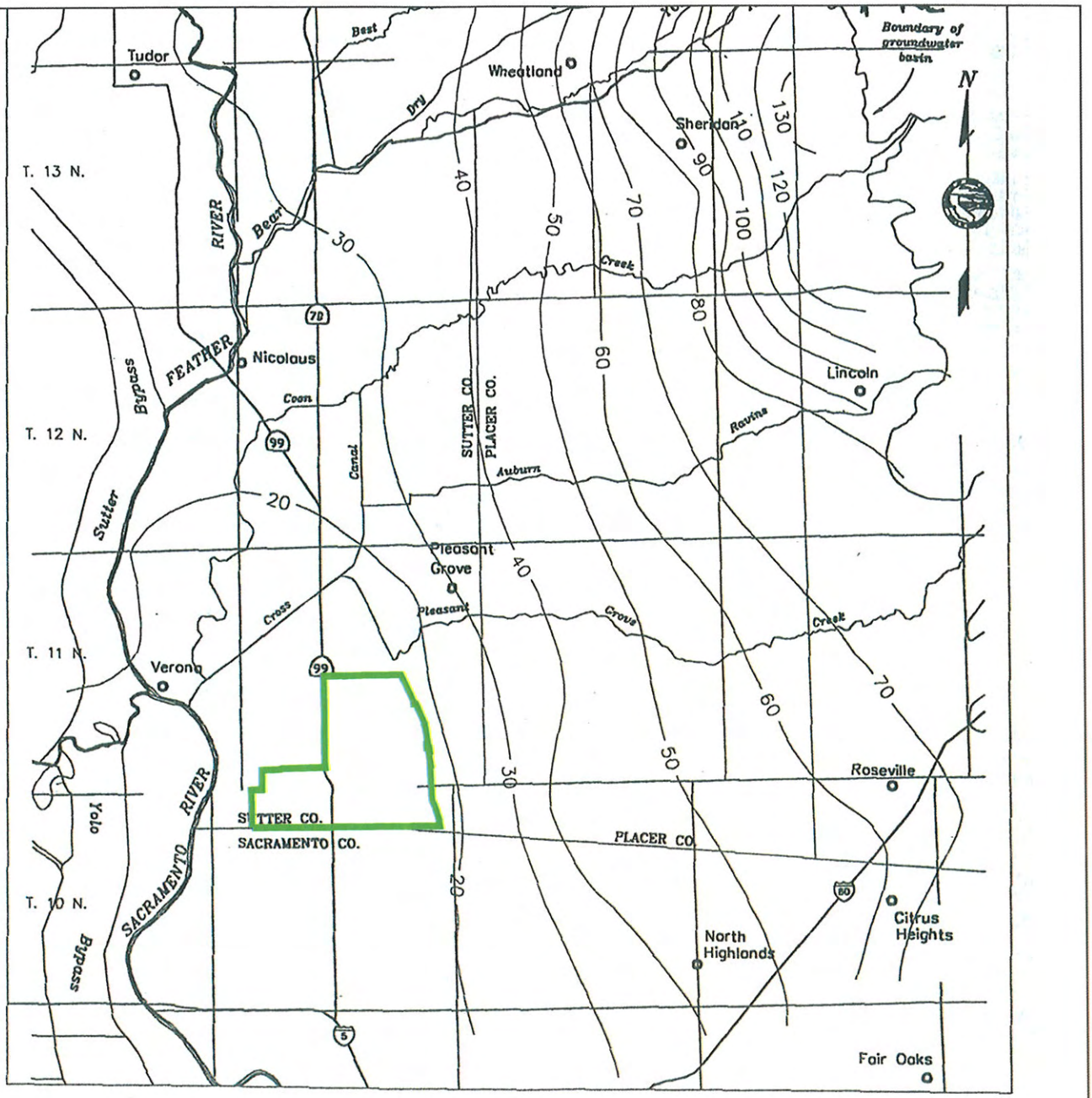
Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 53, Figure 22.

SUTTER POINTE

MEASURE "M" GROUP

Location of Groundwater Level Monitoring Wells

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

10 Line of equal elevation of water surface in wells, feet. Contour interval 10 feet.

0 2 4

SCALE: 1" = 4 MILES

Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 56, Figure 23.

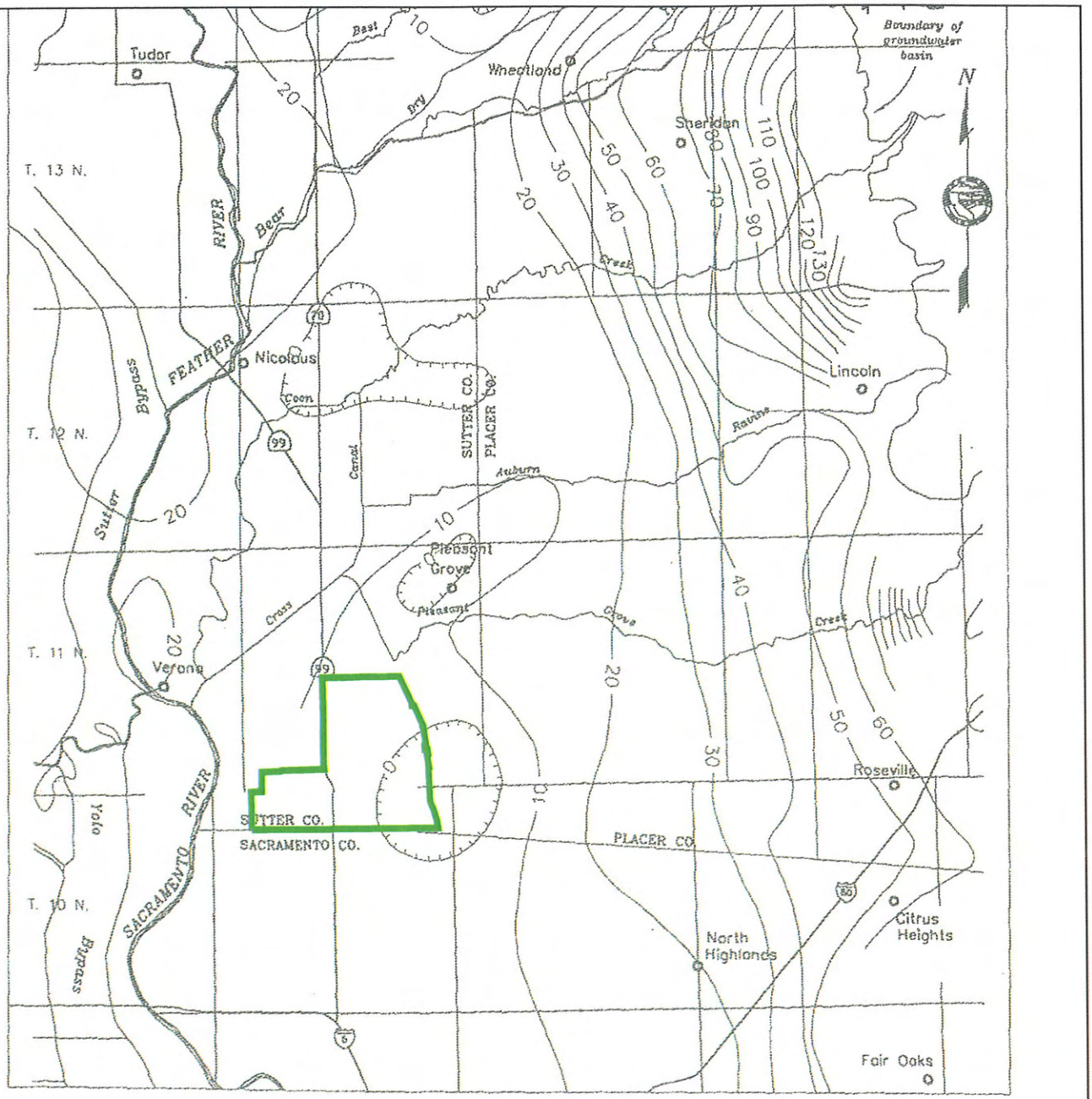
J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure23.dwg 4/10/08 1:18pm jbuchanan

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1950

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

10 Line of equal elevation of water surface in wells, feet.
Contour interval 10 feet.

0 2 4
SCALE: 1" = 4 MILES

Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 57, Figure 24.

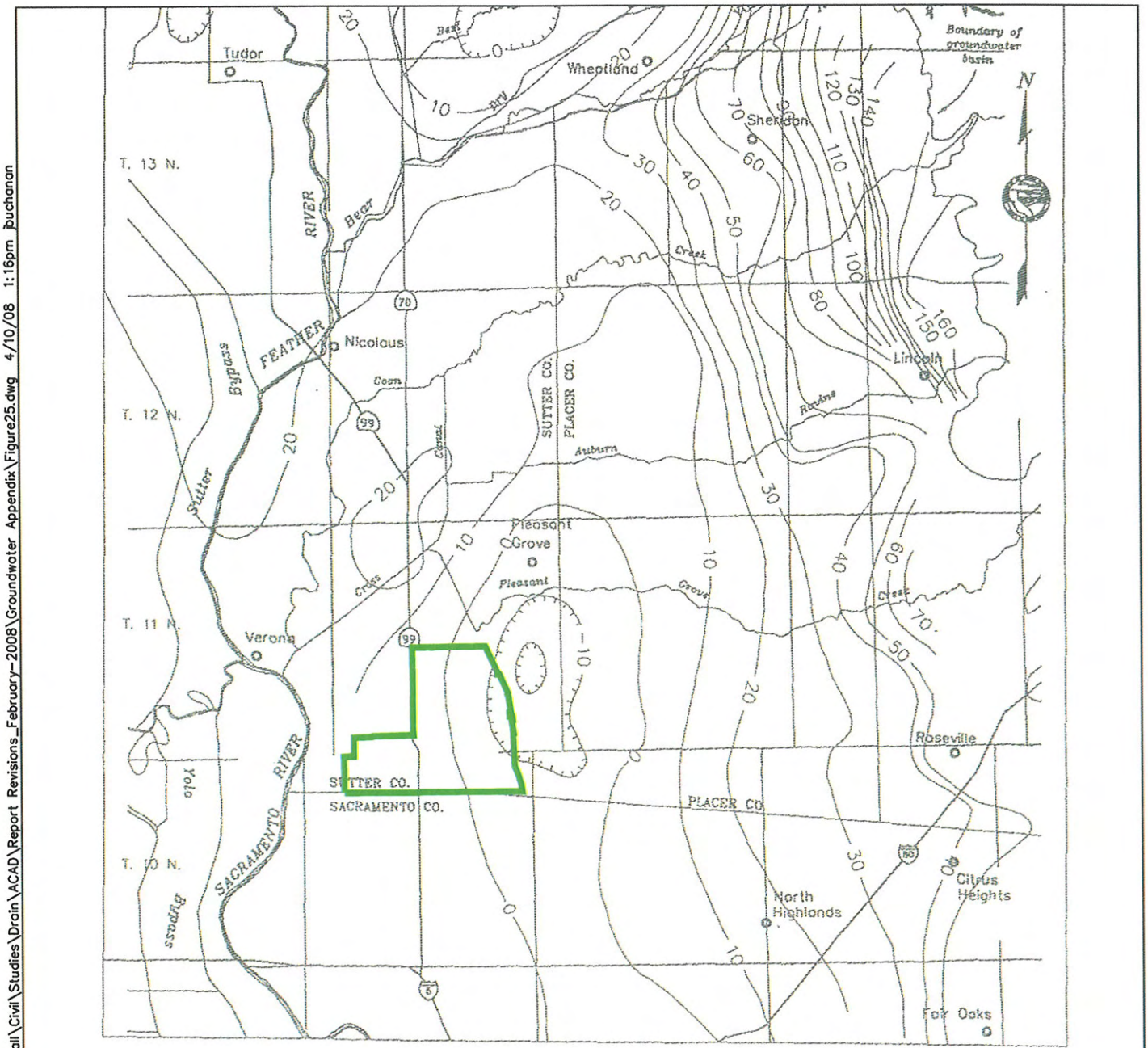
J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure24.dwg 4/10/08 1:17pm puchanan

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1960

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure25.dwg 4/10/08 1:16pm jbuchanan

L E G E N D

Sutter Pointe Specific Plan Area

10 — Line of equal elevation of water surface in wells, feet. Contour interval 10 feet.

0 2 4

SCALE: 1" = 4 MILES

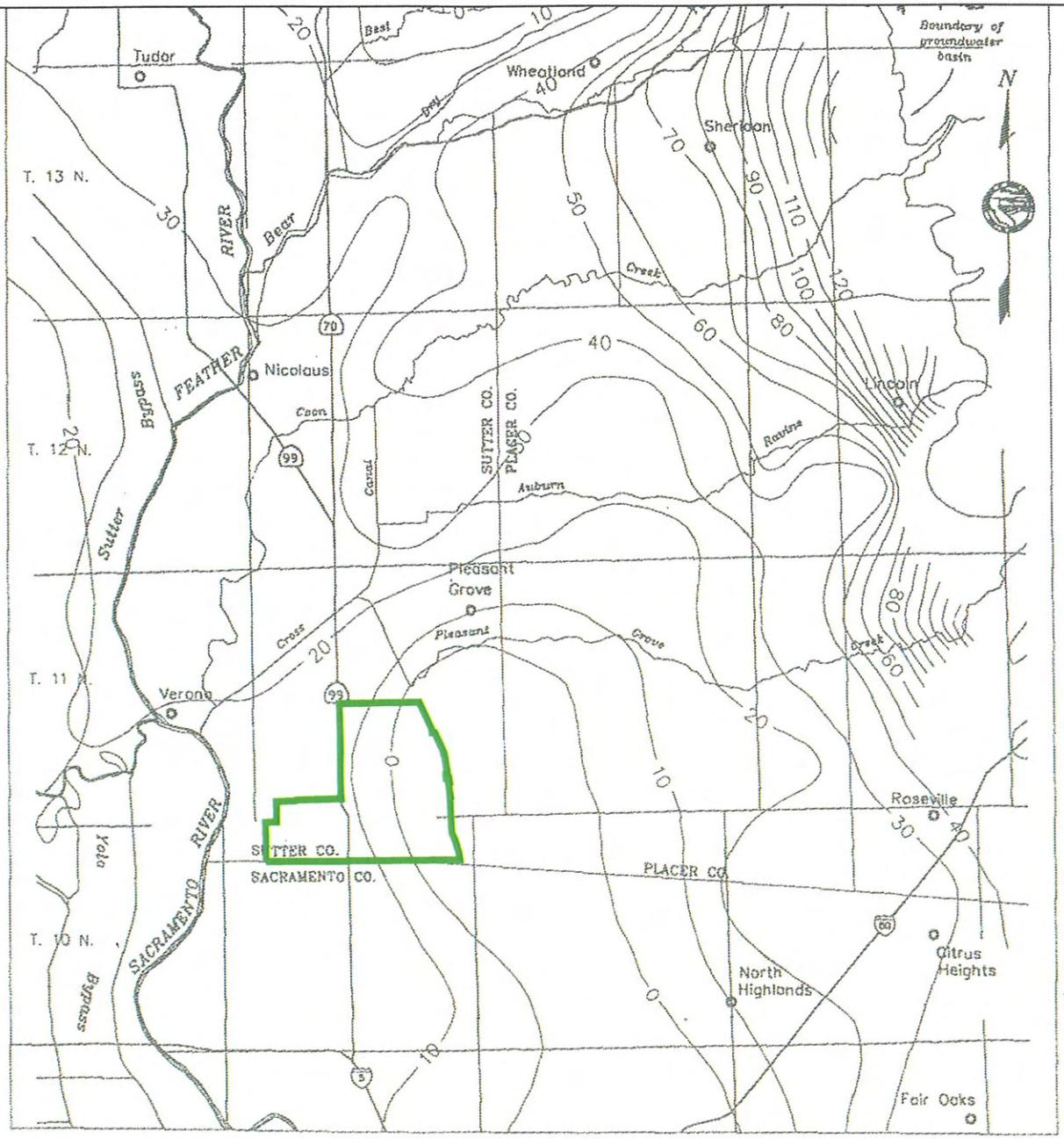
Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 58, Figure 25.

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1965

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

10 — Line of equal elevation of water surface in wells, feet. Contour interval 10 feet.

0 2 4

SCALE: 1" = 4 MILES

Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 59, Figure 26.

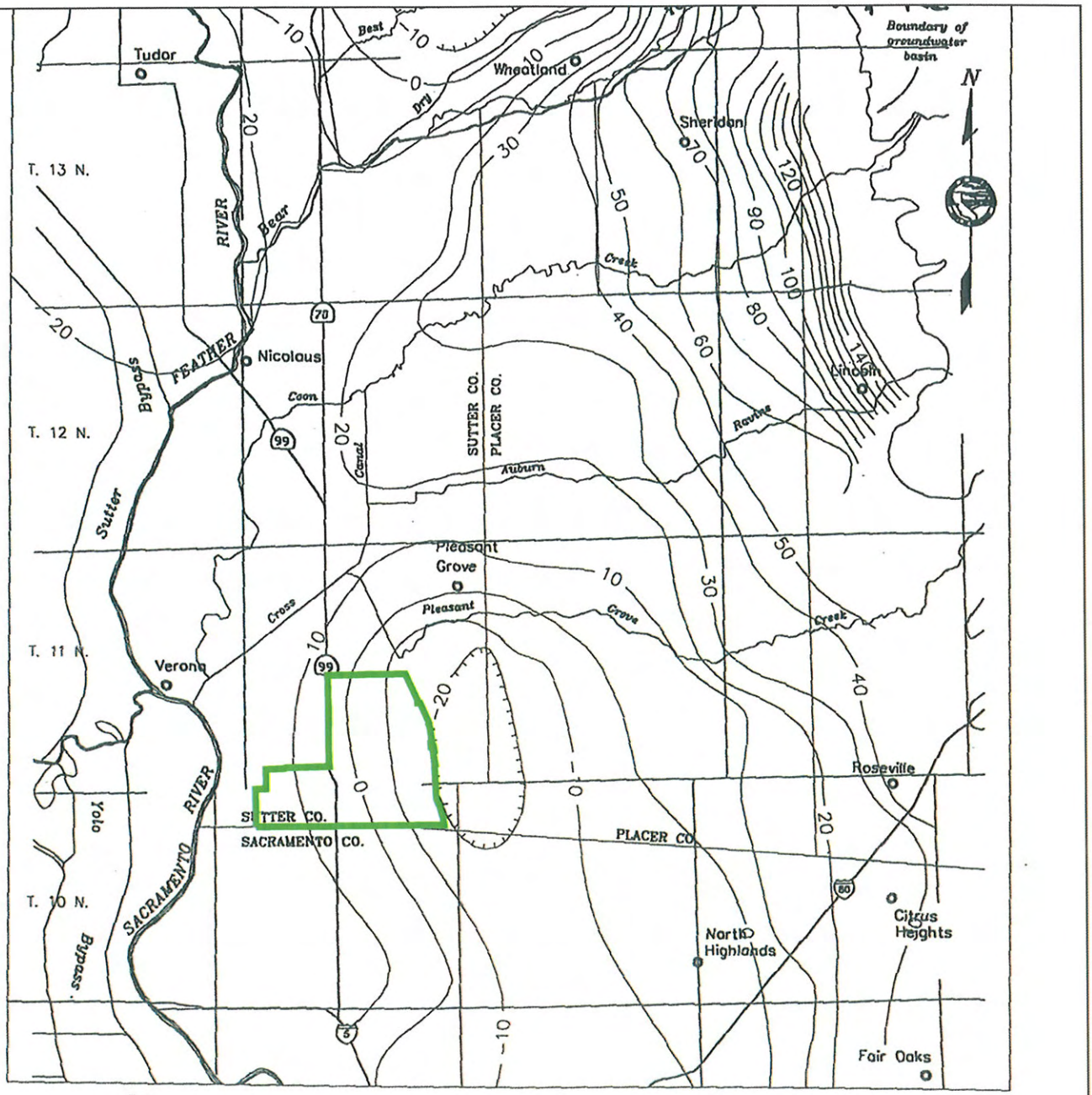
J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure26.dwg 4/10/08 1:14pm jbuchanan

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1970

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

10 Line of equal elevation of water surface in wells, feet.
Contour interval 10 feet.

0 2 4
SCALE: 1" = 4 MILES

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure27.dwg 4/10/08 1:13pm jbuchanan

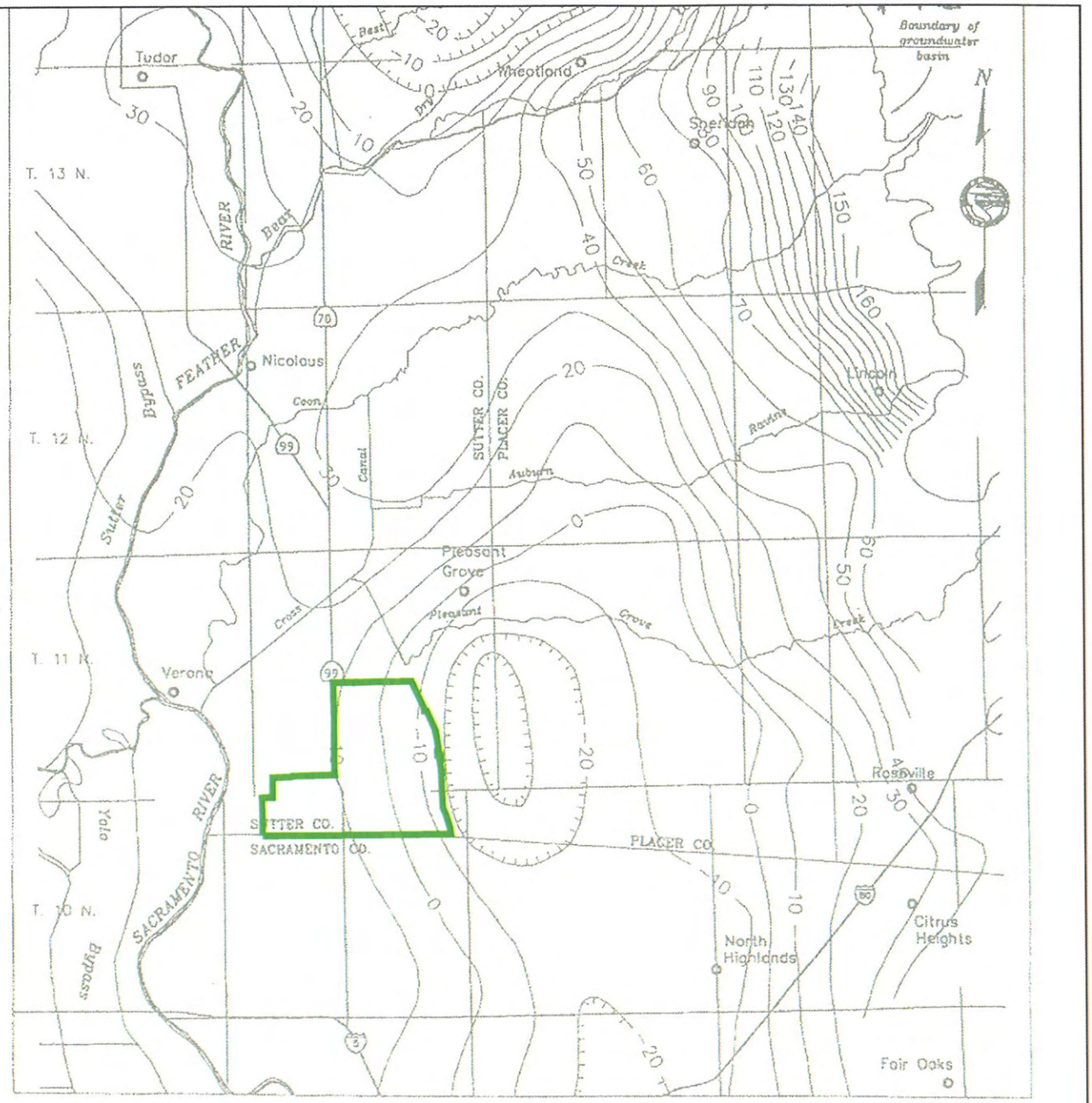
Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 60, Figure 27.

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1977

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure28.dwg 4/10/08 1:12pm jbuchanan

L E G E N D

Sutter Pointe Specific Plan Area

10 — Line of equal elevation of water surface in wells, feet. Contour interval 10 feet.

0 2 4

SCALE: 1" = 4 MILES

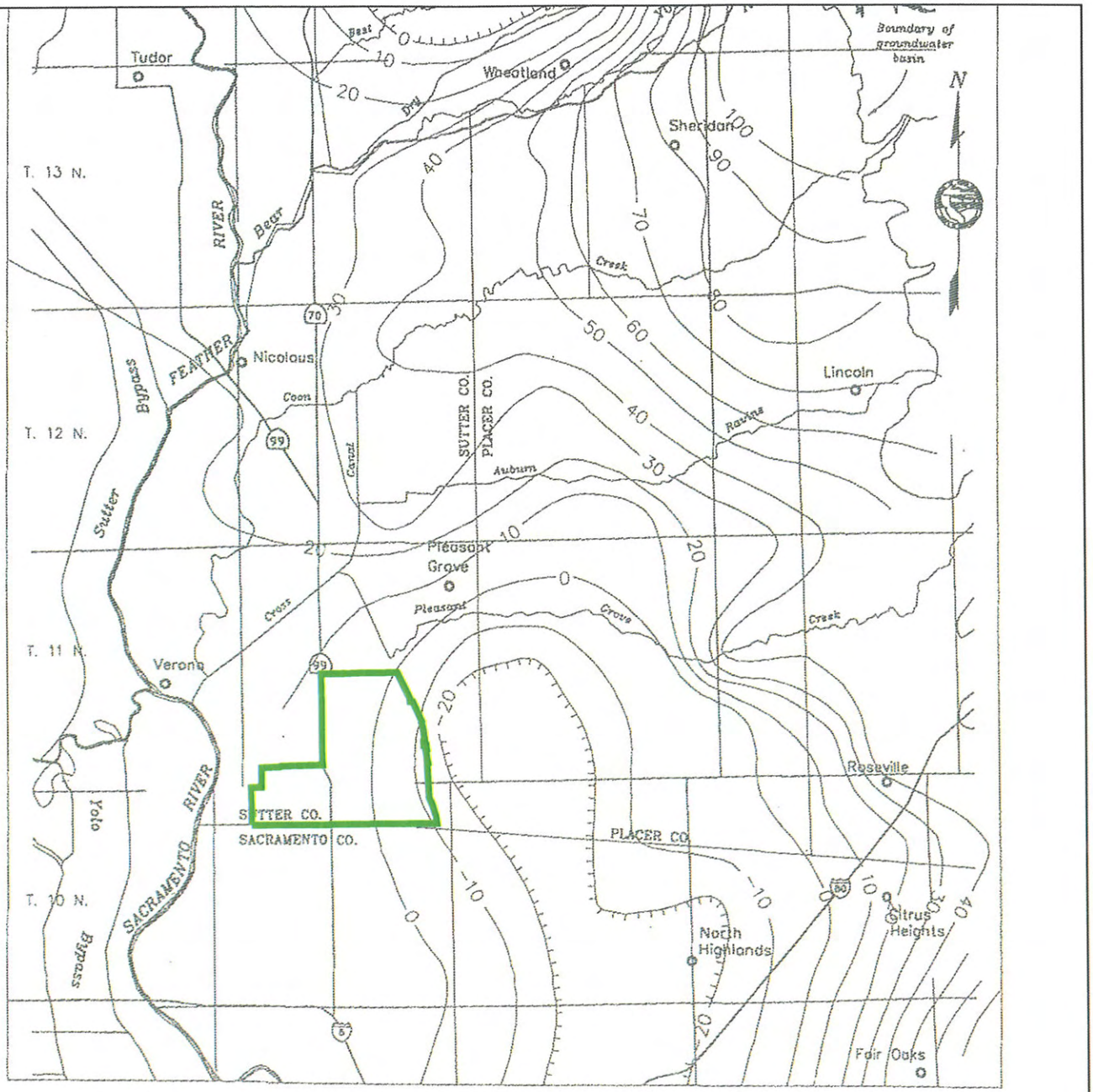
Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 62, Figure 28.

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1980

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

10 — Line of equal elevation of water surface in wells, feet. Contour interval 10 feet.

0 2 4

SCALE: 1" = 4 MILES

Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 63, Figure 29.

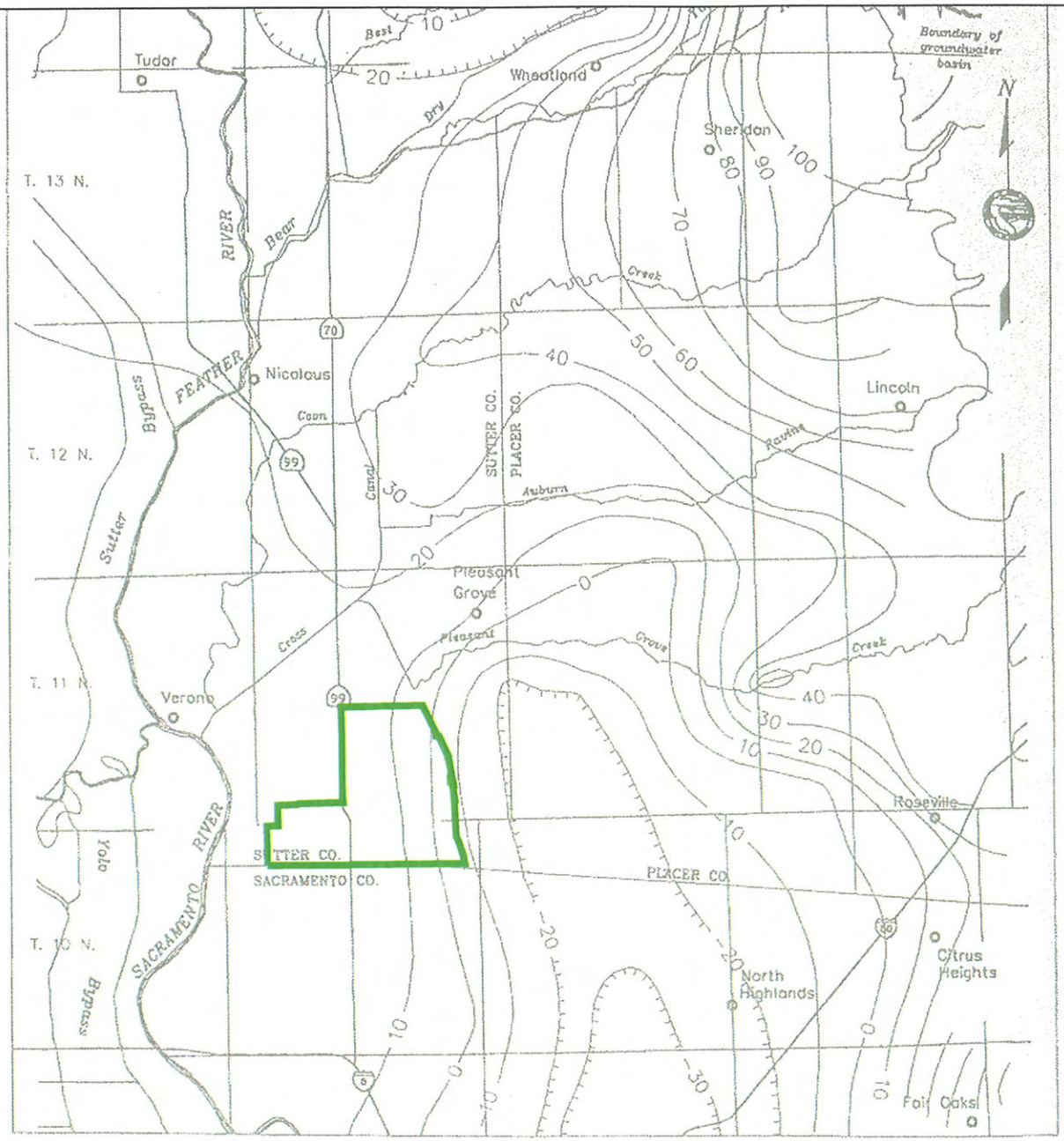
SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1985

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure29.dwg 4/10/08 1:10pm jbuchanan



L E G E N D

Sutter Pointe Specific Plan Area

10 Line of equal elevation of water surface in wells, feet.
Contour interval 10 feet.

0 2 4
SCALE: 1" = 4 MILES

Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 64, Figure 30.

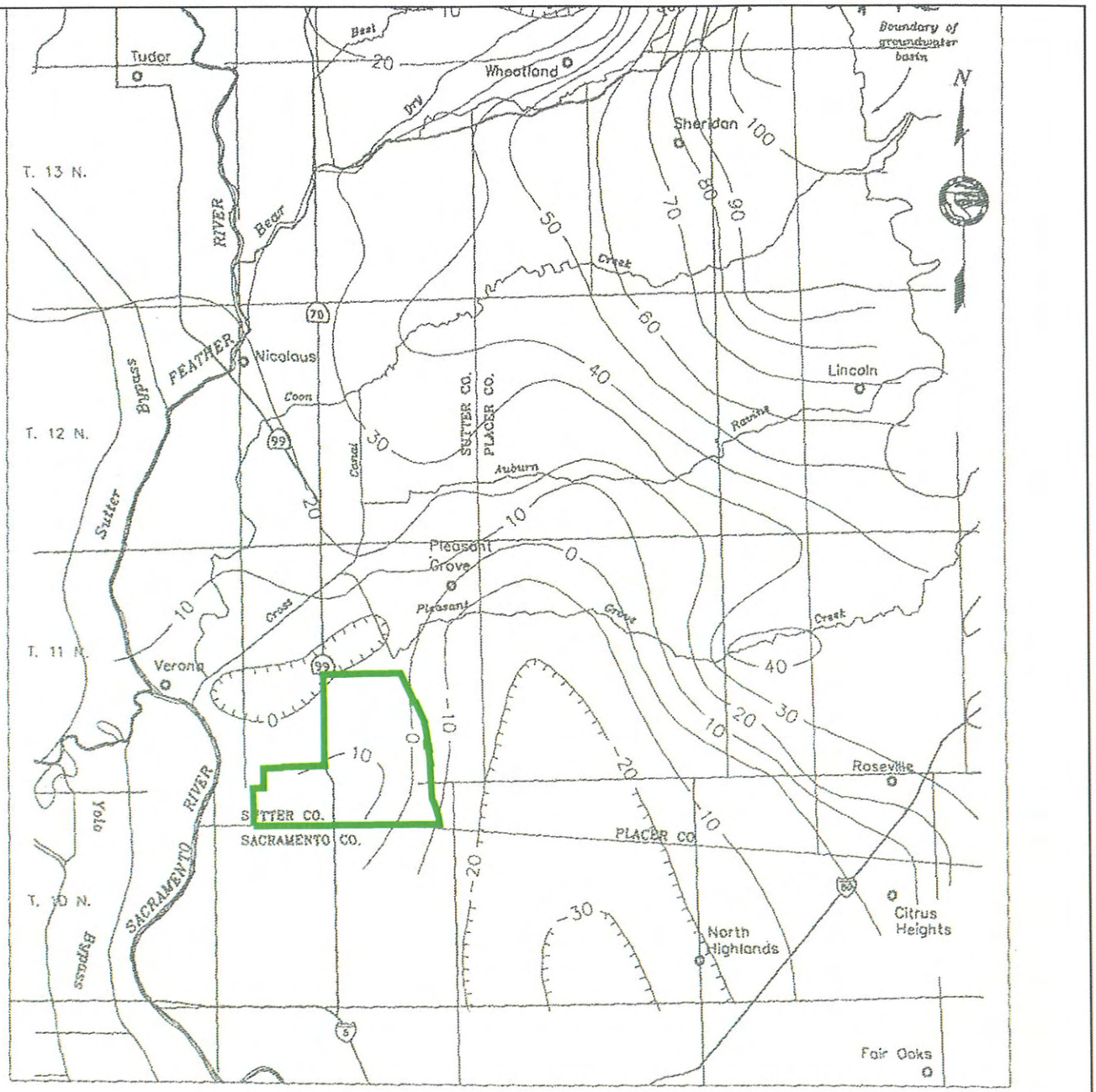
J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure30.dwg 4/10/08 1:09pm jbuchanan

SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1990

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS



L E G E N D

Sutter Pointe Specific Plan Area

10 Line of equal elevation of water surface in wells, feet. Contour interval 10 feet.

0 2 4

SCALE: 1" = 4 MILES

Source: Department of Water Resources. "Feasibility Report-American Basin Conjunctive Use Project." (1997): 65, Figure 31.

J:\Jobs\1604_SouthSutterSpecPln\Overall\Civil\Studies\Drain\ACAD\Report Revisions_February-2008\Groundwater Appendix\Figure31.dwg 4/10/08 1:08pm jbuchanan

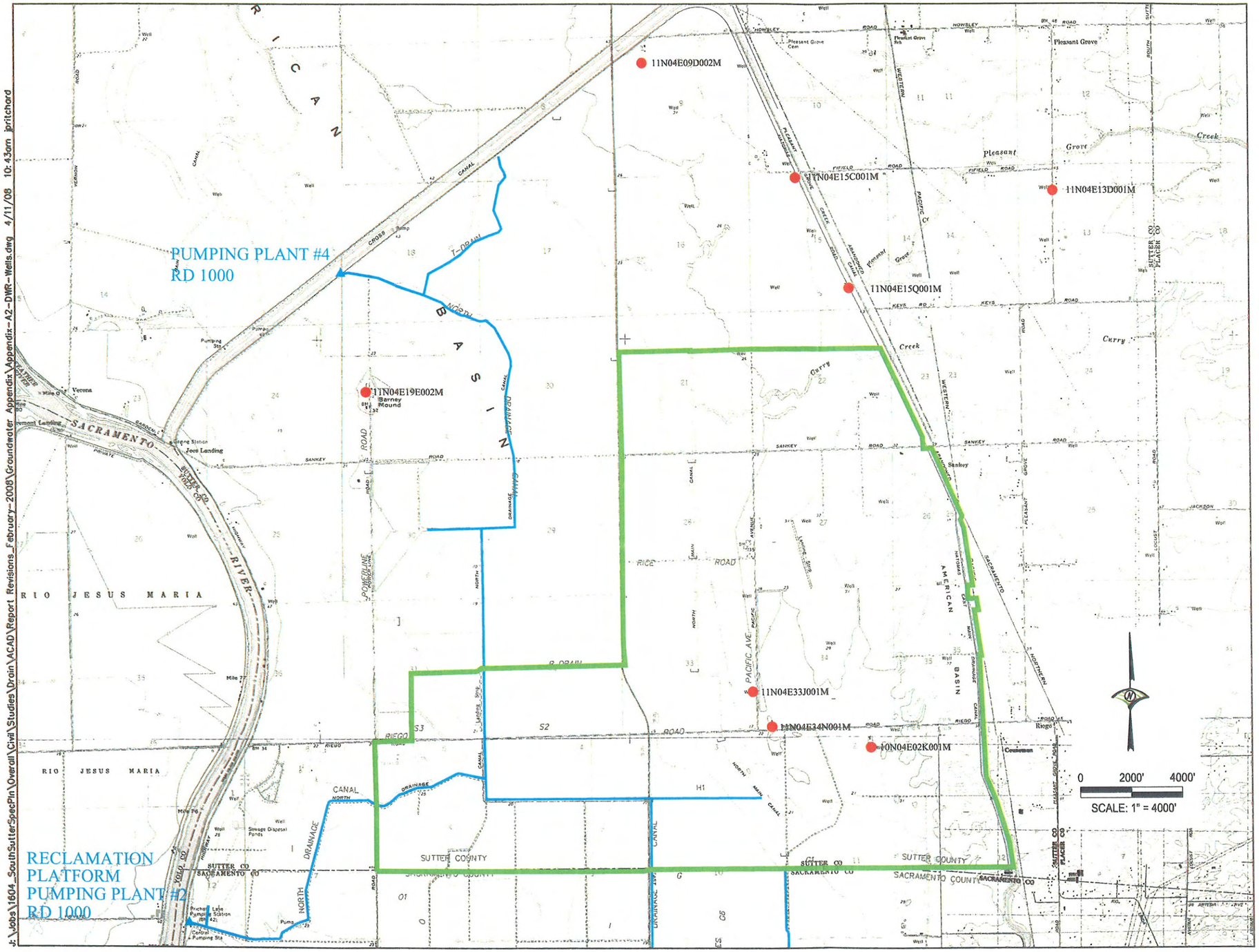
SUTTER POINTE

Lines of Equal Elevation of Water in Wells, Spring 1992

MEASURE "M" GROUP

WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS

APPENDIX A2
DWR Groundwater Well Data – 1947-2007



L E G E N D

- Sutter Pointe Specific Plan Area
- RD 1000 Drain
- DWR Groundwater Monitoring Well

Sources:

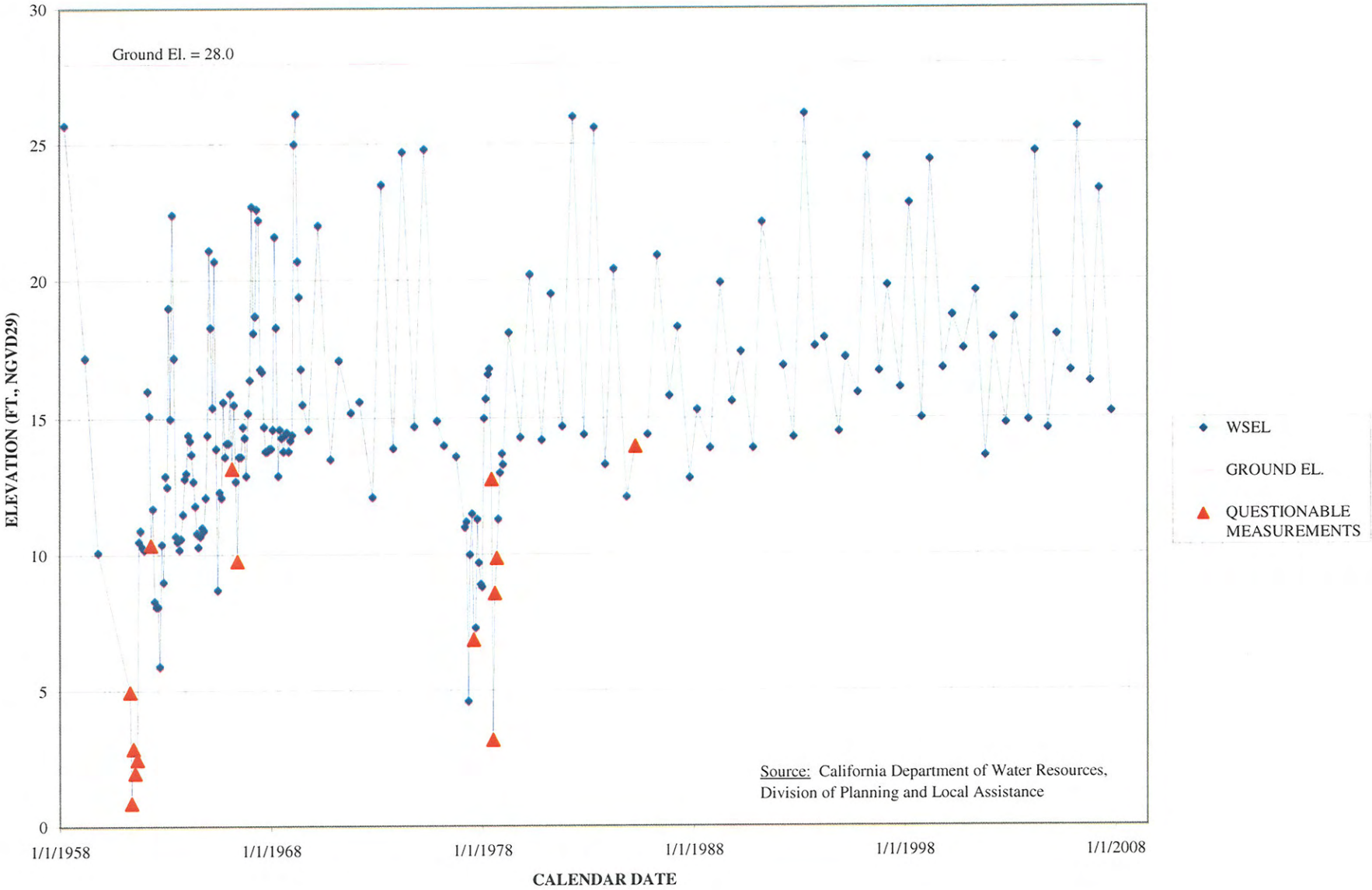
1. USGS 7.5 Minute Series (Topographic) Quadrangle Mapping, Vertical Datum is National Geodetic Vertical Datum of 1929 (NGVD29).
2. California Department of Water Resources (DWR), Division of Planning and Local Assistance.
3. RD 1000 map prepared by Mead & Hunt, April 6, 2005.

SUTTER POINTE

MEASURE "M" GROUP

DWR Groundwater Wells

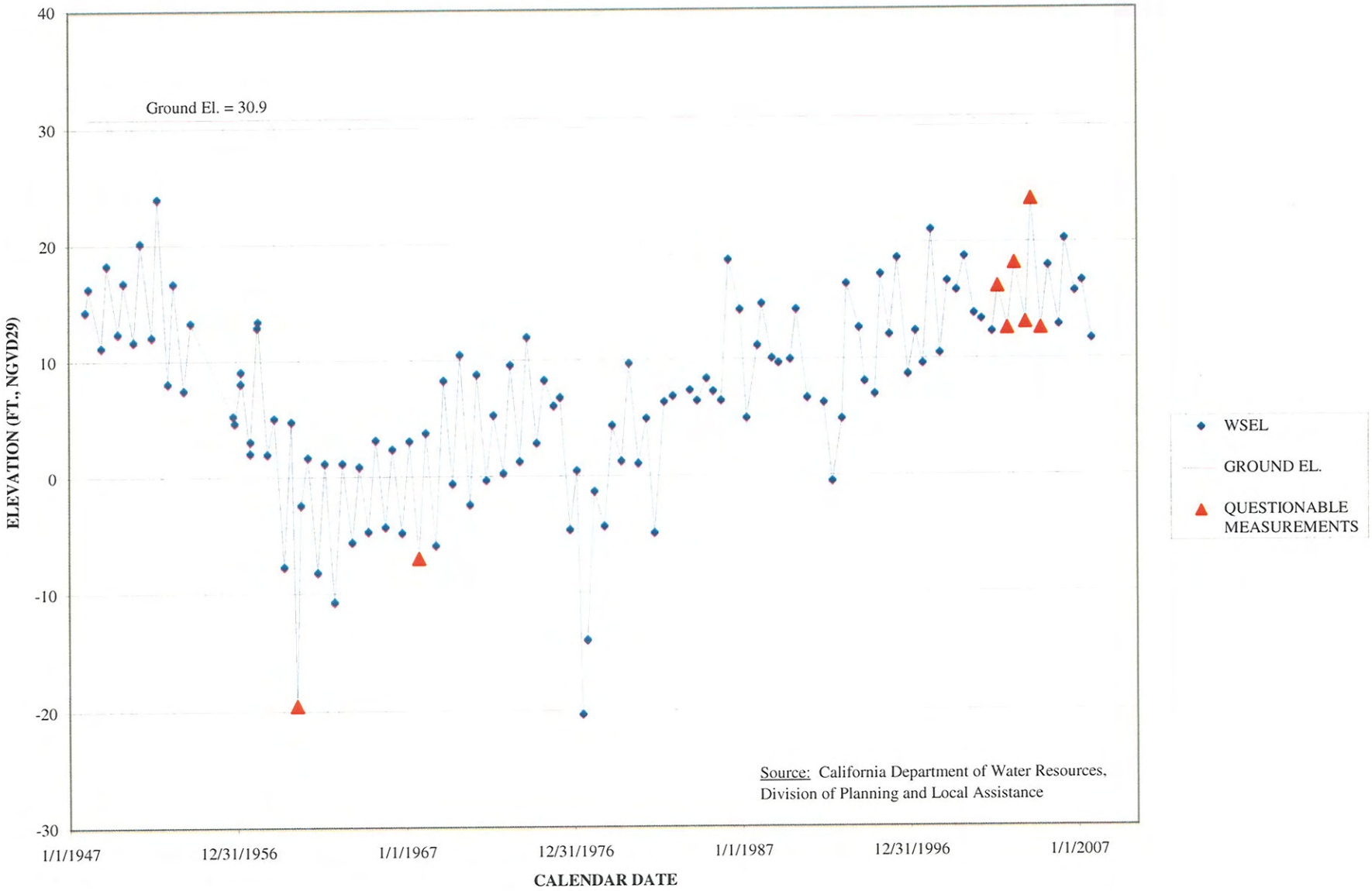
GROUNDWATER LEVEL - WELL NO. 11N04E09D002M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

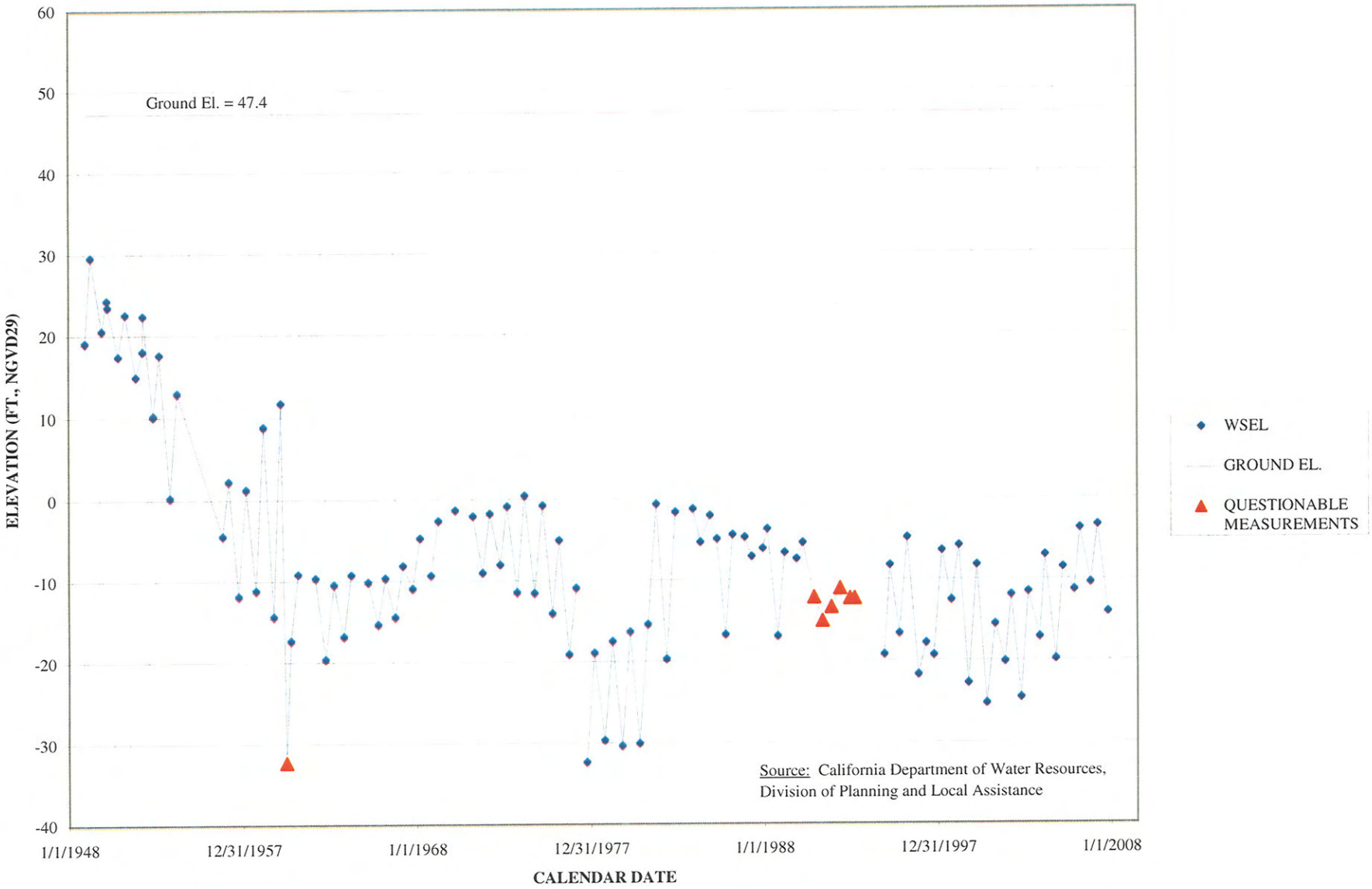
GROUNDWATER LEVEL - WELL NO. 11N04E15C001M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

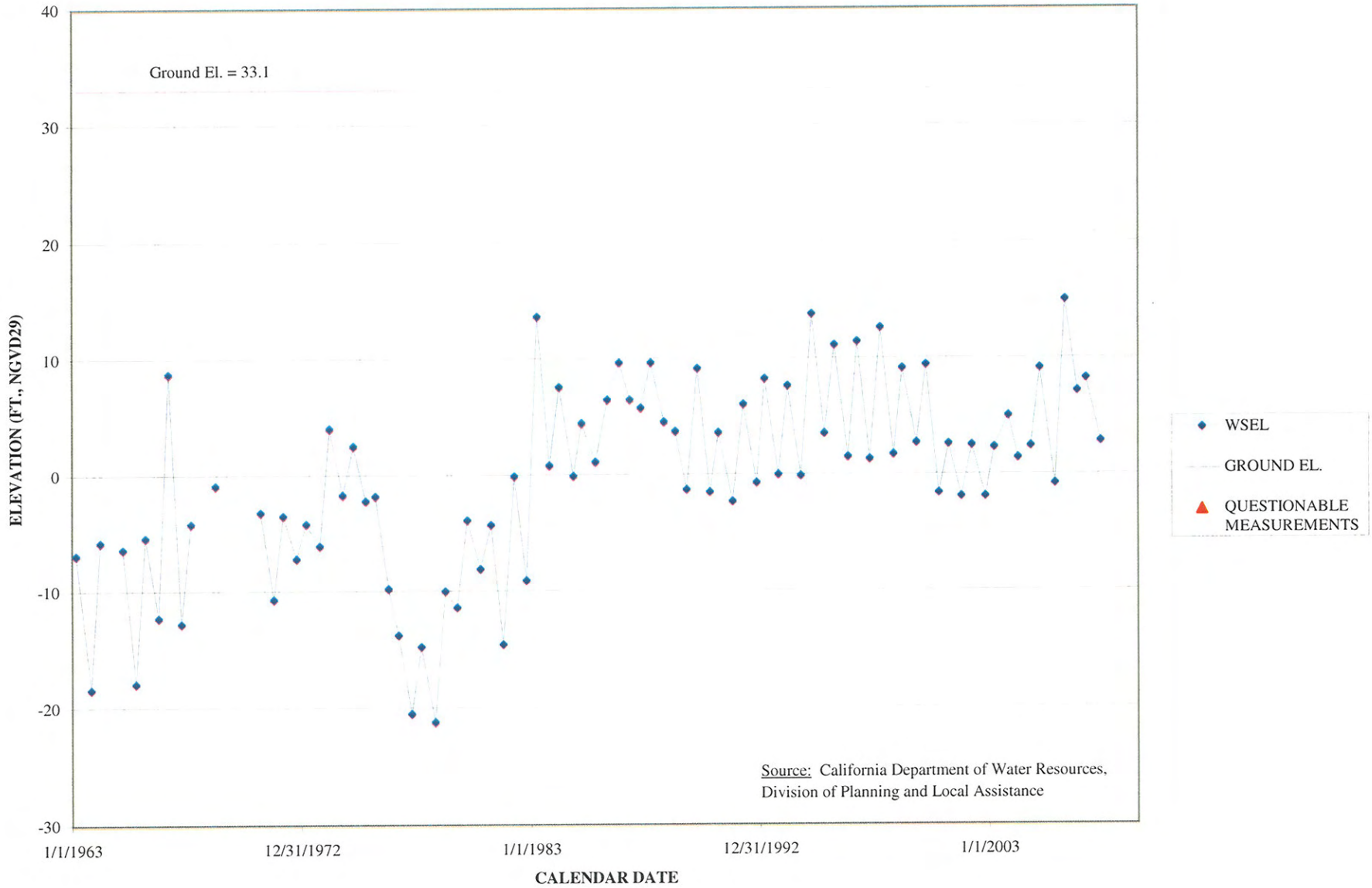
GROUNDWATER LEVEL - WELL NO. 11N04E13D001M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

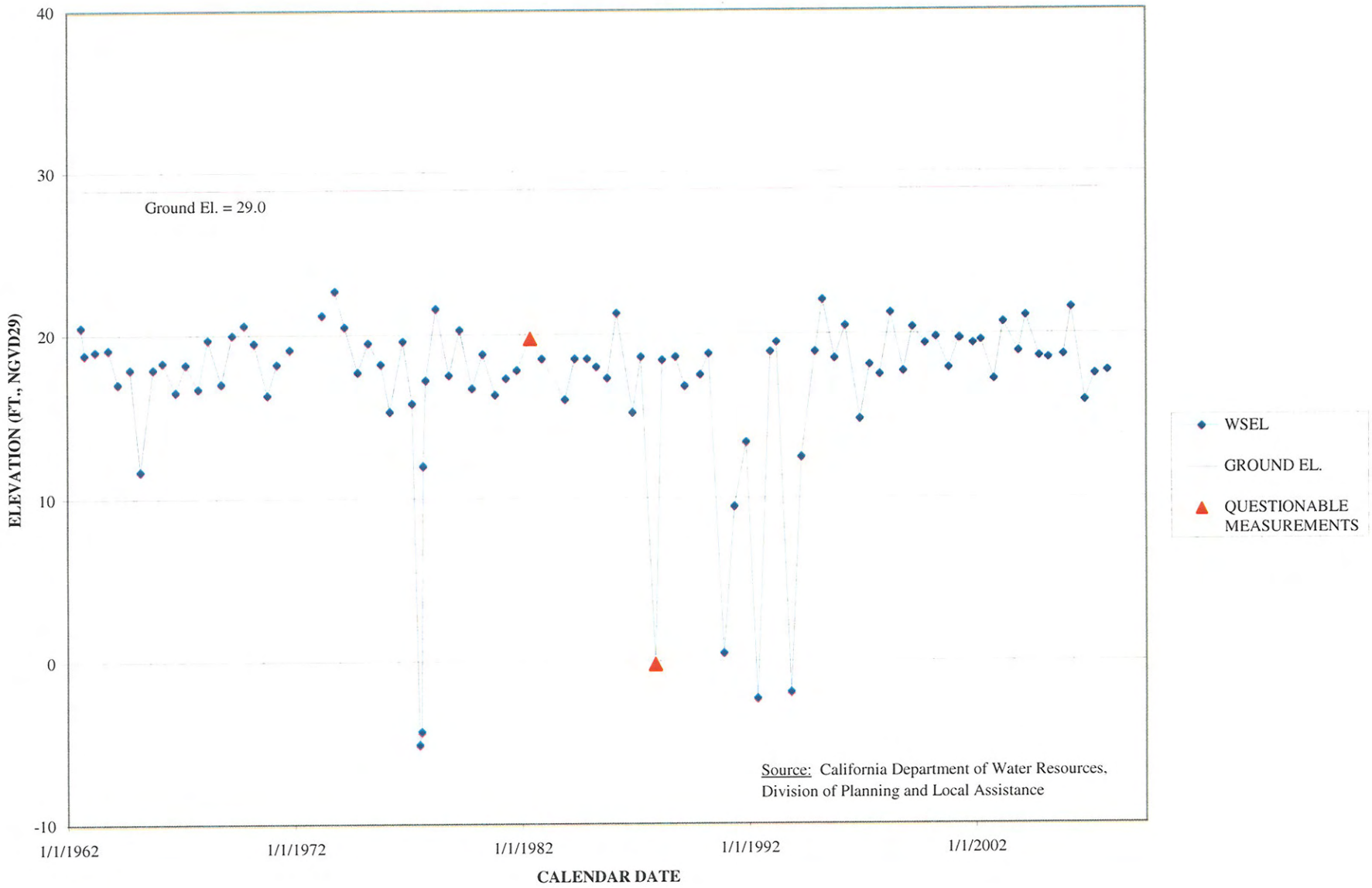
GROUNDWATER LEVEL - WELL NO. 11N04E15Q001M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

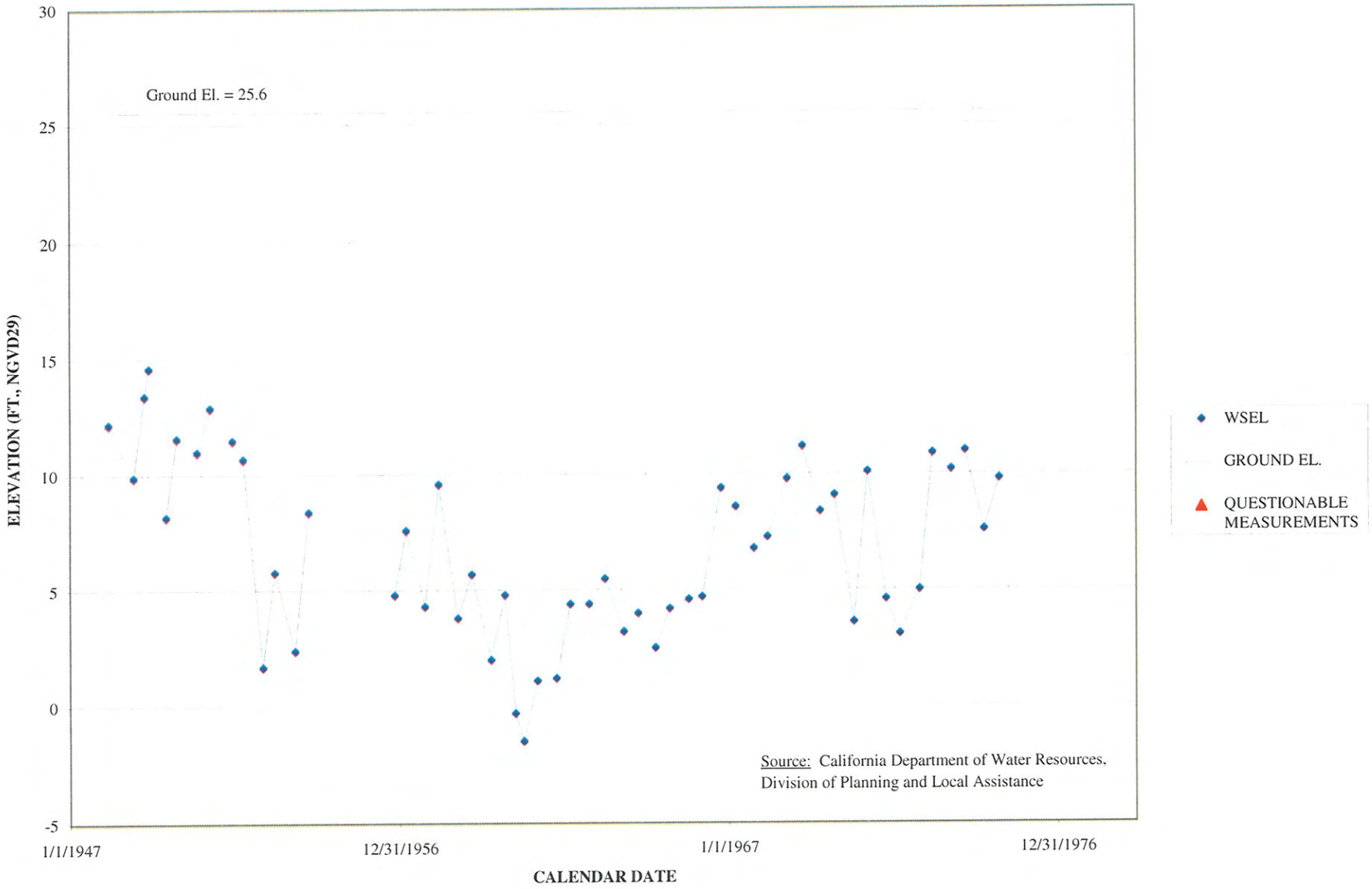
GROUNDWATER LEVEL - WELL NO. 11N04E19E002M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

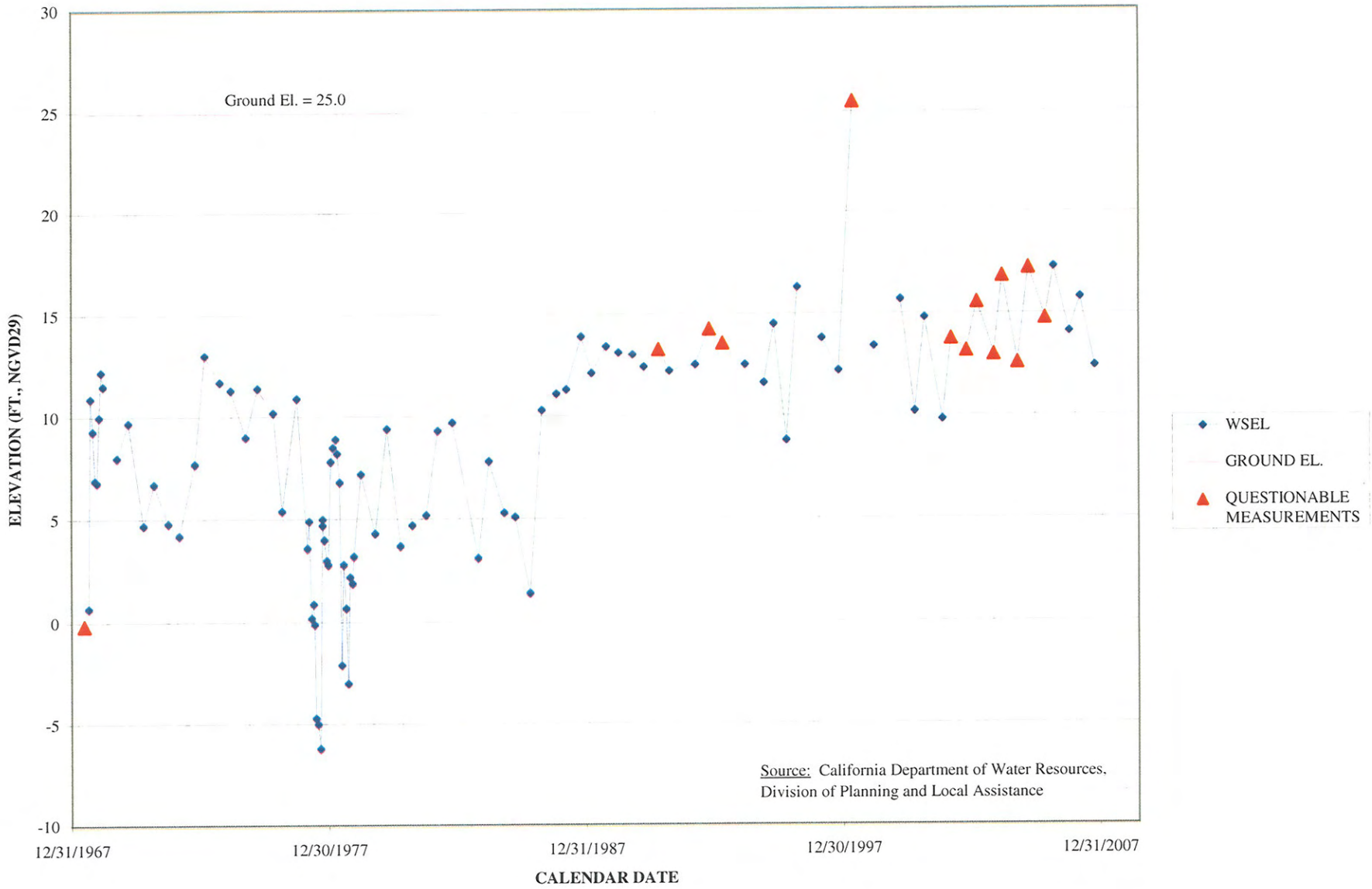
GROUNDWATER LEVEL - WELL NO. 11N04E33J001M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

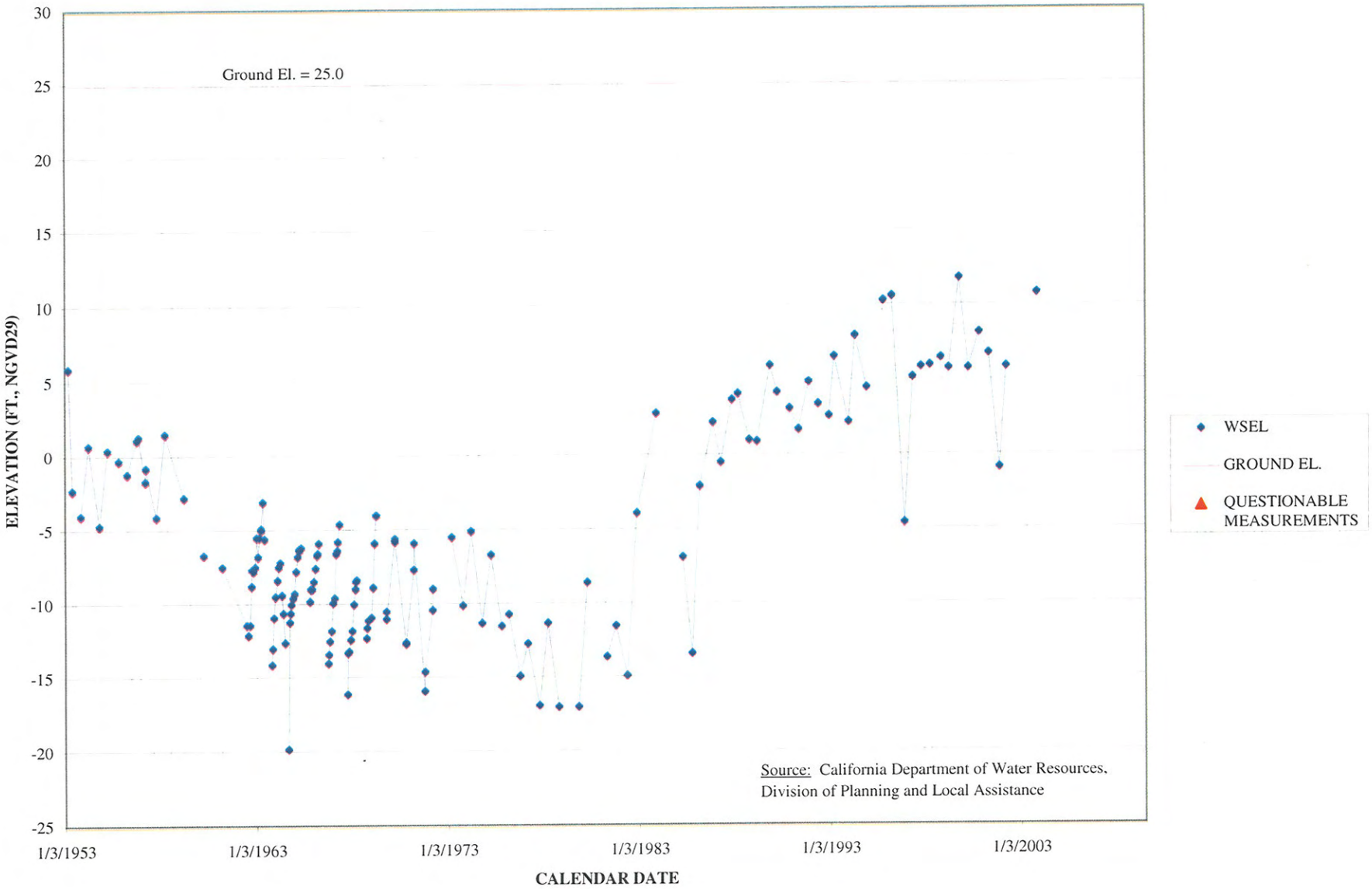
GROUNDWATER LEVEL - WELL NO. 11N04E34N001M



Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

GROUNDWATER LEVEL - WELL NO. 10N04E02K001M

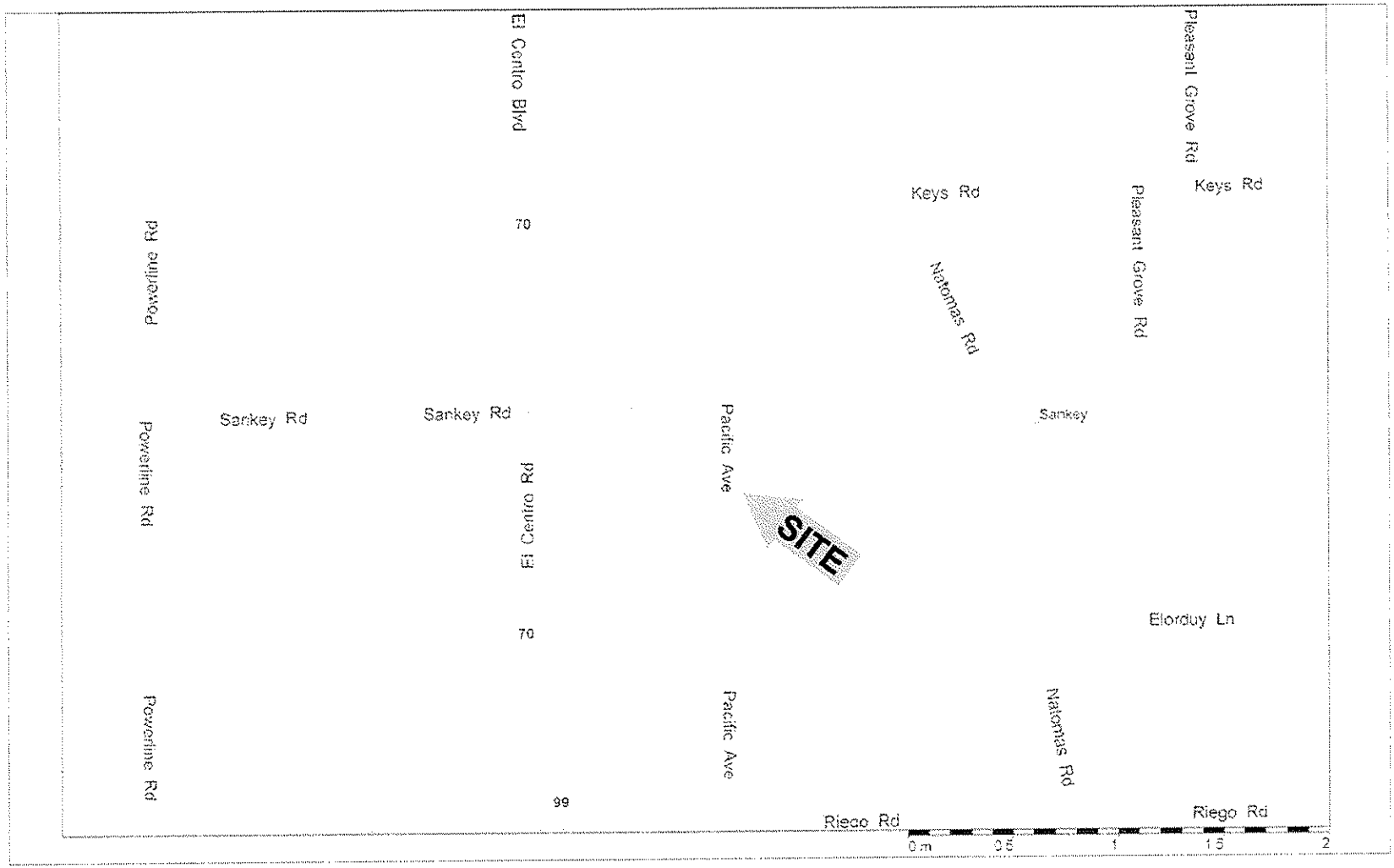


Sutter Pointe
Measure "M" Group

Wood Rodgers, Inc.
4/11/2008

APPENDIX A3

Quarterly Groundwater Monitoring at Holt of California, Pleasant Grove, California – September 1999 Through December 2006



Source: Microsoft Map Point 2002

FIGURE

1

MACTEC

SITE LOCATION MAP
QUARTERLY GROUNDWATER MONITORING REPORT
HOLT OF CALIFORNIA
7310 PACIFIC AVENUE
PLEASANT GROVE, CALIFORNIA

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
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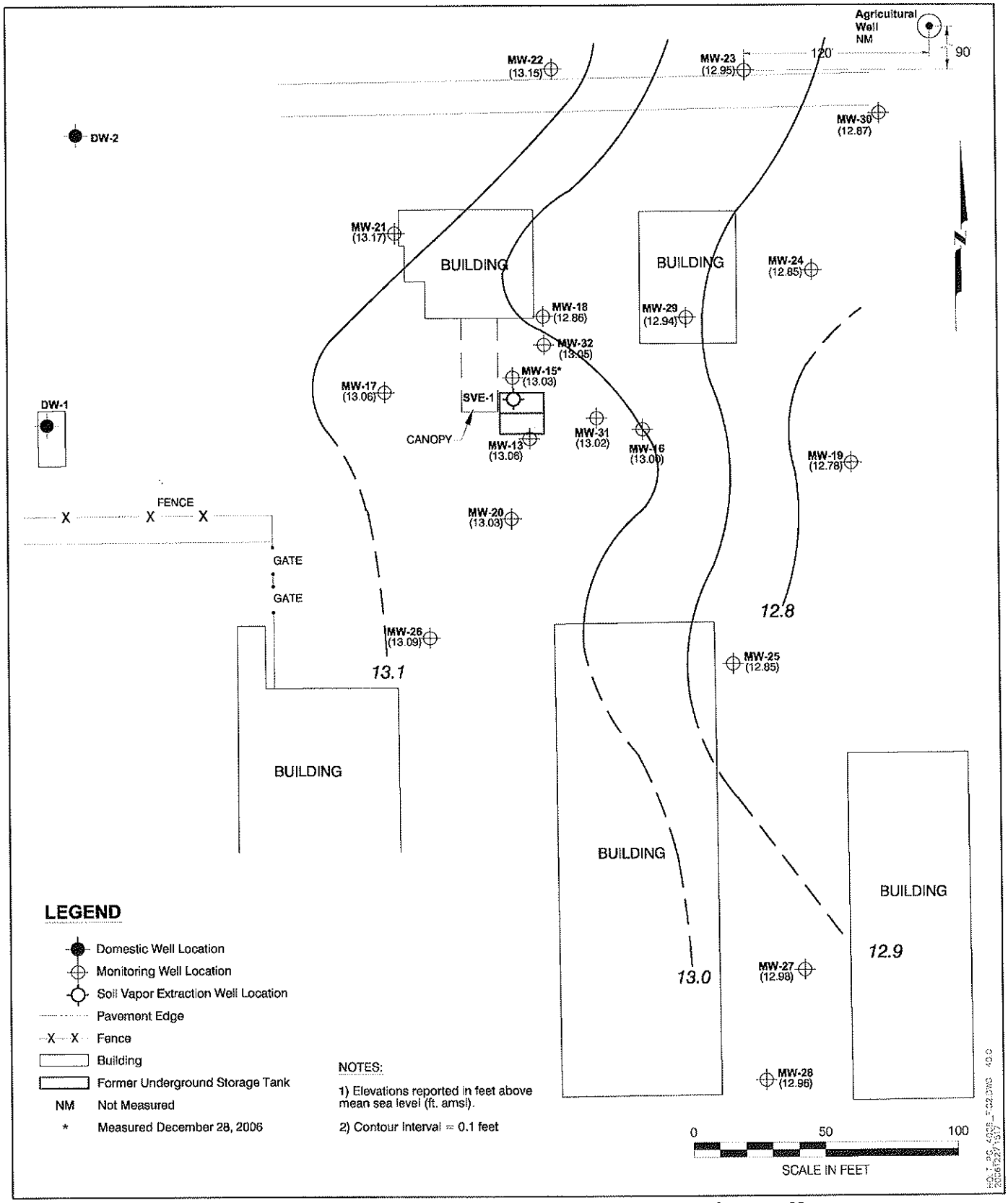

MACTEC

Groundwater Elevation Contour Map
December 27, 2006
Holt of California
Pleasant Grove, California

FIGURE
2

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
BAR	4088064264.02	*GPM*	1/09/2007	*SKP*	1/24/2007

TABLE 2

HISTORICAL GROUNDWATER ELEVATION DATA
HOLT OF CALIFORNIA
PLEASANT GROVE, CALIFORNIA

Monitoring Well	Groundwater Elevation (feet above mean sea level)										
	Sep-99	Dec-99	Mar-00	Jun-00	Aug-00	Nov-00	Jul-01	Dec-01	Mar-02	Jun-02	Oct-02
MW-13	NM	10.64	13.48	9.31	6.32	10.31	4.46	8.97	12.25	6.54	9.65
MW-15	NM	10.84	13.58	8.83	6.71	10.60	5.13	9.04	12.28	6.52	9.91
MW-16	NM	7.33	13.52	8.28	5.98	9.80	4.40	8.96	12.18	6.31	9.50
MW-17	1.25	10.05	13.54	9.18	7.00	10.54	5.21	9.18	12.31	6.80	9.93
MW-18	NM	11.07	13.11	9.47	6.62	10.43	5.09	9.04	12.07	6.66	9.86
MW-19	NM	10.17	12.69	8.04	5.27	9.81	4.04	8.58	11.91	5.75	9.35
MW-20	NM	10.69	13.58	8.59	6.41	10.09	4.19	9.12	12.36	6.56	9.69
MW-21	2.41	11.12	13.90	9.27	7.29	10.51	5.63	9.31	12.41	7.19	10.01
MW-22	2.36	11.22	13.93	9.30	7.23	10.45	NM	NM	NM	7.24	10.95
MW-23	-4.55	10.65	13.60	8.40	6.00	9.76	NM	NM	NM	6.33	9.54
MW-24	-3.36	10.30	13.39	8.23	5.53	9.80	4.25	8.70	11.95	6.07	9.38
MW-25	-0.76	10.21	12.78	8.41	5.81	9.94	4.44	8.81	12.07	6.12	9.51
MW-26	NM	10.67	13.63	7.86	6.85	10.22	4.98	9.10	12.37	6.54	9.79
MW-27	1.11	10.10	13.41	8.38	6.00	10.11	NM	8.94	NM	6.21	9.65
MW-28	1.51	10.14	12.94	8.52	6.17	10.40	NM	9.03	NM	6.28	NM
MW-29	-4.30	10.56	13.64	8.43	5.93	9.68	3.05	8.85	NM	6.26	9.48
MW-30	-7.37	10.46	13.51	8.04	5.45	9.54	NM	NM	NM	5.95	9.35
MW-31	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-32	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Monitoring Well	Groundwater Elevation (feet above mean sea level)										
	Apr-03	Aug-03	Dec-03	Jan-05	Apr-05	Jul-05	Nov-05	Mar-06	May-06	Jul-06	Dec-06
MW-13	12.82	7.65	10.07	11.38	15.59	-3.96	10.93	15.12	16.40	3.10	13.06
MW-15	12.80	8.03	10.47	11.40	15.48	-3.80	11.32	14.94	15.96	1.00	13.03
MW-16	12.79	7.37	9.99	11.33	15.57	-4.38	10.72	14.85	15.53	4.70	13.00
MW-17	12.94	8.18	10.38	11.51	15.84	-3.29	11.58	15.38	16.51	2.90	13.06
MW-18	12.67	7.92	10.29	10.98	15.28	-4.87	11.06	14.75	16.18	2.10	12.86
MW-19	12.61	6.78	9.69	11.06	15.64	NM	11.09	15.09	16.37	2.00	12.78
MW-20	12.89	7.74	9.16	11.46	15.78	-3.72	11.30	14.93	16.46	3.42	13.03
MW-21	13.03	8.49	10.46	11.62	15.84	-3.26	11.68	15.42	16.52	3.11	13.17
MW-22	12.96	8.40	10.36	11.55	15.83	-4.33	11.65	15.41	16.58	2.91	13.15
MW-23	12.74	7.38	9.91	11.26	15.67	-6.87	11.32	15.20	16.36	1.51	12.95
MW-24	12.64	7.00	9.73	11.12	15.63	-4.96	11.17	14.96	16.31	1.12	12.85
MW-25	12.83	NM	9.94	11.21	NM	-2.15	11.23	15.26	16.31	3.10	12.85
MW-26	13.00	7.98	10.27	11.52	15.82	-2.14	11.51	NM	16.31	3.73	13.09
MW-27	13.09	7.25	10.06	11.49	15.90	-0.02	11.39	15.65	16.29	3.87	12.98
MW-28	13.18	7.42	10.19	11.47	16.11	NM	11.52	15.77	16.55	4.15	12.96
MW-29	12.74	7.35	9.95	11.26	15.63	-6.35	11.15	14.85	16.38	2.09	12.94
MW-30	12.65	6.97	9.75	11.17	15.61	-5.18	11.22	15.06	16.34	1.87	12.87
MW-31	12.82	7.49	10.02	11.35	14.98	-5.46	7.88	15.48	16.38	3.01	13.02
MW-32	NM	NM	NM	11.23	14.13	NM	11.08	15.47	16.47	2.45	13.05

Prepared by: GPM Reviewed by: BAR

Notes:

NM Well not measured based on one of the following reasons: not installed, inaccessible, or dry at time of event.

TABLE 1

GROUNDWATER ELEVATION DATA
DECEMBER 27, 2006
HOLT OF CALIFORNIA
PLEASANT GROVE, CALIFORNIA

Monitoring Well	Monitoring Well (TOC elevation *)	Depth to Water (feet below TOC)	Well Depth (feet below TOC)	Groundwater Elevation (feet above mean sea level)
MW-13	32.36	19.30	38.05	13.06
MW-15 [b]	32.99	19.96	38.39	13.03
MW-16	34.18	21.18	38.81	13.00
MW-17	32.59	19.53	37.71	13.06
MW-18	32.73	19.87	38.75	12.86
MW-19	33.89	21.11	37.21	12.78
MW-20	33.99	20.96	38.10	13.03
MW-21	32.99	19.82	42.86 [a]	13.17
MW-22	32.81	19.66	44.51 [a]	13.15
MW-23	31.76	18.81	44.33 [a]	12.95
MW-24	32.55	19.70	42.73	12.85
MW-25	35.16	22.31	44.76 [a]	12.85
MW-26	35.51	22.42	43.51 [a]	13.09
MW-27	34.6	21.62	38.90 [a]	12.98
MW-28	34.85	21.89	33.70 [a]	12.96
MW-29	33.96	21.02	58.11 [a]	12.94
MW-30	31.24	18.37	38.36 [a]	12.87
MW-31**	32.79	19.77	49.11	13.02
MW-32**	32.79	19.74	45.40	13.05

Prepared by: BAR Reviewed by: GPM

Notes:

TOC	Top of casing elevation relative to United States Geological Survey datum (Q-858)
*	Surveyed by Morrow Surveying 1/21/02
**	Surveyed by Morrow Surveying 3/7/05
a	Total depth not obtained from non-sample wells. Data based on sampling event from Tetra Tech EM Inc. in December 2003
b	Measured December 28, 2006

APPENDIX A4

Groundwater Elevation Contours for Spring 2002 (Figure 8 of MWH Western Placer County Groundwater Feasibility Study, April 2004)

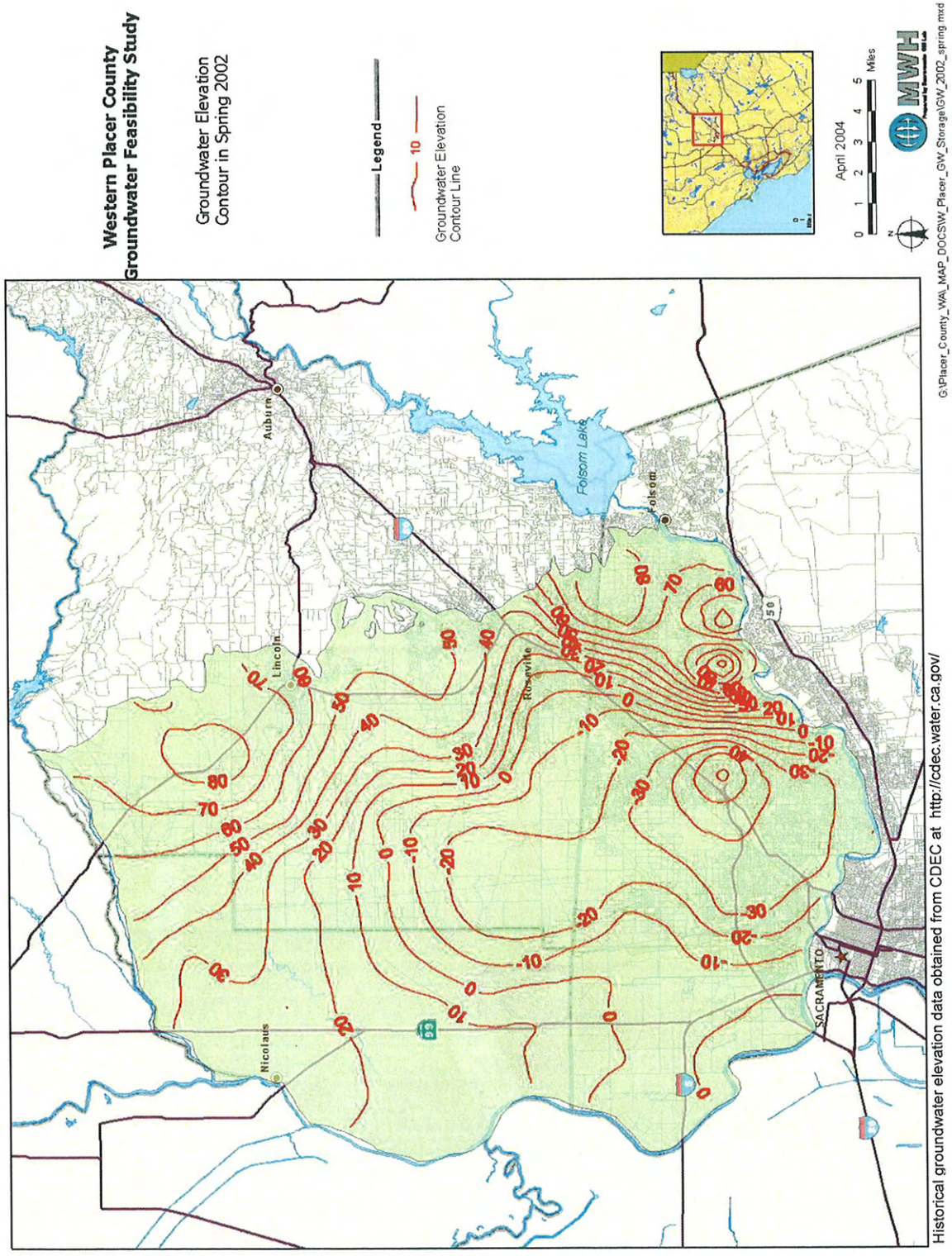

Figure 8 - Groundwater Elevation Contours for Spring 2002