VOLUME III
ADDITIONAL PROJECT REQUIREMENTS

A. Additional Mandatory Standards

1. Merced City Fire Department, Fire Department Access Roadways document (draft)
2. California Fire Code Appendix D (Fire Apparatus Access Roads)

B. Project Commitments

1. General

a. Agreement Between The Regents of the University Of California and Pacific Gas and Electric Company to Provide Electric Service to the UC Merced Campus (October 9, 2003)
b. Power Purchase Agreement between Solar Star California XII, LLC and The Regents of the University of California (December 23, 2008)
c. Drainage Contract between Merced Irrigation District (MID) and The Regents of the University of California (July 20, 2005)
d. Joint Use and Maintenance Agreement between Merced Irrigation District (MID) and The Regents of the University of California (April 15, 2003)
e. Roadway Repair Agreement between The Regents of the University of California and the County of Merced (form agreement)

2. Site Commitments

a. A.L.T.A./A.C.S.M. Land Titles Survey, University of California, Merced 2015 Regents Campus Area Survey (March 4, 2016)
b. Amended Record of Survey for University of California Merced Campus (July 1, 2015)
c. Agreement for the Exchange of Easements and for Delivery of Water between Merced Irrigation District (MID) and Merced County Board of Education as Trustees of The Virginia Smith Testamentary Trust (October 6, 1981)
d. Non-exclusive Utility Crossing Agreement between Merced Irrigation District (MID) and The Regents of the University of California (April 2005)
e. Non-exclusive Pipeline License Agreement between Merced Irrigation District (MID) and The Regents of the University of California (October 7, 2009)
f. Non-exclusive Crossing Agreement between Merced Irrigation District (MID) and The Regents of the University of California (February 18, 2011)
g. Construction and Easement Agreement between Merced Irrigation District (MID) and The Regents of the University of California (draft)

3. Owner-Provided Approvals

a. General Permit For Waste Discharge Requirements (WDRS) for Storm Water Discharges From Small Municipal Separate Storm Sewer Systems (MS4s) Order No. 2013-0001-DWQ NPDES No. Cas000004 (February 5, 2013)

b. Clean Water Act Section 404 Permit for the fill of waters of the United States resulting from the UC Merced Campus and Community North (SPK-1999-00203) (April 29, 2009 as extended March 15, 2012)
c. Clean Water Act Section 401 Water Quality Certification for the Discharge of Dredged Materials associated with the UC Merced Campus and University Community Project
d. California Department of Fish and Game Incidental Take Permit No. 2081-2009-010-04 (April 6, 2011)
e. Amendment No. 1 to California Department of Fish and Game Incidental Take Permit No. 2081-2009-010-04 (October 3, 2011)
f. Amendment No. 2 to California Department of Fish and Game Incidental Take Permit No. 2081-2009-010-04 (December 17, 2015)
g. Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1 and Campus Buildout (Corps # 199900203) and Infrastructure Project (Corps # 200100570) (August 19, 2002)
h. Amendment to Formal Section 7 Consultation on the University of California, Merced Campus and Community North Project (Corps # 199900203), Merced County, California (April 28, 2009)

MERCED CITY FIRE DEPARTMENT
FIRE DEPARTMENT ACCESS ROADWAYS

UNIFORM FIRE CODE / GENERAL ACCESS ROAD REQUIREMENTS

- Fire apparatus access. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.
- Specifications
  - Fire apparatus access roads shall have an unobstructed width of 20 feet.
  - An unobstructed vertical clearance of 13 feet 6 inches shall be provided.
  - Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface as to provide all-weather driving capabilities.
  - The turning radius of a fire department access road shall be as approved. Turning radii shall be a minimum of 33 feet inside, 47 feet curb to curb and 49 feet wall to wall.
  - Dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of apparatus. See attached illustration for examples of approved turn around areas.
  - Bridges shall be approved by the City of Merced Engineering Department and conform to nationally recognized standards.
  - The grade and angle of approach shall be designed to allow for access of all fire department apparatus.
- Signage
  - Fire Department Access roads shall be designated as "Fire Lanes" and shall be posted in accordance with Section 22500.1 of the California Vehicle Code.
- Obstruction
  - The required width of a fire department access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances shall be maintained at all times.
  - All gates or other barriers serving fire department access roads shall be approved for type and width. All power gates shall be equipped with an approved Fire Department over-ride switch.
  - All entrances to fire department access roads shall not be obstructed by parked vehicles.

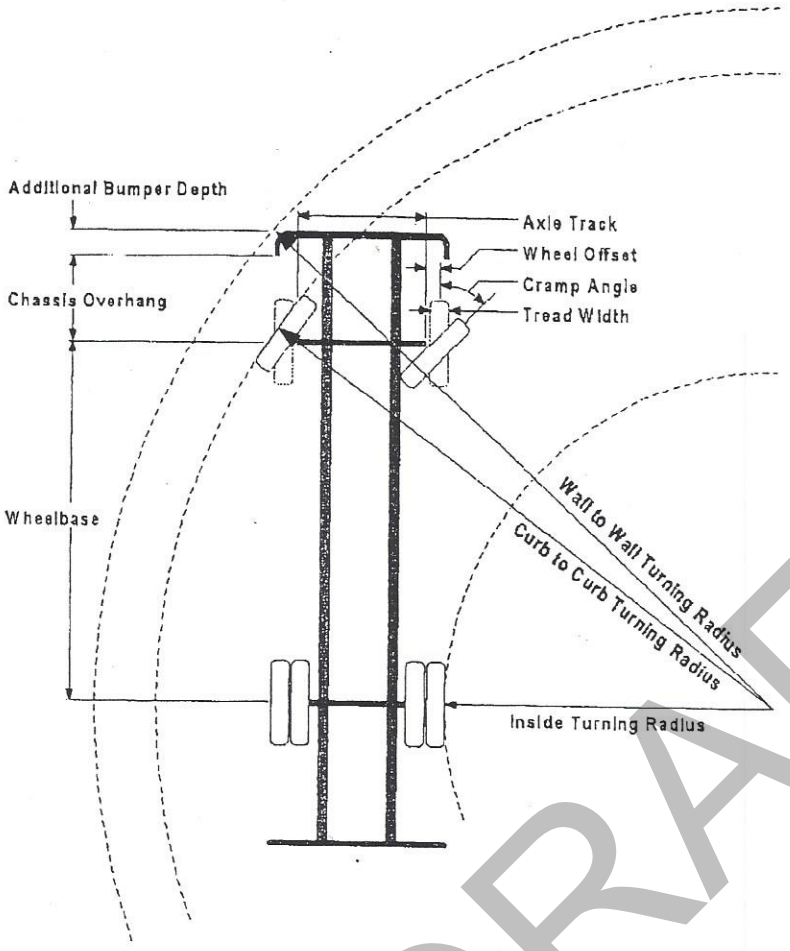
DRAFT

Turning Performance Analysis

10/1/2001

Bid Number: 2020
Department: MERCED CITY FIRE DEPARTMENT

Chassis: Dash-2000 Chassis, PAP/SkyArm/Midmount
Body: Aerial, Platform 85', No Pump, Alum Body



Parameters:

Inside Cramp Angle:	45°
Axle Track:	81.92 in.
Wheel Offset:	5.25 in.
Tread Width:	17.7 in.
Chassis Overhang:	78.99 in.
Additional Bumper Depth:	13 in.
Wheelbase:	243.50 in.

Calculated Turning Radii:

Inside Turn:	19 ft. 1 in.
Curb to Curb:	35 ft. 1 in.
Wall to Wall:	39 ft. 0 in.

Comments:

FOR CHIEF FRANCO

DRAFT

Components	PRIDE #	Description
Wheels, Front	0001656	Wheels, Frt, Steel 22.50" x 12.25" (385/425)
Bumpers	0012243	Bumper, 13" extended - all chassis'
Tires, Front	0031621	Tires, Michelin, 425/65R22.50 20 ply XZY tread
Aerial Devices	0046900	Aerial, 85' Pierce Platform
Axle, Front, Custom	0010275	Axle, Front, Meritor FL-943, 21,500#, w/assist, DLX/Qtm

Notes:

Actual Inside Cramp Angle may be less due to highly specialized options.

Curb to Curb turning radius calculated for a 9.00 inch curb.

Reduce turning radius by 33% if vehicle is equipped with all-wheel steer.

oct 02 01 08:37a GoldenStateFireApparatus (209) 522-0464 p.4

Turning Performance Analysis

10/15/2004

Definitions:

Inside Cramp Angle	Maximum turning angle of the front inside tire.
Axle Track	King-pin to king-pin distance of the front axle.
Wheel Offset	Offset from the center-line of the wheel to the king-pin.
Tread Width	W idth of the tire tread.
Chassis Overhang	Distance from the center-line of the front axle to the front edge of the cab. This does not include the bumper depth.
Additional Bumper Depth	Depth that the bumper assembly adds to the front overhang.
Wheelbase	Distance between the center lines of the vehicle's front and rear axles.
Inside Turning Radius	Radius of the smallest circle around which the vehicle can turn.
Curb to Curb Turning Radius	Radius of the smallest circle inside of which the vehicle's tires can turn. This measurement assumes a curb height of 9 inches.
Wall to Wall Turning Radius	Radius of the smallest circle inside of which the entire vehicle can turn. This measurement takes into account any front overhang due to the chassis, bumper extensions and/or aerial devices.

DRAFT

after delivery to the original purchaser as established by our original invoice, for a period of **12 months** after delivery to the original purchaser, Pierce Manufacturing Inc. ("Pierce") warrants to the user that its Fire and Rescue Apparatus vehicles are free of defects in material and workmanship. This limited warranty will apply only if the vehicle is properly maintained and used in service which is normal to the particular vehicle. Normal service means service which does not subject the vehicle to stresses or impacts greater than normally result from the careful use of the vehicle or chassis. If the buyer discovers a defect or nonconformity, it must notify Pierce in writing within 30 days after the date of discovery. This limited warranty is not transferable by the first user.

A copy of the Pierce warranty is included with this proposal.

BID BOND
A bid bond for 10% of the total amount of the proposal is enclosed.

PERFORMANCE BOND
Pierce Manufacturing will furnish a 100% performance bond within 30 days after award of the contract.

DASH® 2000 CHASSIS
The Pierce Dash 2000 is the custom chassis developed exclusively for the fire service. Chassis provided will be a new, tilt-type custom fire apparatus. The chassis will be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis will be designed and manufactured for heavy-duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis will be the manufacturers first line tilt cab.

SEATING CAPACITY
The seating capacity in the cab will be six (6) .

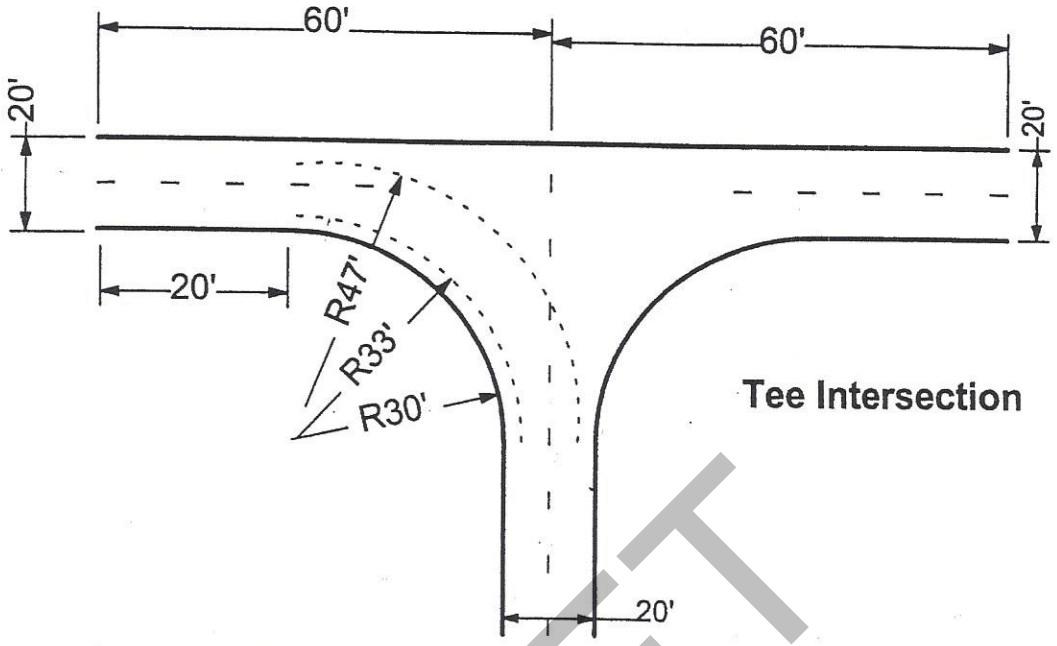
WHEELBASE
The wheelbase of the vehicle will be 243.50".

GVW RATING
The gross vehicle weight rating will be 69,500.

FRAME
The chassis frame will be built with two (2) steel channels bolted to six (6) cross members. The side rails will have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to a 10.75" over the rear axle. Each rail will have a section modulus of 25.992 in. sq. and a resisting bending moment (rbm) of 2,859,122 inch pounds over the critical regions of the frame assembly, with a section modulus of 18.96 in. sq. with an rbm of 2,085,803 inch pounds over the rear axle. The frame rails will be constructed of 110,000 psi yield strength heat treated .38" thick steel, with 3.50" wide flanges.

DRAFT

MERCED CITY FIRE DEPARTMENT



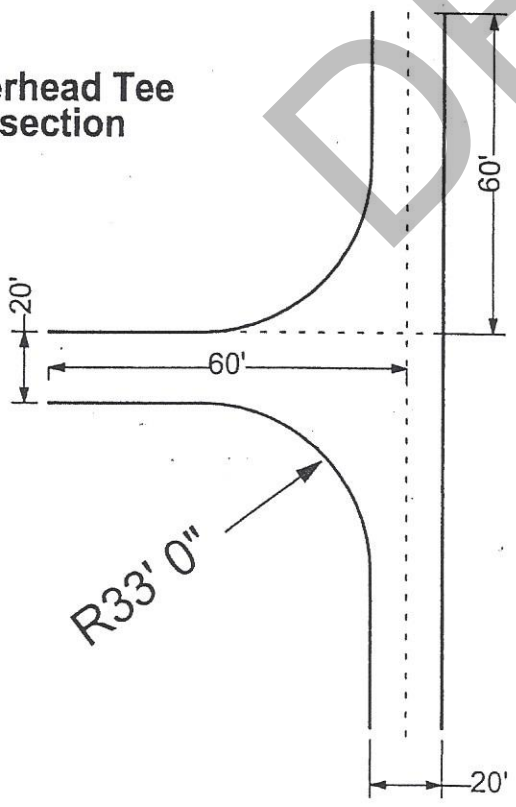
Tee Intersection

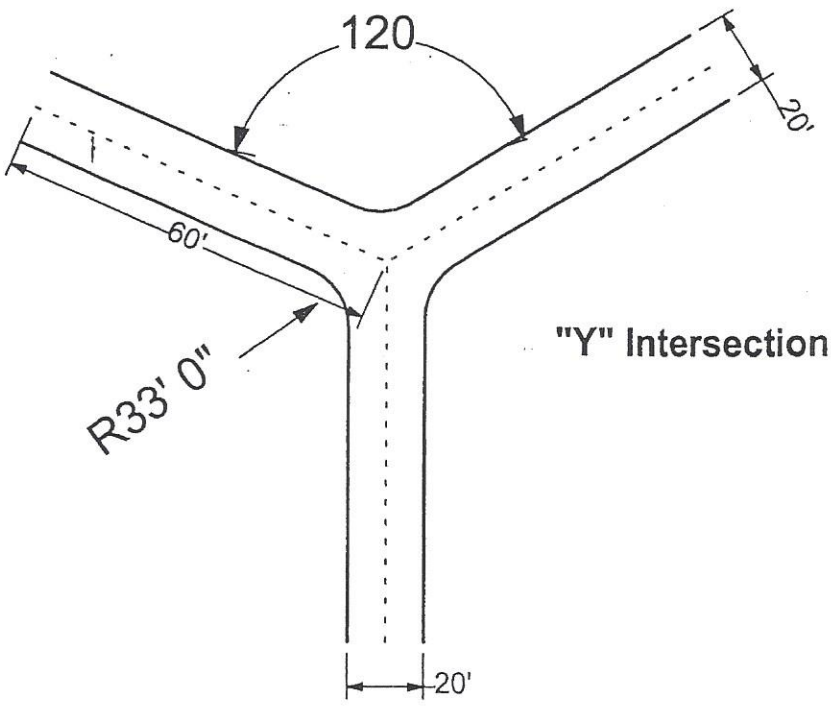
Apparatus Turning Radius Minimums

Inside	33'
Curb to Curb	47'
Wall to Wall	49'

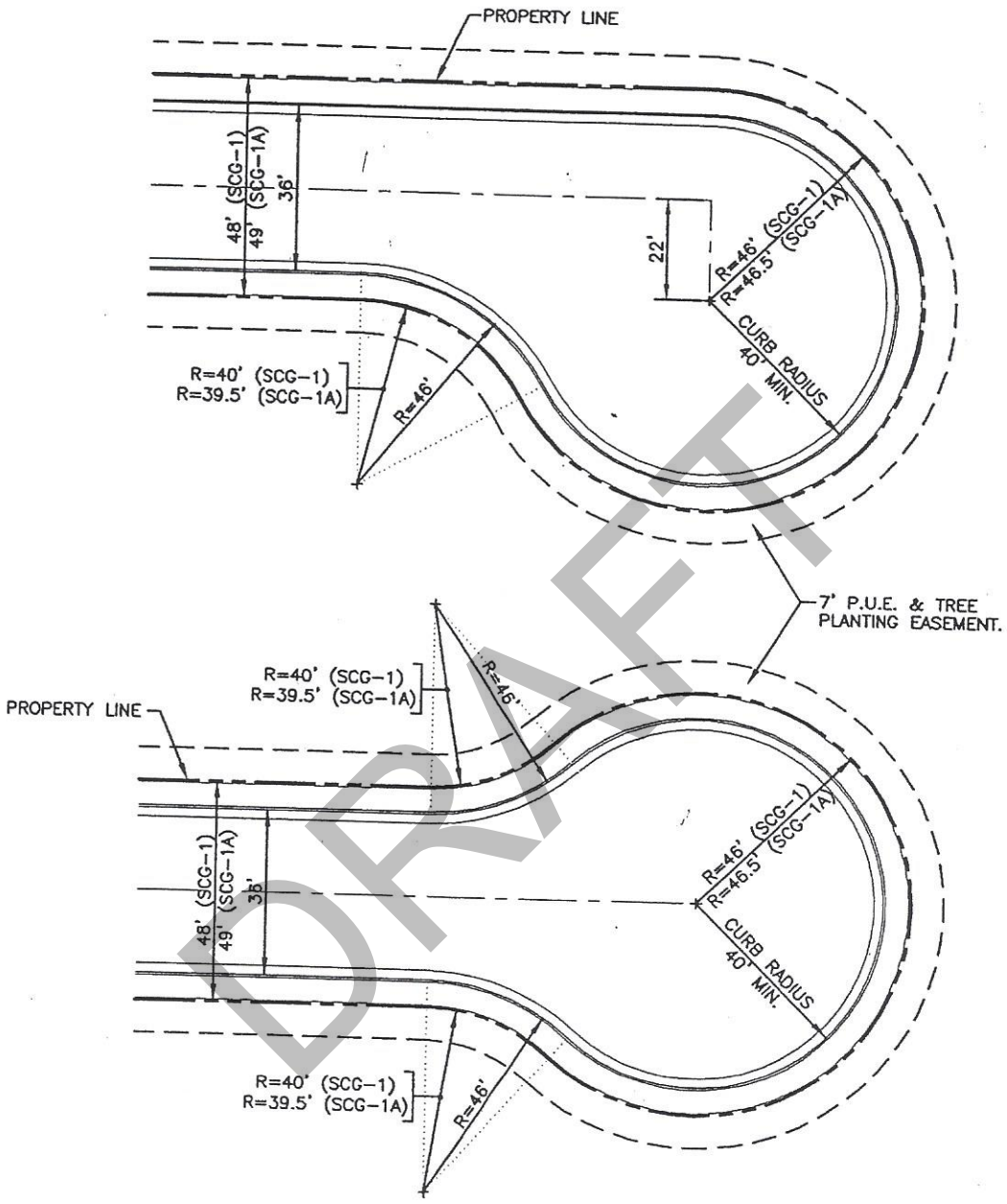
DRAFT

Hammerhead Tee Intersection





"Y" Intersection



DRAFT

NOTES:

1. SIDEWALK PATTERN TO BE DETERMINED BY THE CITY ENGINEER.
2. FOR SIDEWALK ADJACENT TO CURB, MONOLITHIC POUR OF SIDEWALK, CURB AND GUTTER IS ALLOWED.

SCALE 1"=40'

ENGINEERING DEPARTMENT

CITY OF MERCED, CA.

STANDARD CUL-DE-SAC

DRAWN: KGE	APPROVED BY: David L. Tucker	ST-4
DATE: 12/01	CITY ENGINEER — DATE 01/22/02	
REVISED:		SHEET OF

		F888	F439
Length of both trucks		44'	39'
Wheel base of both trucks		246.5"	241"
Weight of both trucks		70,740lbs	??
Length of basket in front of cab of 888		5'	N/A
Reach of both trucks at ideal operating angle	Out	22' @ 75deg	25'@ 75deg
	High	85'@ 75deg	105'@75deg
Turning radius of both trucks.		44'	??

DRAFT

Truck with Rear Stabilizers

Date: 2-11-08

Location: Co 51

Truck: Manufacturer: Pierce Date of Manufacture: 5/01

Number of Rear axles: 2

F-888

Aerial: Length: 85 ft Number of sections: 3 Stick or (Platform)?

Rated Capacity 1000

GVWR = 70,740 lbs Front = 18740

Rear = 52,000 Wheel base = 217"

Tires: Front = 9920 lbs @ 130 psi 2 tires = 19840 lbs

Rear duals = 6780 lbs @ 120 psi __ tires = 54,240 lbs

Water? in tank (?) = Yes / No

Axle Weights

	Driver's side	Passenger's side	
Front axle	8900	8600	17,500 lbs
Rear Axle: Intermediate	10,100	13,800	23'900
Rear	12,200	11,500	23,700
total =	31,200	33,900	64,100 lbs

Stabilizers: total lateral spread = 16 ft or inches 192 in

Front - Rear stabilizer spread = 18 ft

Stabilizer Forces

Aerial Orientation	Driver's side Front stabilizer	Driver's side Rear stabilizer	Passenger's side Front stabilizer	Passenger's side Rear stabilizer
Ladder bedded	17,300 lbs	7,100 lbs	12,500 lbs	11,000 lbs
Elevated @ 75°	15'300	10'500	10'300	12'800
Fully extended @ 75°	16,100	9,200	11,400	13,000
Rotate 90° to truck	.....	.....	.....	.....
75°	16,100	13,800	8400	12,800
60°	17,700	16,500	6'900	11,300
45°	19,100	19'200	5200	9'300
30°	20'100	21,200	4100	7200
15°	20'800	22400	3500	6,200
0°	21'000	22,900	3,100	5'500
with 200 lb tip load	21,300	23,600	2,800	5,300

DRAFT

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX D – FIRE APPARATUS ACCESS ROADS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	SFM		HCD			DSA		OSHPD				BSCC	DHS	AGR	DWR	CEC	CA	SL	SLC
		T-24	T-19*	1	2	1/AC	AC	SS	1	2	3	4								
Adopt Entire Chapter																				
Adopt Entire Chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below																				
[California Code of Regulations, Title 19, Division 1]																				
Chapter / Section																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

APPENDIX D

FIRE APPARATUS ACCESS ROADS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION D101
GENERAL

D101.1 Scope. Fire apparatus access roads shall be in accordance with this appendix and all other applicable requirements of the *California Fire Code*.

SECTION D102
REQUIRED ACCESS

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing at least 75,000 pounds (34 050 kg).

SECTION D103
MINIMUM SPECIFICATIONS

D103.1 Access road width with a hydrant. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103.1).

D103.2 Grade. Fire apparatus access roads shall not exceed 10 percent in grade.

Exception: Grades steeper than 10 percent as approved by the fire chief.

D103.3 Turning radius. The minimum turning radius shall be determined by the fire code official.

D103.4 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with width and turnaround provisions in accordance with Table D103.4.

TABLE D103.4
REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS

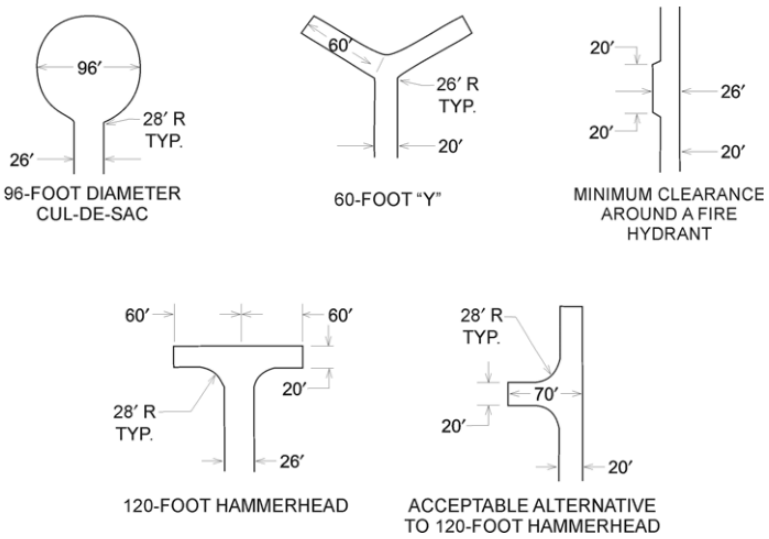
LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0-150	20	None required
151-500	20	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
501-750	26	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
Over 750	Special approval required	

For SI: 1 foot = 304.8 mm.

D103.5 Fire apparatus access road gates. Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. The minimum gate width shall be 20 feet (6096 mm).
2. Gates shall be of the swinging or sliding type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be approved by the fire code official.

Copyright to, or licensed by, ICC (ALL RIGHTS RESERVED); accessed by INDIVIDUAL USE ONLY pursuant to License Agreement. No further reproductions authorized.



For SI: 1 foot = 304.8 mm.

FIGURE D103.1
DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND

6. Manual opening gates shall not be locked with a padlock or chain and padlock unless they are capable of being opened by means of forcible entry tools or when a key box containing the key(s) to the lock is installed at the gate location.
7. Locking device specifications shall be submitted for approval by the fire code official.
8. Electric gate operators, where provided, shall be listed in accordance with UL 325.
9. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

D103.6 Signs. Where required by the fire code official, fire apparatus access roads shall be marked with permanent NO PARKING—FIRE LANE signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section D103.6.1 or D103.6.2.

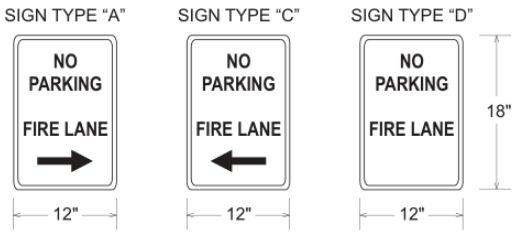


FIGURE D103.6
FIRE LANE SIGNS

D103.6.1 Roads 20 to 26 feet in width. Fire lane signs as specified in Section D103.6 shall be posted on both sides of fire apparatus access roads that are 20 to 26 feet wide (6096 to 7925 mm).

D103.6.2 Roads more than 26 feet in width. Fire lane signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

SECTION D104
COMMERCIAL AND INDUSTRIAL DEVELOPMENTS

D104.1 Buildings exceeding three stories or 30 feet in height. Buildings or facilities exceeding 30 feet (9144 mm) or three stories in height shall have at least two means of fire apparatus access for each structure.

D104.2 Buildings exceeding 62,000 square feet in area. Buildings or facilities having a gross building area of more than 62,000 square feet (5760 m^2) shall be provided with two separate and approved fire apparatus access roads.

Exception: Projects having a gross building area of up to 124,000 square feet (11 520 m^2) that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.

D104.3 Remoteness. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses.

Copyright to, or licensed by, ICC (ALL RIGHTS RESERVED); accessed by INDIVIDUAL USE ONLY pursuant to License Agreement. No further reproductions authorized.

SECTION D105
AERIAL FIRE APPARATUS ACCESS ROADS

D105.1 Where required. Where the vertical distance between the grade plane and the highest roof surface exceeds 30 feet (9144 mm), approved aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater.

D105.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

D105.3 Proximity to building. At least one of the required access routes meeting this condition shall be located within a minimum of 15 feet (4572 mm) and a maximum of 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be approved by the fire code official.

D105.4 Obstructions. Overhead utility and power lines shall not be located over the aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the fire code official.

SECTION D106
MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS

D106.1 Projects having more than 100 dwelling units. Multiple-family residential projects having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads.

Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.

D106.2 Projects having more than 200 dwelling units. Multiple-family residential projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus access roads regardless of whether they are equipped with an approved automatic sprinkler system.

SECTION D107
ONE- OR TWO-FAMILY RESIDENTIAL DEVELOPMENTS

D107.1 One- or two-family dwelling residential developments. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads, and shall meet the requirements of Section D104.3.

Exceptions:

1. Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the *California Fire Code*, access from two directions shall not be required.
2. The number of *dwelling units* on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

D108
REFERENCED STANDARDS

ASTM	F 2200—05	Standard Specification for Automated Vehicular Gate Construction	D103.5
UL	325—02	Door, Drapery, Gate, Louver, and Window Operators and Systems, with Revisions through February 2006	D103.5

Copyright to, or licensed by, ICC (ALL RIGHTS RESERVED); accessed by INDIVIDUAL USE ONLY pursuant to License Agreement. No further reproductions authorized.

Copyright to, or licensed by, ICC (ALL RIGHTS RESERVED); accessed by INDIVIDUAL USE ONLY pursuant to License Agreement. No further reproductions authorized.

http://www.pge.com/nots/rates/tariffs/2003-e.shtml

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, *Governor*

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

Tel. No. (415) 703-1691

November 25, 2003 Advice Letter 2435-E

Ms Anita Smith, Rate Analyst
Pacific Gas and Electric Company
77 Beale Street, Mail Code 10B
San Francisco, CA 94177

Subject: Agreement with the Regents of the University of California in Accordance with GO 96-A, Sec. XB

Dear Ms Smith:

Advice Letter 2435-E is effective October 31, 2003. A copy of the advice letter is returned herewith for your records.

Sincerely,

Paul Clanon

Paul Clanon, Director
Energy Division

jjr

Pacific Gas and Electric Company

Karen A. Tomcala
Vice President
Regulatory Relations

77 Beale Street, Room 1065
San Francisco, CA 94105

Mailing Address
Mail Code B10A
P.O. Box 770000
San Francisco, CA 94177

415.972.5209
Internal: 222.5209
Fax: 415.972.5625
Internet: KAT5@pge.com

October 31, 2003

Advice 2435-E
(Pacific Gas and Electric Company ID E)

Public Utilities Commission of the State of California

Subject **Submits Agreement With The Regents of the University of California In Accordance With General Order 96-A, Section X.B**

Pacific Gas and Electric Company (the Company) hereby submits, in accordance with General Order (G.O.) 96-A, Section X.B, an agreement between the Company and the Regents of the University of California, a corporation organized and existing under the laws of the State of California (hereinafter referred to "UC Merced"), regarding the construction and operation of electric distribution facilities to serve its university campus in eastern Merced County. The affected tariff sheets are attached and identified in Attachment.[1]

Background

UC Merced is developing a university campus in eastern Merced County, to be known as the University of California, Merced (the "UC Merced Campus"). The attached Agreement is the result of the Company's response to a request for bids by UC Merced to provide cost effective and reliable electrical distribution service to UC Merced's campus.

On September 24, 2001, UC Merced issued a Request For Proposal ("RFP") to provide electrical distribution service to UC Merced's campus. UC Merced addressed its RFP to, among others, the Company.[2] On October 15, 2001, the

[1] The Company reserves all legal rights to challenge the decisions or statutes under which it has been required to make this advice filing, and nothing in this advice filing constitutes a waiver of such rights. Also, the Company reserves any additional legal rights to challenge the requirement to make this advice filing by reason of its status as a debtor under Chapter 11 of the Bankruptcy Code, and nothing in this advice filing constitutes a waiver of such rights.

[2] In the vicinity of the planned UC Merced campus, PG&E competes for new loads with the

Company submitted a Response to UC Merced's RFP. The Company's Response to the RFP contained several service configuration options. UC Merced and PG&E thereafter exchanged a series of communications to clarify UC Merced's selection of a specific service configuration and PG&E's proposal to serve the UC Merced campus based upon the selected service configuration. On January 25, 2002, UC Merced notified PG&E that it had been selected as the preferred bidder based upon PG&E's RFP Response, as clarified and supplemented.

Following UC Merced's selection of PG&E as the preferred bidder to provide electric service, UC Merced and the Company negotiated the Agreement Between The Regents Of The University Of California And Pacific Gas And Electric Company To Provide Electric Service To The UC Merced Campus (the "Agreement") to memorialize the terms of their contract. On October 3, 2003, UC Merced approved the Agreement. A true and correct copy of the Agreement is attached as Exhibit A.

The basic elements of the transaction are that the Company will provide a dual feed electric distribution system to meet UC Merced's reliability requirements for the UC Merced Campus. The dual feed distribution facilities consist of an independent 12 kV distribution circuit from each of the Company's El Capitan and Wilson substations. The circuits closest to the proposed service points for the UC Merced Campus are overhead lines with some underground segments. The existing circuit from El Capitan substation will be extended underground for approximately 1,100 feet to its service point located on the UC Merced Campus. The existing circuit from the Wilson substation will be partially reconstructed and extended overhead, and then extended underground for the last 1,100 feet to the second service point located on the UC Merced Campus. Only one circuit at a time will serve UC Merced, but limited periods of parallel operation will be permitted in accordance with an operating agreement entered into by the parties (the form of which is set forth as Exhibit B of the Agreement). Under the Agreement, the Company has agreed to promptly commence construction of the distribution facilities to serve the UC Merced Campus, and service will be ready from the normal distribution feeder on March 15, 2004 and from the alternate distribution feeder on April 15, 2004.

The term of the Agreement is fifteen (15) years, and there is an "evergreen" clause which will renew the term automatically for ten (10) successive one-year periods. During the term, the Company will provide electric distribution service to the UC Merced Campus pursuant to the Company's electric tariff rules on file and approved from time to time by the Commission. Under the Agreement, the Company will maintain the dual feed distribution facilities serving the UC Merced Campus in accordance with the Commission's General Orders 95, 128 and 165, and all other applicable Commission orders and regulations.

Merced Irrigation District. It is PG&E's understanding that Merced Irrigation District also submitted a Response to UC Merced's RFP.

Under the Agreement, the Company has the exclusive right to provide service for all of the electric load for the UC Merced Campus for the term of the Agreement, subject to the following exceptions: 1) UC Merced may use the generated output of the Fairfield Hydroelectric facility owned by Merced County and Merced Irrigation District (not to exceed 970 peak kW); 2) UC Merced has the right to establish an "over the fence" connection in accordance with California Public Utilities Code section 218 with the proposed campus community to receive renewable power; and 3) UC Merced may provide electricity for some of its own load using renewable power or co-generation generated within the boundaries of the UC Merced Campus.

UC Merced retains the right to terminate service under the Agreement prior to the expiration of the term, without incurring the penalties for service termination applicable under standard provisions of Rules 15 and 16. Upon either termination or expiration of the Agreement, however, UC Merced may be required to pay a facility termination charge to the Company, depending on whether or not the Company has recovered the cost of both its capital investment and projected operating expenses from the distribution revenue received from UC Merced. The facility termination charge is based upon the cost of the dual feed distribution facilities installed under the Agreement, and is designed to ensure provision or termination of this service is not to the detriment of other ratepayers. The facility termination charge is based on a formula set out in Section 8.3 of the Agreement and in a table set forth in Exhibit E. In summary, UC Merced may terminate service in any year of the contract term. In the year in which UC Merced wishes to terminate service, however, PG&E shall compare actual revenues received to the cost of installation, operation and maintenance of the facilities serving the campus, including taxes and cost of capital. Upon termination of service, UC Merced has agreed to pay to PG&E all current and accumulated costs of service, as well as any other tariffed charges applicable at the time of termination.

As part of the transaction, UC Merced is entering into a special facilities agreement with respect to the capacity reservation charge for alternate feeder capacity. UC Merced is also paying the capital cost and entering into a special facilities agreement with respect to metering of the alternative feeder second service. UC Merced is also paying the Income Tax Component of Contributions (ITCC) on the metering of the second service. The total costs associated with these special facilities is $24,258. These costs are itemized in Section 5.0 of the Agreement and the special facilities agreements are attached to the Agreement as Exhibits G and H.

The transaction between the Company and UC Merced consists of:

1) Agreement Between The Regents Of The University Of California And Pacific Gas And Electric Company To Provide Electric Service To The UC Merced Campus (Tab A)

The Lists of Contracts and Deviations have been revised to reflect the

agreement, the affected tariff sheet is listed on Enclosure 1.

This filing will not increase any rate of charge, cause the withdrawal of service, or conflict with any rate schedule or rule.

Protest

Anyone wishing to protest this filing may do so by sending a letter by **November 19, 2003**, which is 20 days from the date of this filing. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. Protests should be mailed to:

IMC Branch Chief – Energy Division
California Public Utilities Commission
505 Van Ness Avenue, 4th Floor
San Francisco, California 94102
Facsimile: (415) 703-2200
E-mail: jjr@cpuc.ca.gov

Protests also should be sent by e-mail and facsimile to Mr. Jerry Royer, Energy Division, as shown above, and by U.S. mail to Mr. Royer at the above address.

The protest should be sent via both e-mail and facsimile to the Company on the same date it is mailed or delivered to the Commission at the address shown below.

Pacific Gas and Electric Company
Attention: Brian J. Cherry
Director, Regulatory Relations
77 Beale Street, Mail Code B10C
P.O. Box 770000
San Francisco, California 94177
Facsimile: (415) 973-7226
E-mail: RxDd@pge.com

Effective Date

In accordance with Section X.B. of General Order 96-A, the Company hereby notifies all interested parties that this advice filing shall become effective on the date filed, **October 31, 2003.**

Notice

In accordance with General Order 96-A, Section III, Paragraph G, a copy of this advice letter is being sent electronically and via postal mailing to parties shown on the attached list. Address change requests should be directed to Sandra

Ciach at (415) 973-7572. Advice letter filings can also be accessed electronically at:

http://www.pge.com/customer_services/business/tariffs/

Karen A. Tomcala/SLT
Vice President - Regulatory Relations

cc: University of California, Merced Campus

Attachments

Cal P.U.C. Sheet No.	Title of Sheet	Canceling Cal P.U.C. Sheet No.
20831-E	Lists of Contracts and Deviations	12035-E
20832-E	Table of Contents (Rules and Contracts and Deviations)	20610-E
20833-E	Table of Contents	20814-E

LIST OF CONTRACTS AND DEVIATIONS
(Continued)

Name and Location of Customer / PG&E Installation Reference No.	Type or Class of Service	Execution and Expiration Dates	Commission Authorization Number and Date	Most Comparable Regular Tariff: Schedule or Rule No.	Most Comparable Regular Tariff: Contract Difference	
SAN JOAQUIN VALLEY REGION (Cont'd.)						
Supplemental Power						
Stockton Cogen., Co. and CPC International, Stockton	General Service	12-20-88	Res. E-3166	Rule 18	Deviation from Submetering Restrictions	
The Regents of University of California, Merced Campus	General Service	9-2003 9-2018	G.O.96-A.X.B Advice 2432-E	Rules 15, 16	Special Rate	(N) I (N)
Developers/Subdividers						
Boise Cascade Pine Mountain Lake Tuolumne County	General Service	11-18-69 6-19-70 10-14-70 11-4-70 3-16-71 3-21-72 1-21-72 Indefinite	D-77186; 5-5-70 Res. E-1285 5-4-71 Res. E-1295 9-1-71 Res. E-1297 9-1-71 Res. E-1341 9-26-72 Res. E-1348 12-12-72	Rules 15 and 15.1	Annual Charge for Excess Facilities	
Boise Cascade Rancho Calaveras Calaveras County	Domestic Service	10-28-70	G.O.96-A,X.A. Res. E-1287 5-25-71	Rule 15	Annual Charge for Excess Facilities	
Boise Cascade Lake Don Pedro Subd. Tuolumne and Mariposa Counties (3 Agreements)	General Service	2-19-71	G.O.96-A,X.A. Res. E-1298 9-1-71	Rule 15	Annual Charge for Excess Facilities	
Boise Cascade Recreation Communities (Subdivider) Charge Lake Don Pedro La Grange Tuolumne County	Domestic	6-29-71 –	Res. E-1784 8-22-78	Rule 15	Cost of Ownership Charge	

(Continued)

TABLE OF CONTENTS
(Continued)
RULES

RULE	TITLE OF SHEET	CAL P.U.C. SHEET NO.
1	Definitions	14855,16368,14857 to 14861,19095,14863 to 14865,19403,14867 to14871, 15564,14873,14874-E
2	Description of Service	11257,11896,11611, 14079,11261 to 11264,11498,11266,11267,11499,11269 to 11278,14055,11280 to 11283-E
3	Application for Service	11714,14875-E
4	Contracts	13612-E
5	Special Information Required on Forms	11287,14192,11289-E
6	Establishment and Re-establishment of Credit	14193,14194-E
7	Deposits	11300,11301-E
8	Notices	14144,14145,13137,14146,13139-E
9	Rendering and Payment of Bills	16369,14877,14878,13986,14317,14318-E
10	Disputed Bills	11308 to 11310-E
11	Discontinuance and Restoration of Service	13140 to 13150,14080,13152-E
12	Rates and Optional Rates	16872,16873,16874-E
13	Temporary Service	15573,15574-E
14	Shortage of Supply and Interruption of Delivery	15526,15527-E
15	Distribution Line Extensions	15575,15576,15577,15578,17850,17851, 17852,15582,15583,17853,17854,17855,15587,15588,17856,17857,15591,16986,15593-E
16	Service Extensions	15594, 15595,14880,14881,15596 to 15598,16987,15600 to 15608,14254,13775,15609,15610-E
17	Meter Tests and Adjustment of Bills for Meter Error	14885,12050 to 12052-E
17.1	Adjustment of Bills for Billing Error	14886,12054-E
17.2	Adjustment of Bills for Unauthorized Use	14887,12056 to 12058-E
18	Supply to Separate Premises and Submetering of Electric Energy	14329,14330,13396,13276-E
19	Medical Baseline Quantities	14346,13839,13518-E
19.1	California Alternate Rates for Energy for Individual Customers and Submetered Tenants of Master-Metered Customers	16391,18922,16393,16394-E
19.2	California Alternate Rates for Energy for Nonprofit Group-Living Facilities	13728,18923,13589,13730,13591-E
19.3	California Alternate Rates for Energy for Qualified Agricultural Employee Housing Facilities	13899,18924,13901,13902-E
20	Replacement of Overhead with Underground Electric Facilities	19012,11240,11241,19013,16665,15611,19014-E
21	Generating Facility Interconnections	19404 to 19407,20600,20601,19410 to 19425,20602,19427 to 19453-E
22	Direct Access Service	14888,14889, 15565,14891 to 14901,16448,14903,14904,16449,16235 to 16243,14913,16244,16245, 16384,14917,15833 to 15836,14920,14921,15568,14923,15569,14925,14926,15190,15191, 14929,14930,16385,16386,14933,16387,14935,14936,15192,14938 to 14946,16388-E

SERVICE AREA MAPS:

Boundary Lines		10534-E
Map A	Lassen Municipal Utility District/Surprise Valley	10423-E
Map B	Sacramento Municipal Utility District	4524-E
Map C	Modesto Irrigation/Turlock Irrigation District	4525-E
Map D	SoCalEdison	4671-E
Map E	Palo Alto	4672-E
Map F	Redding	13310-E
Map G	Healdsburg	13079-E
Map H	Lompoc	13372-E
Map I	Gridley	13780-E

LIST OF CONTRACTS AND DEVIATIONS: 13819,13794,14452,12000,12001,13672,12003,13456,11435, 12004,17021,12006,14162,12008,12009,11191,12010,11193,11194,11195,12969, 15050,12012,13466, 12014,12015,13296,12955,14221,12018 to 12024,17259,12026,13092,11211,12027,12028,16703,12030, 12031,14035,11217,12032,12033,11219,12034,20831,12036,11223,11986,11987,17007,16898,11227-E (T)

(Continued)

TABLE OF CONTENTS

	CAL P.U.C. SHEET NO.	
Title Page	8285-E	
Table of Contents:		
Rate Schedules	20833,20813,20805-E	(T)
Preliminary Statements	20088,20087-E	
Rules, Maps, Contracts and Deviations	20832-E	(T)
Sample Forms	19880,20377,20196,19236,18911,19572,20804-E	

RATE SCHEDULES

SCHEDULE	TITLE OF SHEET	CAL P.U.C. SHEET NO.
	RESIDENTIAL RATES	
E-1	Residential Service	20634,20635,19910,20636,20637-E
E-2	Experimental Residential Time-of-Use Service	19882,20638,20639,20235, 19887,20640,20641-E
E-3	Experimental Residential Critical Peak Pricing Service	19990,20642,20643 19894 to 19896,20644,20645-E
EE	Service to Company Employees	18188-E
EM	Master-Metered Multifamily Service	20646,20647,20648,20649,20650-E
ES	Multifamily Service	20651,20652,19920,20653,20654-E
ESR	Residential RV Park and Residential Marina Service	20655,20656,20657,20658,20659-E
ET	Mobilehome Park Service	20660,20661,19930,20662,20663-E
E-7	Residential Time-of-Use Service	19170,20664,20665,20666,20667-E
E-A7	Experimental Residential Alternate Peak Time-of-Use Service	19172,20668,20669,20670,20671-E
E-8	Residential Seasonal Service Option	20672,20673,20674-E
E-9	Experimental Residential Time-of-Use Service for Low Emission Vehicle Customers	19176,20675,20676,20677,20678,20679,20680,20681-E
EL-1	Residential CARE Program Service	20682,19951,20683,20684-E
EML	Master-Metered Multifamily CARE Program Service	20685,19955,20686,20687-E
ESL	Multifamily CARE Program Service	20688,19959,20689,20690-E
ESRL	Residential RV Park and Residential Marina CARE Program Service	20691,19963,20692,20693-E
ETL	Mobilehome Park CARE Program Service	20694,19967,20695,20696,20697-E
EL-7	Residential CARE Program Time-of-Use Service	19990,20698,19781,20699-E
EL-A7	Experimental Residential CARE Program Alternate Peak Time-of-Use Service	19192,20700,19783,20701-E
EL-8	Residential Seasonal CARE Program Service Option	20702,20703,20704-E
	COMMERCIAL/INDUSTRIAL	
A-1	Small General Service	20706,20707,20708,20709-E
A-6	Small General Time-of-Use Service	19790,20710,19791,20711,20712-E
A-10	Medium General Demand-Metered Service.	19794,20713,20714,19987,20715,20716,19990-E
A-T	Nondomestic Interruptible Service	11862-E
A-RTP	Experimental Real-Time-Pricing Service	19991-E
A-15	Direct-Current General Service	20717,20718-E
E-19	Medium General Demand-Metered Time-of-Use Service	19797,17092,17093,20719,20720, 20721,19996,19603,20722,20723,18037,18864,18039,18040,18865,17900,16414,15330, 20724,20725,20726,20003,20004,19800,19801,20727,20728,20729,19805,20730,20731-E
E-20	Service to Customers with Maximum Demands of 1,000 Kilowatts or More	19209,17254,20732, 20733,20734,20010,20735,19314,20736,18866,18044,18045,18867,15356,16430,15358, 20737,20738,20739,20016,20017,16434,16435,16436,20740,20741,17101,20742-E

(Continued)

PG&E Electric Advice Filing List
General Order 96-A, Section III(G)

ABAG Power Pool
ACN Energy, Inc.
Aglet Consumer Alliance
Agnews Developmental Center
Ahmed, Ali
Alcantar & Elsesser
Anderson Donovan & Poole P.C.
Applied Power Technologies
APS Energy Services Co Inc
Arter & Hadden LLP
Avista Corp
Barkovich & Yap, Inc.
BART
Bartle Wells Associates
Blue Ridge Gas
Bohannon Development Co
BP Energy Company
Braun & Associates
C & H Sugar Co.
CA Bldg Industry Association
CA Cotton Ginners & Growers Assoc.
CA League of Food Processors
CA Water Service Group
California Energy Commission
California Farm Bureau Federation
California ISO
Calpine
Calpine Corp
Calpine Gilroy Cogen
Cambridge Energy Research Assoc
Cameron McKenna
Cardinal Cogen
Cellnet Data Systems
Childress, David A.
City of Glendale
City of Healdsburg
City of Palo Alto
City of Redding
CLECA Law Office
Constellation New Energy
CPUC
Creative Technology
Crossborder Inc
CSC Energy Services
Davis, Wright Tremaine LLP
Davis, Wright, Tremaine, LLP
Defense Fuel Support Center
Department of the Army
Department of Water & Power City
Dept of the Air Force
DGS Natural Gas Services
DMM Customer Services
Downey, Brand, Seymour & Rohwer
Duke Energy
Duke Energy North America
Duncan, Virgil E.
Dutcher, John
Dynegy Inc.
Ellison Schneider
Energy Law Group LLP
Enron Energy Services
Exeter Associates
Foster, Wheeler, Martinez
Franciscan Mobilehome
Future Resources Associates, Inc
GLJ Energy Publications
Goodin, MacBride, Squeri, Schlotz &
Grueneich Resource Advocates
Hanna & Morton
Heeg, Peggy A.
Hogan Manufacturing, Inc
House, Lon
Imperial Irrigation District
Integrated Utility Consulting Group
International Power Technology
J. R. Wood, Inc
JTM, Inc
Kaiser Cement Corp
Korea Elec Power Corp
Marcus, David
Masonite Corporation
Matthew V. Brady & Associates
Maynor, Donald H.
McKenzie & Assoc
McKenzie & Associates
Meek, Daniel W.
Meyer, Joseph
Mirant California, LLC
Modesto Irrigation Dist
Morrison & Foerster
Morse Richard Weisenmiller & Assoc.
New United Motor Mfg, Inc
Norris & Wong Associates
North Coast Solar Resources
Northern California Power Agency
Occidental Energy Marketing
PG&E National Energy Group
Pinnacle CNG Company
PPL EnergyPlus, LLC
Price, Roy
Product Development Dept
Provost Pritchard
R. M. Hairston & Company
R. W. Beck & Associates
Recon Research
Regional Cogeneration Service
RMC Lonestar
Sacramento Municipal Utility District
SCD Energy Solutions
Seattle City Light
Sempra
Sempra Energy
Sequoia Union HS Dist
SESCO
Sierra Pacific Power Company
Silicon Valley Power
Simpson Paper Company
Smurfit Stone Container Corp
Southern California Edison
SPURR
St. Paul Assoc
Stanford University
Sutherland, Asbill & Brennan
Tabors Caramanis & Associates
Tansev and Associates
Tecogen, Inc
TFS Energy
TJ Cross Engineers
Transwestern Pipeline Co
Turlock Irrigation District
United Cogen Inc.
URM Groups
Utility Cost Management LLC
Utility Resource Network
Wellhead Electric Company
Western Hub Properties, LLC
White & Case
WMA

AGREEMENT BETWEEN THE REGENTS OF THE UNIVERSITY OF CALIFORNIA AND PACIFIC GAS AND ELECTRIC COMPANY TO PROVIDE ELECTRIC SERVICE TO THE UC MERCED CAMPUS

This Agreement ("Agreement") is entered into the 9th day of October, 2003, between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a corporation organized and existing under the laws of the State of California ("UC Merced"), and PACIFIC GAS AND ELECTRIC COMPANY, a corporation organized and existing under the laws of the State of California, and having its principal office and place of business at 77 Beale Street, San Francisco, California ("PG&E.") UC Merced and PG&E will sometimes be referred to collectively as "Parties."

RECITALS

1. The University of California is developing a university campus in eastern Merced County, to be known as the University of California, Merced. As of the date of this Agreement, construction has begun on the site of the campus.

2. On September 24, 2001 UC Merced issued a Request For Proposal ("RFP") to provide cost effective and reliable electrical distribution service to UC Merced's campus.

3. On October 15, 2001, PG&E submitted a Response to UC Merced's RFP by delivery to the UC Office of the President. As submitted, PG&E's Response to the RFP contained several service configuration options from which UC Merced could choose.

4. Following submittal of PG&E's Response to the RFP, UC Merced and PG&E exchanged a series of communications which served to clarify UC Merced's selection of a specific service configuration and PG&E's proposal to serve the UC Merced campus based upon such a service configuration. As a result of UC Merced's selection of a service configuration, elements of PG&E's Response to the RFP were modified and/or supplemented. Among other things, PG&E's Response to the RFP provided an estimate of reliability predicated on historical data of the existing Wilson-Atwater 115 kV transmission lines, the El Capitan 1102 and Wilson 1102 12kV distribution circuits and the installation of a S&C Power Operated PMH automated high-speed transfer switch capable of switching between two independent power sources under load within 15 cycles. Following submittal of PG&E's Response to RFP, UC Merced elected to install the automatic transfer switch in accordance with PG&E's design and specifications for the switch.

5. On January 25, 2002, UC Merced notified PG&E that it had been selected as the preferred bidder based upon PG&E's RFP Response, as clarified and supplemented.

6. Pursuant to California Public Utilities Commission General Order 96-A, Section X.B., PG&E has the authority to enter into contracts with governmental entities, such as UC Merced, that depart from filed tariff schedules.

7. PG&E has filed a Plan of Reorganization with the United States Bankruptcy Court in San Francisco. PG&E and the California Public Utilities Commission staff have entered into a proposed settlement of the bankruptcy proceedings which provides that PG&E will emerge from Chapter 11 protection in early 2004 as a vertically integrated utility. The proposed settlement is subject to further approval by the CPUC, PG&E's board of directors and PG&E Corporation. The proposed settlement must also be incorporated into a new Plan of Reorganization to be submitted to the Bankruptcy Court for its approval.

8. The Parties desire to enter into an agreement to memorialize the terms and conditions for the electrical interconnection service to UC Merced's campus.

NOW, THEREFORE, in consideration of the terms, and covenants contained herein, UC Merced and PG&E hereby agree as follows:

AGREEMENT

1.0 MEANING OF TERMS

As used in this Agreement, the following terms shall be defined as provided in this section.

1.1 "Accrued Annual Net" means the difference between PG&E's Annual Distribution Revenue Requirement and the Annual Distribution Revenue received from UC Merced, plus the Accrued Annual Net of the previous year.

1.2 "Annual Distribution Revenue" means the actual annual revenue received by PG&E from UC Merced related to the distribution system component of PG&E's electric Tariff used to calculate campus electric charges

1.3 "Annual Distribution Revenue Requirement" means those amounts set forth in Exhibit E, Line 1 that represent PG&E's cost of owning and maintaining the dual feed Distribution Facilities to the UC Merced Campus. These charges include depreciation, bond interest, regulated rate of return, income tax, ad valorum tax, insurance and maintenance. The Annual Distribution Revenue Requirement set forth in Exhibit E, Line 1 shall for all purposes be deemed to be PG&E's cost of owning and maintaining the dual feed Distribution Facilities to the UC Merced Campus during the term of this Agreement, and shall not be subject to any modification except by mutual consent of the parties to this agreement.

1.4 "Capital Base" means those amounts set forth in Exhibit E, Line 4 that represent PG&E's depreciated investment in the dual feed Distribution Facilities to the UC Merced Campus. The Capital Base set forth in Exhibit E, Line 4 shall for all purposes be deemed to be PG&E's depreciated investment to the UC Merced Campus, and shall not be subject to any modification except by mutual consent of the parties to this agreement.

1.5 "the Commission" refers to the California Public Utilities Commission, or its regulatory successor, as applicable.

1.6 "Co-generation" means the sequential use of energy for the production of electrical and useful thermal energy. The sequence can be thermal use followed by power production or the reverse, subject to the following standards:

(a) At least 5 percent of the facility's total annual energy output shall be in the form of useful thermal energy.

(b) Where useful thermal energy follows power production, the useful annual power output plus one-half the useful annual thermal energy output equals not less than 42.5 percent of any natural gas and oil energy input.

1.7 "Distribution Facilities" refers to the utility infrastructure facilities in service and planned to deliver electricity to the UC Merced Campus.

1.8 "Effective Date" means the date, following execution of this Agreement by PG&E and UC Merced, that PG&E advice files a copy of this Agreement with the Commission pursuant to General Order 96-A, Section X.B.

1.9 "Facility Termination Charge" refers to the charge arising from the unilateral termination or the expiration of this Agreement and based upon the cost of the dual feed Distribution Facilities installed under this Agreement, as calculated pursuant to Section 8.3 and Exhibit E of this Agreement. The Facilities Termination Charge shall be paid to PG&E upon unilateral termination or the expiration of this Agreement. The Facilities Termination Charge does not include any charges to which PG&E may be legally entitled under PG&E's Tariffs or under applicable law, including without limitation, non-bypassable charges, and any charges owed for the electric service furnished to the UC Merced Campus through the date of expiration or termination.

1.10 "Governmental Authority" means any government or any agency, bureau, board, commission, court, department, official, political subdivision, tribunal or other instrumentality of any government, whether federal, state or local, domestic or foreign.

1.11 "Parallel Operation" refers to UC Merced's capability to utilize its automatic transfer switch (to be located at the Main Campus Central Plant) to momentarily parallel PG&E's distribution circuits in accordance with the operating agreement

to be entered into by the Parties in the form attached as Exhibit B attached hereto and incorporated by reference.

1.12 "Renewable Power" means electricity generated from one of the following non-combustion sources: wind-powered generation, fuel cells and solar photovoltaic generation.

1.13 "Service Point" means the point at which PG&E would deliver Utility Service to UC Merced. There will be two such Service Points provided by PG&E under this Agreement.

1.14 "Tariffs" refers to the entire body of rates, rate schedules, rentals, charges, classifications, and rules collectively applied by PG&E and on file with the Commission and approved from time to time by the Commission and any other regulators and includes all preliminary statements and appendices.

1.15 "UC Merced Campus" shall refer to the site of the campus facilities located on the former Merced Hills Golf Course, on property south of Lake Yosemite Regional Park, two miles north and east of the City of Merced, in the vicinity of Lake Road and Bellevue Road, and all other lands identified as the location of the campus in the University of California Merced Long Range Development Plan dated January 2002, and the Final Environmental Impact Report dated January 2002. A legal description of the initial UC Merced Campus is set forth in Exhibit A, which is attached hereto and incorporated by reference.

1.16 "Utility Service" means electric distribution utility service and all aspects of delivery and associated delivery service furnished by PG&E pursuant to PG&E's Tariffs on file and approved from time to time by the Commission and any other regulators relating to such Utility Service.

2.0 DUAL FEED DISTRIBUTION FACILITIES

2.1 Project Description

PG&E will provide dual feed Distribution Facilities to the UC Merced Campus. Dual feed Distribution Facilities shall consist of an independent 12 kV distribution circuit from each of PG&E's El Capitan and Wilson substations, as described in Section 2.2. Each of these two circuits will serve UC Merced through individual revenue meters located at the switchgear that will be located elsewhere on the UC Merced Campus at a point to be determined by UC Merced, in accordance with Section 2.3. The Service Points for these two circuits will be separated by a distance of at least 300 feet at the point where each circuit meets the boundary between PG&E's franchise area and the UC Merced Campus, on Lake Road, at or near the intersection of Lake Road and Bellevue Road in the County of Merced. The overhead lines will only occupy the same side of the street on the east side of Lake Road at the property boundary of UC Merced where it receives the two primary voltage services. The overhead portions of

these two circuits will not be placed on common poles. Only one circuit at a time will serve UC Merced, but limited periods of Parallel Operation will be permitted in accordance with the operating agreement to be entered into by the Parties concurrently with this Agreement and in the form set forth in Exhibit B attached hereto and incorporated by reference (the "Operating Agreement").

The two revenue meters provided by PG&E shall have a pulse output signal and be capable of being queried by the UC Merced Campus. PG&E will cooperate with UC Merced in establishing and maintaining campus access to metered data information from the revenue meters.

2.2 Service and Route

PG&E will provide dual feed, 12 kV Distribution Facilities from the El Capitan substation and Wilson substation along the approximate route depicted in Exhibit C, which is attached hereto and incorporated by reference. The circuits currently serving the UC Merced Campus are overhead lines supported on typical wood frame structures with some underground segments. All lines are located within existing established private rights of way or city or county franchise areas.

The El Capitan substation is located approximately 1.5 miles north of Merced along State Route 59. UC Merced's normal distribution feed shall be a circuit originating from the El Capitan Substation (El Capitan 1102). El Capitan 1102 runs overhead due east from the El Capitan substation across open fields and along Yosemite Avenue to G Street, runs north on G Street to Bellevue Road, and then turns east on Bellevue Road to the intersection at Lake Road. At this point, El Capitan 1102 will be extended underground for approximately 1,100 linear feet to the first Service Point, approximately 760 feet north of the intersection of Bellevue Road. From this Service Point, UC Merced shall be responsible to continue the service to the revenue meter and switchgear location, that will be located elsewhere on the UC Merced Campus at a point to be determined by UC Merced, subject to approval by PG&E, which shall not be unreasonably withheld. The underground portion of the El Capitan 1102 will consist of 600 amp, 1100 MCM aluminum conductor installed in 6-inch diameter PVC conduit. The overall circuit length is approximately 5.6 miles. PG&E shall replace one (1) circuit mile of existing copper conductor with 715 MCM aluminum conductor and the necessary pole structures and equipment that will accommodate the new conductor.

PG&E's Wilson Substation is located approximately three miles east of Merced along State Route 140. The alternate distribution feed to the UC Merced Campus shall be from a circuit which originates at PG&E's Wilson Substation (Wilson 1102). Wilson 1102 runs west on State Route 140, then turns north on Kibby Road until it reaches Yosemite Avenue. Wilson 1102 then runs west on Yosemite Avenue to Lake Road, and on Lake Road it runs north to the intersection of Bellevue Road. From this point, Wilson 1102 will be extended underground for

approximately 1,100 linear feet to PG&E's second Service Point, approximately 280 feet north of the intersection of Bellevue Road. From this second Service Point, UC Merced shall again be responsible to continue the service to the meter and switchgear location, that will be located adjacent to the revenue meter and switchgear leading from the first Service Point. The underground portion of this circuit will consist of 600 amp, 1100 MCM aluminum conductor installed in 6-inch diameter PVC conduit. The overall circuit length is approximately six (6) miles. PG&E shall install 6900 circuit feet of new 715 MCM aluminum conductor, in part replacing 2700 linear circuit feet of existing copper conductor, and install and replace the necessary pole structures and equipment to accommodate the new conductor.

PG&E plans to normally serve UC Merced from El Capitan 1102. In preparation for PG&E planned outages, UC Merced will be capable of Parallel Operation on both circuits.

2.3 Service Point(s) and Revenue Meter Location(s)

PG&E's Service Point associated with El Capitan 1102 will be on Lake Road, approximately 760 feet north of the intersection of Bellevue Road. PG&E's Service Point associated with Wilson 1102 will also be on Lake Road, approximately 280 feet north of the intersection of Bellevue Road, at least 300 feet to the south of the El Capitan 1102 Service Point. The revenue meter location for each circuit will be located at the Main Campus Central Plant.

2.4 Future System Engineering and Construction Modifications

PG&E reserves the right to make any changes it deems necessary to the design or construction of the facilities serving the UC Merced Campus to address changes in its engineering and construction standards, or any future requirements of any Governmental Authority with jurisdiction over PG&E's facilities.

PG&E also reserves the right to modify the route of the facilities serving the UC Merced Campus depicted on Exhibit C, following the initial installation of the facilities. Such modifications to the route may be made, at PG&E's sole discretion, to meet the future requirements of any Governmental Authority with jurisdiction over PG&E's facilities or to address changes in PG&E's future operations, including without limitation, projects to accommodate a larger load, projects involving a change in the existing grade, width or alignment of franchise areas, undergrounding projects, street vacations or relocations to accommodate third party development projects.

Prior to any substantial modification to the existing route of PG&E's facilities serving the UC Merced Campus, PG&E shall consult with UC Merced in accordance with terms and conditions of the Operating Agreement attached hereto as Exhibit B.

2.5 Protection Requirements of UC Merced

In order to ensure that UC Merced's operations will not adversely impact the service reliability of other PG&E customers, UC Merced shall install, own and operate primary protective devices on the UC Merced Campus that are subject to approval by PG&E in accordance with the Operating Agreement attached hereto as Exhibit B. During the term of this Agreement, PG&E may also require other or additional protective equipment as a result of new Tariff provisions or system protection standards.

2.6 Parallel Operation

UC Merced may utilize its automatic transfer switch for Parallel Operation between the El Capitan 1102 Circuit and the Wilson 1102 Circuit as provided in the Operating Agreement using automatic transfer equipment, provided that such use is limited to either planned outages on UC Merced's own system to perform maintenance and repair work, or to respond to planned and unplanned outages on the PG&E distribution system. To ensure the safety of PG&E personnel and reliability of service to other customers, such Parallel Operation by UC Merced is to be implemented only in accordance with terms and conditions of the Operating Agreement attached hereto as Exhibit B.

3.0 SUPPLY OF UTILITY SERVICES

During the entire term of this Agreement, PG&E shall supply Utility Services to UC Merced in accordance with its Tariffs. Upon request by PG&E, UC Merced shall provide an easement for PG&E's facilities to be located on the UC Merced Campus substantially in the form attached hereto as Exhibit F.

4.0 System Maintenance

PG&E shall maintain the El Capitan 1102 and the Wilson 1102 in accordance with Commission General Orders 95, 128 and 165, and all other applicable Commission orders and regulations that may be in effect during the term of this Agreement. PG&E shall also maintain its transmission facilities serving the Distribution Facilities serving the UC Merced Campus in accordance with all applicable orders and regulations of the Federal Energy Regulatory Commission and the Western Electricity Coordinating Council.

5.0 COMPENSATION AND PAYMENT TERMS

Within forty-five days of the Effective Date of this Agreement and receipt of an invoice from PG&E, UC Merced shall pay PG&E the amounts set forth below in Schedule A.

Schedule A

Item	Amount
Capacity reservation charge for alternate feeder capacity (6 MW)	$15,134
Capital cost for metering associated with the alternate feeder second service	$5,000
One Time Cost of Ownership (Special Facilities) cost for metering associated with the alternate feeder second service	$3,024
Income Tax Component of Contributions (ITCC) on the metering associated with the alternate feeder second service, at the rate provided in PG&E's Preliminary Statement.	$1,100
Total	$24,258

The amounts set forth in Schedule A do not include costs associated with providing temporary service, which shall be provided in accordance with PG&E's Tariffs.

UC Merced agrees that it will use all best efforts to obtain funding for its financial obligations under this Agreement.

UC Merced and PG&E shall enter into Special Facility Agreements for the second service metering and the capacity reservation charge substantially in the form attached hereto as Exhibits G and H respectively, and incorporated herein by reference.

6.0 PROJECT SCHEDULE

After the Effective Date of this Agreement, PG&E shall promptly commence construction of its Distribution Facilities to serve the UC Merced Campus. PG&E will first initiate construction on the service that will normally provide power to the UC Merced Campus (El Capitan 1102). Service shall be ready from the normal distribution feeder on March 15, 2004 and from the alternate distribution feeder on April15, 2004.

However, PG&E may defer actual construction of the Distribution Facilities upon the final, unappealable denial of any construction or land use permits required from any Governmental Authority that are essential to the opening of the UC Merced campus in Fall 2005 on its present site.

7. 0 EXCEPTIONS TO DUAL FEED DISTRIBUTION FACILITIES

PG&E shall have the exclusive right to provide Utility Service for all of the electric load for the UC Merced Campus for the term of this Agreement, subject to the following exceptions:

7.1 970 kw Output From Merced Irrigation District's Fairfield Hydroelectric Facility

UC Merced may use the generated output of the Fairfield Hydroelectric facility owned by Merced County and Merced Irrigation District, provided that it is limited solely to the output of this existing facility as of the date of this Agreement, not to exceed 970 peak kW.

7.2 Over-The-Fence Service

UC Merced shall have the right to establish an "over the fence" connection in accordance with California Public Utilities Code section 218 with the proposed campus community to receive Renewable Power, bypassing the PG&E grid, should such a resource be developed.

7.3 On-Site Generation

UC Merced has expressed its intent to provide electricity for some of its own load from Renewable Power or Co-generation generated within the boundaries of the UC Merced Campus. UC Merced shall, however, continue to be responsible for all applicable obligations specified in PG&E's Tariffs as they currently exist and as they are amended for the duration of this Agreement.

8.0 TERM AND TERMINATION

8.1 Term

This Agreement shall commence on the Effective Date and continue in force for a period of fifteen (15) years and it shall be automatically extended for successive one (1) year periods on the fifteenth anniversary of the Effective Date and each anniversary of the Effective Date thereafter for ten (10) successive years, unless ninety (90) days prior to the fifteenth anniversary of the Effective Date UC delivers to PG&E written notice of its intention not to extend the term of this Agreement beyond such date, and during the extended period thereafter, until UC delivers to PG&E ninety (90) days advance written notice of its intention to unilaterally terminate this Agreement. During the extended period, all of the terms and conditions of the Agreement shall be in full force and effect. This Agreement shall not be terminable except as expressly provided herein.

8.2 Unilateral Termination

This Agreement may be terminated prior to the expiration of the term set forth in Section 8.1 at the election of UC Merced by providing at least ninety (90) days advance written notice to PG&E, subject to the terms and conditions of this Section 8.

8.3 Facility Termination Charge

Upon expiration or unilateral termination of this Agreement, UC Merced shall pay to PG&E on demand (in addition to all other monies to which PG&E may be legally entitled by virtue of such termination) a Facility Termination Charge. PG&E will calculate and present to UC Merced (along with all relevant backup materials) a Facility Termination Charge equal to the amount calculated pursuant to the formulas below and pursuant to the table set forth in Exhibit E, which is attached hereto and incorporated by reference. The Facility Termination Charge shall be based on the year of expiration or unilateral termination of this Agreement, and calculated as follows:

Step A:

Annual Distribution Revenue (line 1) minus Annual Distribution Revenue Requirement (line 2) equals Current Net Revenue (line 3)

If Current Net Revenue is a positive number, then PG&E has collected revenue above its annual requirement. If it is a negative number, PG&E has collected revenue below its annual requirement.

Step B:

Current Net Revenue (line 3) plus Accrued Net Revenue (line 4) from the prior year shall equal Accrued Net Revenue for the current year

If Accrued Net Revenue is a positive number, then PG&E has collected revenue above its cumulative annual requirements. If it is a negative number, PG&E has collected revenue below its cumulative annual requirements.

Step C:

In the year for which the termination payment is calculated, Capital Base (line 5) minus Accrued Net Revenue (line 4) shall equal the termination payment, which in no case shall be less than zero (0).

The Facility Termination Charge specified in this Agreement shall be the sole charge paid by UC Merced arising from its unilateral termination or the expiration of this Agreement. Provided however, that in addition to such Facility Termination Charge, UC Merced shall be responsible for: 1) the charges associated with the removal of the second meter in accordance with the Special Facility Agreement attached hereto as Exhibit G, and 2) any non-bypassable

charges that PG&E may be legally entitled to under PG&E's Tariffs or under applicable law.

Upon receipt of the Facility Termination Charge calculation and all relevant supporting documentation, UC Merced shall have sixty (60) days to review such payment. The Facility Termination Charge shall be due and payable after the expiration of the 60-day review period, provided however, that in the event UC Merced disputes any portion of Facility Termination Charge, such dispute shall be resolved in accordance with the dispute resolution procedure set forth in Section 24 below. In the event of any such dispute, UC Merced shall immediately, and in no event more than fifteen (15) days after the Facility Termination Charge is otherwise due, deposit the disputed portion of the Facility Termination Charge into a mutually acceptable escrow account, and pay any undisputed portion of the Facility Termination Charge directly to PG&E. The escrow officer shall be instructed to deposit such funds in an interest bearing account at a bank or savings and load of its choice located in San Francisco, California. Upon deposit in escrow of the disputed portion of the Facility Termination Charge, UC Merced and PG&E shall forthwith diligently proceed to complete the dispute resolution process as provided in Section 24. The escrow officer shall return the moneys deposited in the escrow account, including all accrued interest thereon, to UC Merced or PG&E in accordance with the arbitration award issued pursuant to Section 24 of this Agreement. The escrow holder's fees shall be paid equally by UC Merced and PG&E.

Amounts owed to PG&E hereunder that are not paid by the due date shall accrue interest from the due date at a rate equal to the highest rate permitted by law, not to exceed 10% per annum. Such interest shall be paid for the number of days elapsed since the due date and shall be computed on the basis of a thirty (30) day month.

8.4 Effect of Termination; Survival

Upon expiration or unilateral termination of this Agreement, all rights UC Merced shall have under this Agreement for the dual feed Distribution Facilities to the UC Merced Campus from PG&E shall cease and UC Merced shall have no further right to the supply of Utility Service from PG&E by reason of this Agreement. The provisions of this Section 8.4 however shall not be construed as a bar to UC Merced of any rights it may have apart from this Agreement to obtain Utility Service from PG&E following expiration or termination of this Agreement, pursuant to any applicable law, regulation or Tariff, independent and exclusive of this Agreement. The expiration or termination of this Agreement shall not extinguish or otherwise affect any obligations or liabilities of the Parties that have accrued prior to such expiration or termination. Section 17.0 [Indemnification], Section 24.0 [Dispute Resolution], and this Section 8.0 [Term and Termination] shall survive the expiration or termination of this Agreement.

8.5 Removal of Distribution Facilities

Upon expiration or unilateral termination of this Agreement, PG&E shall be entitled to remove any portion of the Distribution Facilities located on the UC Merced Campus. If PG&E elects to remove such Distribution Facilities, PG&E shall provide sufficient notice of its intent to remove any such Distribution Facilities to UC Merced and shall cause such removal operations, conducted either by PG&E or by a third party with whom PG&E contracts, to be conducted in a reasonable manner.

9. 0 FORCE MAJEURE

"Force Majeure" means any occurrence beyond the reasonable control of and not occurring due to the fault or negligence of the Party claiming Force Majeure that causes the Party to be unable to perform part or all of its obligations, that by exercise of due foresight such Party could not reasonably have been expected to avoid and that the Party is unable to overcome by the exercise of due diligence. Such an occurrence may include fires, floods, earthquakes or other acts of God, acts of terrorism, war, riots or other civil disturbances, sudden actions of the elements, actions or inactions by federal, state, or local agencies, actions or inactions of legislative, judicial, or regulatory agencies of competent jurisdiction, and industry-wide or region-wide strikes and other labor disputes (including collective bargaining disputes and lockouts) involving a Party or a Party's subcontractors and not directed exclusively at such Party. Failure of either Party to perform such Party's obligations under this Agreement due to the failure of any subcontractor of such Party to perform any obligation to such Party, will not constitute Force Majeure hereunder unless such subcontractor is excused from performance under its applicable agreement with such Party, and such agreement contains terms in respect of Force Majeure which are substantively the same as those contained in this Agreement, including this definition of Force Majeure. Actions of the Commission shall be considered Force Majeure.

10.0 TARIFF APPLICATION

Unless otherwise stated in this Agreement, all of the provisions of PG&E's rates, rules, Tariffs, and policies shall apply to service provided by PG&E to UC Merced, or energy delivered to, generated by, or used at the UC Merced Campus, including, but not limited to, Electric Tariff Rule 14, which provides, in pertinent part, that "PG&E will not be liable for interruption or shortage or insufficiency of supply, or any loss or damage of any kind of character occasioned thereby, if same is caused by inevitable accident, act of God, fire, strikes, riots, war, or any other cause except that arising from its failure to exercise reasonable diligence."

11.0 CHOICE OF LAWS

This Agreement shall be construed and interpreted in accordance with the laws of the State of California, excluding any choice of law rules that may direct the application of the laws of another jurisdiction. Any controversy or claim arising out of or in any way relating to the Agreement which is not amicably settled or submitted to arbitration in accordance with the dispute resolution procedure set forth in Section 24 and which is not within the exclusive jurisdiction of the Commission, shall be litigated in a California State Court of competent jurisdiction; or if jurisdiction over the action cannot be obtained in a California State Court, in a Federal Court of competent jurisdiction situated in the State of California.

12.0 NON-WAIVER

The waiver by either Party of any breach of any term, covenant or condition contained in this Agreement, or any default in the performance of any obligations under this Agreement, shall not be deemed to be a waiver of any other breach or default of the same or any other term, covenant, condition or obligation. Nor shall any waiver of any incident of breach or default constitute a continuing waiver of the same.

13.0 GENERAL ACCESS

Where it is necessary for PG&E to install facilities on the UC Merced Campus, UC Merced hereby grants to PG&E: (a) the right to install, own and maintain such facilities on the UC Merced Campus together with sufficient legal clearance between all structures now or hereafter erected on the UC Merced Campus; (b) the right to enter and leave the UC Merced Campus for any purpose connected with the furnishing of electric service (including but not limited to meter reading, inspection, testing, routine repairs, maintenance, replacement, and emergency work) and the exercise of any and all rights secured to it by law, or under PG&E's Tariff schedules.

14.0 LAND RIGHTS

Where formal rights-of-way, easements, land leases, or permits are required by PG&E for the installation of the facilities on or over the UC Merced Campus, UC Merced understands and agrees that PG&E shall not be obligated to install the facilities unless and until any necessary permanent rights-of-way, easements, land leases, or permits, satisfactory to PG&E, are granted to or obtained for PG&E without cost to or condemnation by PG&E; however, if PG&E is unable to obtain such land rights, UC Merced shall provide them. Such land rights shall include the right of access and the right to trim trees as necessary to maintain required legal clearances from overhead wires.

15.0 SAFETY PRECAUTIONS

UC Merced shall inform all persons doing work in proximity of the location of PG&E's facilities on the UC Merced Campus of the existence of such facilities and shall ensure that all work of non-PG&E employees is planned and conducted in a manner to safeguard persons and property from injury. Work performed in close proximity to PG&E's energized electric facilities on the UC Merced Campus also shall be performed in accordance with established Cal-OSHA safety rules and practices, and as may be directed by PG&E. Only personnel duly authorized by PG&E are allowed to connect or disconnect conductors from PG&E-owned service facilities, or perform any work upon PG&E-owned existing facilities.

16.0 CHANGE ORDERS AND RELOCATION OF PG&E'S FACILITIES ON THE UC MERCED CAMPUS

All standard design or construction changes made in the field relating to PG&E's facilities located on the UC Merced Campus, which impact the charges to UC Merced, will be made using PG&E's Agreement Change Order. Unforeseen field conditions include, but are not limited to, contaminated soil and obstructions. The proper execution and attachment of the Agreement Change Order, and any necessary changes to the location of PG&E's facilities on the UC Merced Campus resulting from the change order, constitute formal amendment to this Agreement. UC Merced shall pay PG&E for any such changes in accordance with the appropriate Tariff.

EXCEPTION: If the requested changes are in addition to or substitution for the standard Facilities that PG&E would normally install, then a Special Facilities Agreement shall be required under the provisions of Section I of Rule 2.

17.0 INDEMNITY

17.1 PG&E's Obligation

PG&E shall indemnify, defend and hold harmless UC Merced, its officers, agents, and employees from and against any claims, damages, losses, costs, expenses, or liabilities (collectively " Indemnifiable Losses") arising out of, resulting from or otherwise in connection with a Third Party Claim arising out of PG&E's performance under this Agreement , including, without limitation, Indemnifiable Losses for loss or damage to any property, or for death or injury to any person or persons, but only in proportion to and to the extent that such Indemnifiable Losses arise from the negligent or wrongful acts or omissions of PG&E, its officers, partners, agents, or employees. For purposes of this Section 17, "Third Party Claim" means a claim or demand, or an action commenced, against any indemnitee by a person not a party to this Agreement.

17.2 UC Merced's Obligation

UC Merced shall indemnify, defend and hold harmless PG&E, its officers, partners, agents, and employees from and against any Indemnifiable Losses arising out of or resulting from or otherwise in connection with a Third Party Claim arising out UC Merced's performance under this Agreement including, without limitation, Indemnifiable Losses for loss or damage to any property or for death or injury to any person or persons, but only in proportion to and to the extent that such Indemnifiable Losses arise from the negligent or wrongful acts or omissions of UC Merced, its officers, agents, or employees.

17.3 Notice of Third Party Claims

If a Third Party Claim is commenced against the indemnitee for which the indemnifying party may be obligated to provide indemnification under this Section 17, the indemnitee shall give the indemnifying party written notice thereof promptly (and in any event within thirty (30) days) after receipt by the indemnitee of notice of the Third Party Claim, which notice shall describe the Third Party Claim in reasonable detail; provided, however, that no delay or failure by the indemnitee to give notice shall affect the indemnitee's right to indemnification under this Agreement, except to the extent the indemnifying party is actually prejudiced by such delay or failure; provided, further, that the indemnifying party shall not be liable for any expenses incurred during the period in which the indemnitee failed to give such notice. Thereafter, the indemnitee shall deliver to the indemnifying party, promptly (and in any event within three (3) business days) after the indemnitee's receipt thereof, copies of all notices and documents (including court papers) received by the indemnitee relating to such Third Party Claim.

17.4 Defense of Third Party Claims by the Indemnifying Party

If a Third Party Claim is made against the indemnitee, the indemnifying party shall be entitled to participate in the defense thereof and, if it so chooses and acknowledges by written notice its obligation to indemnify the indemnitee for the Third Party Claim (which notice shall specify any reservations or exceptions), to assume the defense thereof with counsel selected by the indemnifying party. If the indemnifying party assumes the defense of a Third Party Claim, the indemnifying party shall not be liable to the indemnitee for legal or other expenses subsequently incurred by the indemnitee in connection with the defense of such Third Party Claim. The indemnifying party shall be liable for the reasonable fees and expenses of counsel employed by the indemnitee for any period during which the indemnifying party has failed to assume the defense of a Third Party Claim (other than the period during which the indemnitee failed to give notice of the Third Party Claim). If the indemnifying party elects to assume the defense of any Third Party Claim, the indemnitee shall cooperate with the indemnifying party in the defense or prosecution of any counterclaims therein.

18.0 ASSIGNMENT

UC Merced may assign all or any part of this Agreement, or its rights and obligations hereunder, directly or indirectly, by operation of law or otherwise, on the condition that PG&E consents in writing and the party to whom the Agreement is assigned (Assignee) agrees in writing, to perform the obligations of UC Merced hereunder. Such assignment shall be made using PG&E's Assignment Agreement and shall be notarized. Assignment of this Agreement shall not release UC Merced from any of the obligations under this Agreement unless otherwise provided therein. PG&E may assign all or any part of this Agreement, or its rights and obligations hereunder, directly or indirectly, by operation of law or otherwise, to any company that may be formed pursuant to a Plan of Reorganization confirmed by the Bankruptcy Court, without UC Merced's prior approval or written consent. Subject to the foregoing, this Agreement shall be binding upon and inure to the benefit of the successors and assigns of the Parties hereto.

19.0 ENFORCEABILITY

In the event that any of the provisions, or application of any of the provisions, of this Agreement are held to be illegal or invalid by a court of competent jurisdiction or otherwise changed by a regulatory agency, PG&E and UC Merced shall negotiate an equitable adjustment in the provisions of this Agreement with a view toward effectuating the purpose of the Agreement. The illegality or invalidity of any of the provisions, or application of any of the provisions, of the Agreement will not affect the legality or enforceability of the remaining provisions or application of any of the provisions of the Agreement.

20.0 INTEGRATION

This Agreement and all exhibits attached hereto constitute the entire understanding between the Parties as to the subject matter of hereof, and may not be modified except by mutual written agreement of the Parties. It supersedes all prior or contemporaneous agreements, commitments, representations, writings, and discussions between UC Merced and PG&E, whether oral or written, and has been induced by no representations, statements or agreements other than those expressed herein. Neither UC Merced nor PG&E shall, for so long as it performs its obligations set forth herein, be bound by any prior or contemporaneous obligations, conditions, warranties or representations with respect to the subject matter of this Agreement.

21.0 INCORPORATION OF EXHIBITS

All exhibits attached to or referred to in this Agreement are incorporated herein by such references as if fully and specifically set forth herein. A list of exhibits follows:

LIST OF EXHIBITS

Exhibit No.	Description
A	Legal Description of UC Merced Campus
B	Operating Agreement
C	Map Delineating PG&E's Initial Service Route
D	Designated Contacts For Each Party
E	Termination Calculation Table
F	Grant of Easement
G	Special Facilities Agreement [second service metering]
H	Special Facilities Agreement [capacity reservation charge]

22.0 SURVIVAL

The provisions of this Agreement that by their nature should survive expiration, cancellation or other termination of the Agreement, including but not limited to provisions regarding warranty, indemnity, and availability of information, shall survive such expiration, cancellation or other termination.

23.0 NO THIRD PARTY BENEFICIARIES

Nothing in this Agreement, whether express or implied, is intended to do any of the following:

(a) confer any benefits, rights, or remedies under or by reason of the Agreement on any persons other than UC Merced and PG&E, and their respective successors and assigns; or

(b) give any person not a party to the Agreement any right of subrogation or action against any party.

No amendment of, supplement to, or waiver of any obligations under the Agreement will be enforceable or admissible unless set forth in writing signed by the party against which enforcement or admission is sought.

24.0 DISPUTE RESOLUTION

24.1 Negotiation

The Parties shall attempt in good faith to resolve any dispute arising out of this Agreement promptly by negotiations between PG&E's Vice President of Rates and Account Services and UC Merced's Chancellor or their designated successors or representatives. All such negotiations are confidential and shall be treated as compromise and settlement negotiations, to which Section 1119 of the California

Code of Evidence shall apply, and Section 1119 is incorporated herein by reference.

24.2 Selection of Arbitrator

Either party may give the other party written notice of any dispute arising under this Agreement. Within twenty (20) days after receiving delivery of said notice, the executives shall meet at a mutually acceptable time and place, and thereafter as often as they may reasonably deem necessary to exchange information and to attempt to resolve the dispute. If the matter has not been resolved within thirty (30) days of the first meeting, a party may initiate arbitration by sending written notice to the other party requesting arbitration and describing the dispute under this Agreement and any proposed remedy. Within ten (10) business days after receipt of such notice, the parties shall provide to one another a list of three (3) potential arbitrators and meet within five (5) business days to attempt to select a single arbitrator. The arbitration shall be conducted in San Francisco, California, by the American Arbitration Association before a single arbitrator in accordance with its Commercial Arbitration Rules, except as modified herein or as agreed by the parties in writing. If the parties cannot agree on the selection of an arbitrator or the parties fail to meet within ten (10) business days, the arbitrator shall be selected by the American Arbitration Association in accordance with its Commercial Arbitration Rules. The arbitrator selected under these procedures shall be a lawyer or retired judge with at least ten (10) years' experience arbitrating complex commercial disputes.

24.3 Discovery

In such proceedings, the parties shall have the right to utilize depositions as provided in Section 1283 and 1283.05 of California Code of Civil Procedure.

24.4 Effect of Award

The award of the sole arbitrator shall be final and binding upon-the parties, subject to the provisions of the California Code of Civil Procedure relating to arbitration as the same now exists or as the same shall be amended during the term of this Agreement. In such award, the arbitrator shall include the fixing of the expense of the arbitration and the assessment of the same in the judgment of the arbitrator against either or both parties hereto. Each party shall bear its cost for legal fees, witnesses, depositions, etc.

24.5 Hearing

After giving the parties due notice of hearing, the arbitrator shall hear the dispute arising under this Agreement submitted for arbitration and shall provide a reasoned, written decision within ninety (90) days after the completion of the hearing or such other date selected by agreement of the parties. The decision

shall conform to applicable law. The procedural and substantive law applied in the arbitration shall be the law of the State of California without regard to its conflict of law principles, unless the claims or defenses raise issues of federal law in which case federal substantive law shall apply to those particular claims or defenses. The arbitrator shall be bound to apply the law, including the rules of evidence, and shall be empowered to hear and determine dispositive motions, including motions to dismiss and motions for summary judgment. The decision of the arbitrator shall be final and binding upon the parties, and a party may petition a court to correct or vacate the decision only upon grounds that any award contained therein was procured by corruption, fraud or other undue means and may not petition a court to correct or vacate the decision for failure of the arbitrator to apply the law or any other grounds or reasons. Judgment may be entered on the decision in any court of competent jurisdiction upon the application of a party.

24.6 Fees and Costs

The arbitrator shall award costs and reasonable attorneys' fees to the prevailing party. If both parties prevail in part, such fees will be allocated among the parties in such amounts as may be determined by the arbitrator based on the relative merits and amounts of each party's claims.

24.7 Injunctions

Notwithstanding the foregoing provisions, a party may seek a preliminary injunction or other provisional judicial remedy if in its judgment such action is necessary to avoid irreparable damage or to preserve the status quo.

24.8 Continuing obligations

Each party is required to continue to perform its obligations under this Agreement, pending final resolution of any dispute arising out of or relating to this Agreement.

25.0 EFFECTIVE DATE, SCOPE

PG&E will advice file a copy of this Agreement upon execution by PG&E and UC Merced with the Commission pursuant to General Order 96-A, Section X.B. It shall become effective and binding upon PG&E's filing it with the Commission pursuant to General Order 96-A, Section X.B and PG&E shall provide a conformed copy of its filing to UC Merced.

26.0 APPROVED AGREEMENT

This Agreement shall be subject to all of PG&E's applicable Tariff schedules on file with and authorized by the Commission and shall at all times be subject to

such changes or modifications as the Commission may direct from time to time in the exercise of its jurisdiction. These may include, but are not limited to extension rules and rate schedules.

27.0 CONTACTS

During the term of this Agreement, PG&E and UC Merced shall each designate a representative for the purpose of administering this Agreement. The initial designees of each Party are identified on Exhibit D to this Agreement. Each Party's designated representative shall have the authority to act on behalf of their respective organizations.

28.0 AUTHORITY.

Each Party represents to the other that (a) it has the corporate or other requisite power and authority to execute, deliver and perform this Agreement, (b) the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate or other requisite actions, (c) it has duly and validly executed and delivered this Agreement, and (d) this Agreement is a legal, valid and binding obligation of such Party, enforceable against it in accordance with its terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium or other similar laws affecting creditors' rights generally and general principles of equity.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a corporation organized and existing under the laws of the State of California

By: [signature]
Lindsay A Desrochers

Title: Vice Chancellor for Administration

Date: October 3, 2003

PACIFIC GAS AND ELECTRIC COMPANY, a California corporation

By: [signature]

Title: SRVP

Date: 10-9-03

Exhibit A -- Legal Description of UC Merced (hard copy to be attached to documents prepared for signature)

Entire UST

EXHIBIT "A"

Parcel A:
Parcel 1 as shown on that "Parcel Map for Merced County Board of Education as Trustee of the Testamentary Trust of Virginia Smith" recorded June 10, 1987 in Book 58 of Parcel Maps, Pages 1 & 2, Merced County Records, and being a division of Sec. 13, 24, 25, 26, 35, 36 and portions of 27 and 34, T. 6 S. R.15 E., M.D.B. & M.

Assessors Parcel No.: 052-270-012 and 052-270-014

Parcel B:
Parcels 1, 2 and 3 and all that portion shown as remainder Parcel as per map for "Merced Community Golf Association" recorded November 5, 1997 in Book 83 of Parcel Maps, Pages 9, 10, 11 and 12, Merced County Records, being a division of Parcel 2 recorded in Book 59 of Parcel Maps, Page 1, Merced County Records.

Assessors Parcel No.: 052-270-010/ Portion Parcel B; 052-270-012/ Portion parcel B; 052-270-015/Portion Parcel B; 052-300-003/Portion Parcel B; 052-300-006/Portion Parcel B; 052-300-016/ Portion Parcel B; 053-030-001/ Portion Parcel B; 053-030-002/ Portion Parcel B; 053-030-005/ Portion Parcel B; 053-030-006/ Portion Parcel B; 053-050-011/ Portion Parcel B; 053-050-012/Portion Parcel B; 053-050-013/Portion Parcel B; 053-300-020 Old/ 053-300-018 new Portion Parcel B/ 053-300-005 old/ 052-300-019 new portion Parcel B; 052-300-014 old/ 052-300-020 new/ 052-300-021 new;052-300-022 new portion of Parcel B/ 052-300-016 old; 052-300-017 new portion of Parcel B.

Parcel C:
All that portion of Section 12, Township 6 South, Range 14 East, M.D.B.&M., lying Southerly of the Northerly line of Hornitos Road as said road was conveyed to Merced County by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Excepting the interest of the County of Merced in and to the Northerly 60 feet as acquired for road purposes by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Assessors Parcel No.: 052-250-010

Parcel D:
All that portion of Section 7, Township 6 South, Range 15 East, M.D.B.&M., lying Southerly of the Northerly line of Hornitos Road as said road was conveyed to Merced County by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Excepting therefrom all that portion of said Section 7, which lies Easterly and Northeasterly of a line commencing at the Northwest corner of the Southwest quarter of Section 6, Township 6 SOuth, Range 15 East, M.D.B.&M.; thence South 9 1/2 deg. East 27.25 chains, thence South 33.1/2 deg. East 135.97 chains to the Southeast corner of the Northeast quarter of Section 18, Township 6 South, Range 15 East, M.D.B.&M.

Also excepting therefrom the interest of the County of Merced in and to the Northerly 60 feet as acquired for road purposes by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Assessors Parcel No.: 053-010-011

EXHIBIT 'A'
FORMER GOLF COURSE LAND

All that real property situated in the unincorporated area of the County of Merced, California, described as follows:

A portion of Parcel 2 as shown on Parcel Map of Merced County Board of Education as Trustees of the Testamentary Trust of Virginia Smith, as recorded in Book 59 of Parcel Maps, Page 1 and 2, Merced County Records, described as follows:

Beginning at the Southwest corner of Section 34 T. 6 S., R. 14 E. M.D.M. said point being on the centerline of Lake Road; thence along the West line of Section 34 N. 0 deg. 28' 00" E. 200.14 feet; thence S. 89 deg. 32' 00" E. 30.00 feet to the East line of Lake Road said point being TRUE POINT OF BEGINNING of this description; thence along the east line of Lake Road N. 00 deg. 28' 00" E. 693.78 feet; thence N. 54 deg. 33' 55" E. 206.33 feet; thence N. 72 deg. 07' 43" E. 822.84 feet; thence N. 53 deg. 26' 04" E. 159.14 feet; thence N. 35 deg. 08' 49" E. 372.64 feet; thence N. 47 deg. 39' 02" E. 373.03 feet; thence S. 42 deg. 20' 06" E. 52.28 feet; thence N. 48 deg. 20' 33" E. 200.00 feet; thence N. 85 deg. 10' 59" E. 822.66 feet; thence N. 19 deg. 58' 59" E. 234.09 feet; thence N. 66 deg. 03' 39" E. 350.00 feet; thence S. 74 deg. 40' 07" E. 280.00 feet; thence S. 67 deg. 00' 05" E. 128.73 feet; thence N. 80 deg. 34' 13" E. 443.14 thence S. 45 deg. 00' 00" E. 588.26 feet S. 73 deg. 45' 29" E. 375.88 feet; thence S. 59 deg. 30' 32" E. 295.48 feet; thence S. 46 deg. 00' 01" E. 49.70 feet; thence S. 23 deg. 50' 22" W. 151.47 feet; thence S. 12 deg. 05' 43" E. 92.27 feet; thence S. 46 deg. 23' 54" E. 93.44 feet; thence S. 29 deg. 27' 45" E. 484.79 feet; thence S. 45 deg. 17' 25" E. 170.00 feet; thence S. 72 deg. 41' 29" E. 133.21 feet; thence S. 00 deg. 53' 50" W. 350.00 feet; thence S. 79 deg. 16' 05 W. 325.00 feet; thence S. 59 deg. 24' 58" W. 512.00 feet; thence S. 33 deg. 57' 21" W. 250.00 feet; thence S. 80 deg. 25' 00" W. 640.93 feet; thence S. 89 deg. 47' 29" W. 461.84 feet; thence N. 50 deg. 22' 51" W. 352.85 feet; thence S. 89 deg. 47' 29" W. 229.96 feet; thence S. 48 deg. 54' 31" W. 250.00 feet; thence S. 89 deg. 47' 29" W. 1953.76 feet; thence N. 70 deg. 49' 33" W. 200.00 feet; thence S. 89 deg. 47' 29" W. 530.45 feet to the TRUE POINT OF BEGINNING.

Containing 197.36 acres more or less.

Exhibit B

Operating Agreement for Electric Service

For the Main Campus Of UC Merced

This Operating Agreement shall govern ongoing electrical operations aspects of electric service from Pacific Gas and Electric Company (PG&E) to the University of California, Merced (UC Merced). The scope of this Operating Agreement is limited to the following:

- Procedures to be followed when PG&E wishes to modify the existing service route or facilities serving UC Merced
- Requirements for PG&E notification to UC Merced for modifications to service arrangements
- Process and procedures to be followed by UC Merced to obtain PG&E approval of protection equipment to be installed by UC Merced
- Procedures to prevent parallel operation of secondary systems and equipment
- Description of Service Configuration
- Permissible Operations and Notification Requirements
- Prohibited Operations
- Procedures to be followed by both PG&E and UC Merced when power is lost to the circuit normally serving UC Merced and such power remains available on the alternate service to UC Merced;
- Procedures to be followed by both PG&E and UC Merced in switching UC Merced campus load back to the normal feed when availability of that service has been restored; and,
- Designated contacts for both PG&E and UC Merced

1. Specifications Notification

UC Merced shall provide PG&E with the appropriate general arrangement drawings, line diagrams, relay test results, and pertinent equipment manufacturer specifications for review with regard to UC Merced's connection to the primary service provided by PG&E.

All primary protection settings and power transfer schemes shall be subject to PG&E approval.

UC Merced shall provide PG&E written notice at least 8 days in advance of its intention to transfer load from the El Capitan 1102 to the Wilson 1102 for planned maintenance.

UC Merced shall provide PG&E written notice of any subsequent changes to UC Merced's loads or load characteristics that may impact primary service protection equipment, transfer, and restoration schemes. These changes include, but are not limited to, on-site electric generation.

2. Modification of Existing Services or Facilities Serving UC Merced

If, after initial service to UC Merced is established in accordance with the "Agreement Between The Regents of the University of California and Pacific Gas and Electric Company to Provide Electric Service to the UC Merced Campus," (Master Agreement) PG&E has need to make revisions or alterations to the facilities serving UC Merced, PG&E shall promptly provide UC Merced written notice and shall communicate the expected changes and impacts on service to UC Merced. PG&E shall not commence to make such alterations until notification of and discussions with UC Merced have taken place.

3. Process and Procedures for Approval of PG&E-Required Protective Equipment

Prior to installation and at any time changes are contemplated by UC Merced, UC Merced shall provide PG&E with detailed plans, technical and equipment specifications and intended installation timetables. PG&E shall promptly review the materials and information for compliance with PG&E's standards and requirements in effect at the time such installations are to be made, and communicate its approval or disapproval of such plans to UC Merced. UC Merced shall not install any protective or interconnection equipment not approved by PG&E.

Design and equipment costs shall be the sole responsibility of UC Merced, with the exception of equipment and design provided by PG&E under the "Master Agreement." PG&E shall not be liable for any purchases or commitments that may be made by UC Merced for equipment or design in the event PG&E ultimately rejects such equipment or design as provided in this Operating Agreement.

4. Procedures to Prevent Parallel Operation of UC Secondary System With Primary System

Procedures to prevent parallel operation of UC Merced's secondary voltage system or equipment shall be submitted to PG&E for its review and approval prior to initial operation of the UC Merced campus.

5. Description of Service Configuration

PG&E shall serve UC Merced's load via 2 independent 12 kV distribution circuits, El Capitan 1102 and Wilson 1102, in the manner described in section 2.1 of the contract for electric service. Under normal conditions, each circuit is supplied from a different substation transformer and bus section.

UC Merced shall maintain its protection equipment in a manner consistent with the applicable electric codes and manufacturers specifications and recommendations and PG&E's Electric Tariff Rule 2.

Both circuits are to remain energized and capable of furnishing power at all times during normal operations.

6. Permissible Operations

A. ***Operation/Action:*** Either circuit and its associated substation equipment may be taken out of service for routine maintenance or modification as required by PG&E.

Notification Requirement: PG&E shall provide written notice to the appropriate UC Merced personnel at least 8 days in advance of such occurrence in order to enable UC Merced to take any action on their part, e.g. disabling the automatic transfer equipment at the Central Plant, transferring priority load to standby generation, etc.

B. ***Operation/Action:*** PG&E may perform field and substation switching under emergency conditions as necessary to maintain the integrity of PG&E's electric distribution system.

Notification Requirement: None

C. ***Operation/Action:*** UC Merced may transfer up to 6 MW of campus load from its normal service on El Capitan 1102 to Wilson 1102 in order to make repairs to UC Merced's own facilities. In doing so, UC Merced may operate PG&E's two distribution circuits in parallel, but only through the automatic transfer switch located at the Central Plant. The automatic transfer switch shall be set to allow parallel operation for 60 or fewer cycles.

Notification Requirement: UC Merced shall provide PG&E written notice at least 8 days in advance of its intention to transfer load from the El Capitan 1102 to the Wilson 1102 for planned maintenance.

7. Prohibited Operations

A. UC Merced shall not split the campus load between the 2 circuits. All campus load will be served through one circuit during normal operating conditions.

B. UC Merced shall not transfer load in excess of 6MW from its normal service on El Capitan 1102 to Wilson 1102 under any circumstances, or for any period of time.

C. UC Merced shall not allow any of its secondary voltage system or equipment to operate in parallel to the primary service beyond the automatic transfer switch.

8. Automatic Transfer Equipment Operation During Planned Or Emergency Outage Conditions

A. NORMAL OPERATING CONDITIONS ON UC MERCED MAIN PRIMARY BUS (Located at Central Plant)

1) Normal main breaker at Utility Source 1 closed to El Capitan 1102.

2) Both UC Merced main bus tie breakers closed, energizing both of UC Merced's 12 kV buses from Utility Source 1.

3) Alternate main breaker on Utility Source 2 open to Wilson 1102.

4) Alternate feeder Wilson 1102 energized up to alternate main breaker at Utility Source 2.

B. SEQUENCE OF OPERATION ON LOSS OF VOLTAGE TO NORMAL FEEDER EL CAPITAN 1102

1) During an under voltage or loss of voltage condition, UC Merced's automatic transfer equipment operates to transfer load from PG&E's El Capitan 1102 circuit to the Wilson 1102 circuit.

2) Automatic transfer to alternate feeder Wilson 1102 shall be permitted to occur only if voltage is present on the alternate feeder.

3) UC Merced's Normal main breaker on Utility Source 1 opens automatically upon sensing an under voltage or loss of voltage condition to El Capitan 1102.

4) UC Merced's alternate main breaker on Utility Source 2 automatically closes on the Wilson 1102 circuit upon sensing an under voltage or loss of voltage condition at UC Merced's Normal main breaker on Utility Source 1.

5) UC Merced shall immediately notify (within 10 minutes or less) PG&E's Yosemite Electric Control Center that UC Merced's automatic transfer switch has been operated.

6) If, after an automatic power transfer, voltage is lost on the alternate Wilson 1102 feeder and voltage has been re-established on the normal El Capitan 1102 feeder for at least 30 seconds, power shall transfer back to the normal feeder automatically.

7) UC Merced shall immediately notify (within 10 minutes or less) PG&E's Yosemite Electric Control Center that UC Merced's load has been transferred back to El Capitan 1102.

8) Should the service for UC Merced remain on the Wilson 1102 the manual transfer procedure shall be used to transfer the load back to the El Capitan 1102.

C. MANUAL TRANSFER PROCEDURE FOR RETURNING UC MERCED LOAD TO EL CAPITAN 1102

1) Power becomes available on the UC Merced Utility Source 1 Bus fed by the El Capitan 1102.

2) PG&E Yosemite Electric Control Center notifies UC Merced that power will be transferred back to normal source manually, without interruption to UC Merced's load.

3) PG&E switching personnel complete the necessary operations in preparation to transfer back to the El Capitan 1102.

4) PG&E will direct UC Merced to transfer from the Utility Source 2 served by the Wilson 1102 to the Utility Source 1 served by the El Capitan 1102. Parallel operation of the two circuits shall be momentary, limited to 60 cycles.

5) UC Merced will report completion of the transfer to the Yosemite Electric Control Center.

6) PG&E will complete switching operations on its system to return to normal operations.

7) PG&E will notify UC Merced when the El Capitan 1102 and Wilson 1102 circuits have been returned to normal operating conditions.

9. DESIGNATED CONTACTS FOR PG&E AND UC MERCED

A. For PG&E:

1) Account Services Contact and Functions

2) Yosemite Electric Control Center Operations Contact and Functions

3) Supervising Electric Planner and Functions

B. For UC Merced:

1) Plant Electrical Engineer Contact and Functions

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a corporation organized and existing under the laws of the State of California	PACIFIC GAS AND ELECTRIC COMPANY, a California corporation
By: _____	By: _____
Title: Lindsay P. Desrochers Vice Chancellor for Administration	Title: _____
Date: October 3, 2003	Date: _____

Exhibit C -- Map Delineating Route For Distribution Facilities

The map set forth below depicts the route for the initial installation of PG&E's Distribution Facilities to the UC Merced Campus.

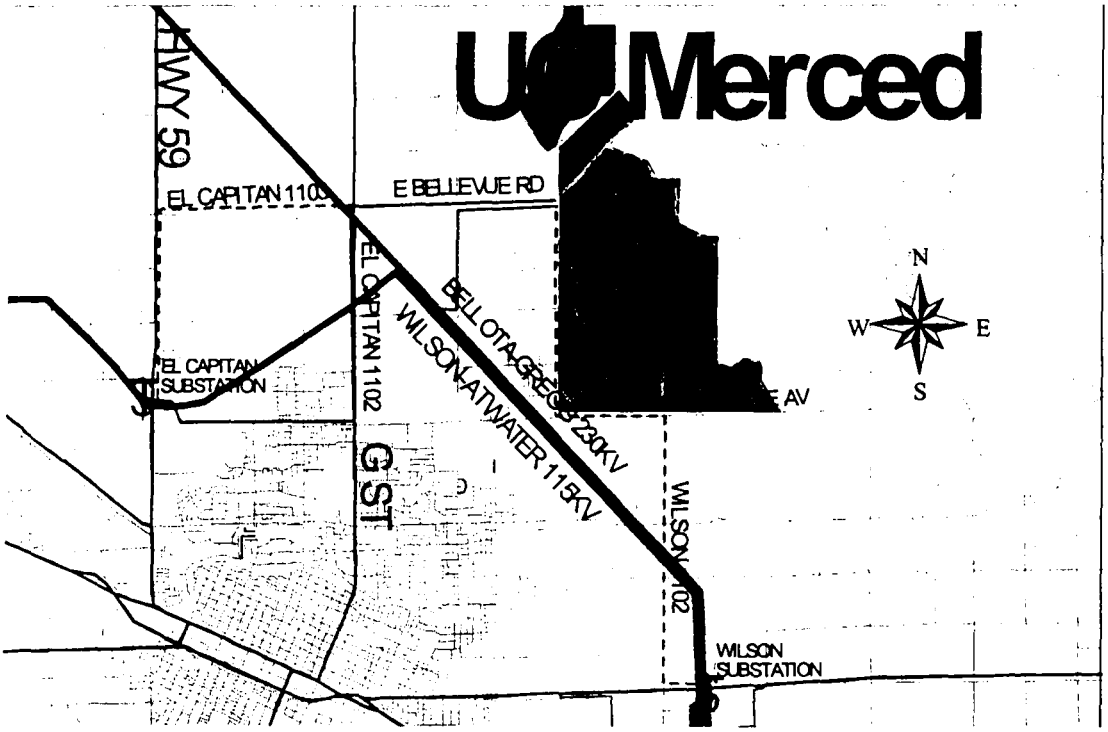


Exhibit D – Designated Contacts for administration of this agreement

For PG&E:

PG&E's local Account Manager assigned to serve the UC Merced campus

Currently Account Manager assigned is:

Dan Pope
Account Manager
Pacific Gas and Electric Company
3185 M Street
Merced, CA 95348

(209) 726-6393

Email: DWP4@pge.com

For UC Merced:

UC Merced's Vice Chancellor for Administration

Currently:

Lindsay A Desrochers
Vice Chancellor for Administration
University Of California
4225 North Hospital Road
Atwater, CA 95301

(209) 724-4430

lindsay.desrochers@ucop.edu

Mailing Address:
P. O. Box 2039
Merced, CA 95344

Exhibit E- termination Calculation Table

	Year	1	2	3	4	5	6	7	8	9	10	11	12
1	Annual Distribution Revenue												
2	Annual Distribution Revenue Requirement	238	233	229	224	220	215	211	206	202	197	193	188
3	Current Net Revenue												
4	Accrued Net Revenue												
5	Capital Base	932	901	870	840	809	778	747	716	685	655	624	593
6	Termination Payment												

	Year	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Annual Distribution Revenue													
2	Annual Distribution Revenue Requirement	184	179	175	170	166	162	157	153	148	144	140	135	131
3	Current Net Revenue													
4	Accrued Net Revenue													
5	Capital Base	562	531	501	470	439	408	377	346	316	285	254	223	192
6	Termination Payment													

**Note: All figures are noted in thousands of dollars*

Step A:

Annual Distribution Revenue (line 1) minus Annual Distribution Revenue Requirement (line 2) equals Current Net Revenue (line 3)

If Current Net Revenue is a positive number, then PG&E has collected revenue above its annual requirement. If it is a negative number, PG&E has collected revenue below its annual requirement.

Step B:

Current Net Revenue (line 3) plus Accrued Net Revenue (line 4) from the prior year shall equal Accrued Net Revenue for the current year.

If Accrued Net Revenue is a positive number, then PG&E has collected revenue above its cumulative annual requirements. If it is a negative number, PG&E has collected revenue below its cumulative annual requirements.

Step C:

In the year for which the termination payment is calculated, Capital Base (line 5) minus Accrued Net Revenue (line 4) shall equal the termination payment, which in no case shall be less than zero (0).

RECORDING REQUESTED BY

PACIFIC GAS AND ELECTRIC COMPANY

AND WHEN RECORDED MAIL TO
PACIFIC GAS AND ELECTRIC COMPANY
Land Services Office-Merced
3185 M Street
Merced, CA, 95348

SPACE ABOVE THIS LINE FOR RECORDER'S USE

GRANT OF EASEMENT

THIS AGREEMENT, made this _____ day of August, 2003, by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, hereinafter referred to as "Grantor", and PACIFIC GAS AND ELECTRIC COMPANY, a corporation organized and existing under the laws of the State of California, hereinafter referred to as "Grantee",

WHEREAS Grantor is the owner of certain real property in the County of Merced, State of California, which land is known as ***[Insert APN]***, and is described as follows:

[Insert Description of Lands]

WHEREAS Grantee has requested a non-exclusive easement to accommodate the underground electrical facilities described in paragraph 1 below; and

WHEREAS Grantor is willing to convey such easement to Grantee, and in consideration of value paid by Grantee, the receipt whereof is hereby acknowledged.

NOW, THEREFORE, the parties agree as follows:

1. Grantor hereby Grants to Grantee the right to install and maintain such underground conduits, pipes, manholes, service boxes, wires, cables, and electrical conductors; aboveground marker posts, risers, and service pedestals; underground and aboveground switches, fuses, terminals, and transformers with associated concrete pads; and fixtures and appurtenances necessary to any and all thereof, as second party from time to time deems necessary, which shall be located within the strips of land not to exceed ten (10) feet in width, and not to exceed five (5) feet on each side of the facilities as initially installed hereunder in, under, and along that certain real property described in Exhibit "A" attached hereto and by this reference made a part hereof. Grantor expressly reserves the right to use the easement or to grant other easements or licenses at the same location; provided such use does not interfere with the rights herein granted, and provided that Grantor shall not erect or construct any building or other structure, or drill or

operate any well, or construct any reservoir or other obstruction, or add to the ground level in said easement area.

2. The rights granted herein shall be for so long as said easement is used for the purpose described in Section 1 above. Grantee agrees that said facilities shall be laid down, constructed and maintained at a depth of at least eighteen (18) inches below the present surface of the ground.

3. The easement herein granted is subject to all covenants, conditions, reservations, contracts, leases, including agricultural licenses, easements, encumbrances, restrictions, and rights-of-way of record and appurtenant thereto, and the use of the word "grant" shall not constitute any warranty on the part of the Grantor.

4. Grantee shall comply with all regulatory environmental and safety requirements at Grantee's sole cost and expense.

5. Grantee shall not use, deposit or permit the use or deposit of any hazardous or toxic waste or material or other harmful substances on Grantor's land.

6. Grantor may relocate the easement if in the opinion of Grantor it unreasonably interferes with the use by the Grantor of Grantor's land; provided, however, that Grantor shall bear the cost of relocating said facilities and provide to Grantee a substitute easement location reasonably suited to Grantee's needs at no cost to Grantee.

7. Grantee shall not materially interfere with the normal operation and activities of Grantor in its use of adjoining land, and Grantee shall use such routes and procedures on Grantor's land as occasion the least practical damage and inconvenience to Grantor. Except in the event of an emergency, Grantee shall not close any road or interfere with the flow of traffic on, to or from Grantor's property without Grantor's prior written consent. Grantee shall provide all appropriate and reasonable safety measures including, if applicable, traffic control and other safety procedures during installation or maintenance.

8. Grantee shall repair and restore to as near as reasonably possible the original condition any of Grantor's property, including, but not limited to, roads, utilities, buildings and fences that may be damaged or destroyed in connection with the exercise of the easement hereby granted.

9. This Grant of Easement is made on the express condition that Grantor is to be free from all liability by reason of injury or death to persons or injury to property arising out of any wrongful or negligent act or omission of Grantee, its contractors, agents, officers, employees, invitees, or licensees, including any liability for injury or death to the person or property of Grantee, its contractors, agents, officers, members, employees, invitees, or licensees, provided, however, that this indemnity shall not extend to that portion of such loss or damage that shall have been caused by Grantor's comparative negligence or willful misconduct. Grantee hereby covenants and agrees to and shall indemnify Grantor, its officers, employees, and agents and save them harmless from any and all liability, loss, costs, or obligations on account of, or arising out of, any such injury or losses caused by any wrongful or negligent act or omission of Grantee, other than those caused by the comparative negligence or willful misconduct of Grantor, its employees, contractors or agents.

10. Grantee, its officers, employees, and agents shall assume all risk of injury or death of persons or damage to any and all property under the control or custody of Grantee upon said premises or damage or loss of any property maintained on the premises by Grantee, its contractors, agents, officers, employees, invitees or licensees, except as to injury, death, loss or damage caused by the comparative negligence or willful misconduct of Grantor, its employees, contractors or agents.

11. Grantee shall be responsible for any damage to the adjoining lands of Grantor of third parties caused by the exercise of this easement by Grantee, including, but not limited to, soil erosion or damage resulting there from; except damage caused by the comparative negligence or willful misconduct of Grantor, its employees, contractors or agents.

12. Grantor may terminate this agreement any time after twenty-five (25) years of continuous non-use of the easement by Grantee. In the event of such termination, the easement shall be quitclaimed from Grantee to Grantor, without expense to Grantor, and Grantor's land shall automatically revert to Grantor or its assigns and successors, without the necessity of any further action to effect said reversion.

13. Grantee alone shall pay any taxes or use fee(s) levied against the premises or against Grantee's interest by any governmental agency relating to the easement herein granted. Grantee shall not cause liens of any kind to be placed against the property.

14. Grantee shall pay all escrow and recording fees incurred in this transaction and if title insurance is required by the Grantee, the premium charge there for.

15. This instrument contains the entire agreement between the parties relating to the rights herein granted and the obligations herein assumed. Any oral representations or modifications concerning this instrument shall be of no force or effect except in a subsequent modification in writing, signed by the party to be charged.

16. This instrument shall bind and inure to the benefit of and bind the respective successors of the parties hereto, and all covenants shall apply to and run with the land.

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

GRANTOR:

THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA

By:_____
Its:_____

Division
Applicant
Customer Operations
Plant Accounting
Customer Accounting

Reference: Schedule A

PACIFIC GAS AND ELECTRIC COMPANY
AGREEMENT FOR INSTALLATION OR ALLOCATION OF
SPECIAL FACILITIES

At the request of **The Regents of The University of California, A California Corporation** (Applicant), PACIFIC GAS AND ELECTRIC COMPANY (PGandE) hereby agrees, as an accommodation, to install at the Applicant's expense within a reasonable time, or allocate for Applicant's use at **Lake Road, Merced**, State of California, certain facilities consisting of **capacity reservation charge for alternate feeder capacity** (Special Facilities), at an estimated total additional installed cost of **$15,134.00** over and above the cost of standard facilities which PGandE would normally provide or allocate for regular service in accordance with its tariffs on file with and authorized by the California Public Utilities Commission (Commission), subject to the following terms and conditions:

1. Applicant shall pay to PGandE, on demand and in advance of construction by PGandE, the initial sum of:

(a) **$15,134.00*** (Advance) which consists of a credit of **$0.00** for that portion of the facilities provided by and conveyed to PGandE by the Applicant, and Applicant's payment of **$15,134.00** representing PGandE's additional costs for Special Facilities; plus,

(b) **$0.00*** (Rearrangement) a nonrefundable amount representing PGandE's cost of rearranging existing facilities to accommodate the installation of the Special Facilities.

2. Applicant shall also pay to PGandE, in addition to the monthly rates and charges for service, at the option of PGandE, either:

(a) A monthly charge for the Special Facilities of **$N/A** (Cost of Ownership Charge) representing the continuing ownership costs of the Special Facilities (**N/A**% per month) as determined in accordance with the applicable percentage rate established in the Special Facilities section of PGandE's applicable Gas or Electric Rule No. 2, copy attached; or,

(b) **$0.00** (Equivalent One-Time Payment) which is the present worth of the monthly ownership costs (**0.46**%) for the Special Facilities in perpetuity. Refunds and adjustments, if any, of the Advance and Equivalent One-Time Payment will be made in accordance with paragraph 13. Interest at the rate of ****** % annually will be added to the unamortized balance of the Equivalent One-Time Payment on each anniversary of the date the Special Facilities are first made available, as such date is established in PGandE's records, before the current year's Cost of Ownership Charges are deducted.

The monthly Cost of Ownership Charge shall commence on the date the Special Facilities are first available for Applicant's use, as such date is established in PGandE's records. PGandE will notify Applicant, in writing, of such commencement date.

3. The annual ownership cost used to determine the Equivalent One-Time Payment or used to determine the monthly charges in paragraph 2 above shall automatically increase or decrease without formal amendment to this agreement if the Commission should subsequently authorize a higher or lower percentage rate for monthly costs of ownership for Special Facilities as stated in Rule No. 2, effective with the date of such authorization. Thereafter, such revised annual ownership cost shall also be used to determine the unamortized balance of the Equivalent One-Time Payment, as provided in paragraph 13.(a).

4. Where it is necessary to install Special Facilities on Applicant's premises, Applicant hereby grants to PGandE:

(a) the right to make such installation on Applicant's premises along the shortest practical route thereon and of sufficient width to provide legal clearance from all structures now or hereafter erected on Applicant's premises for any facilities of PGandE; and,

(b) the right of ingress to and egress from Applicant's premises at all reasonable hours for any purposes reasonably connected with the operation and maintenance of the Special Facilities.

5. Where formal rights of way or easements are required on and over Applicant's property or the property of others for the installation of the Special Facilities, Applicant understands and agrees that PGandE shall not be obligated to install the Special Facilities unless and until any necessary permanent rights of way or easements, satisfactory to PGandE, are granted without cost to PGandE.

6. PGandE shall not be responsible for any delay in completion of the installation of the Special Facilities resulting from shortage of labor or materials, strike, labor disturbance, war, riot, weather conditions, governmental rule, regulation or order, including orders or judgments of any court or Commission, delay in obtaining necessary rights of way and easements, act of God, or any other cause or condition beyond the control of PGandE. PGandE shall have the right, in the event it is unable to obtain materials or labor for all of its construction requirements, to allocate materials and labor to construction projects which it deems, in its sole discretion, most important to serve the needs of its customers, and any delay in construction hereunder resulting from such allocation shall be deemed to be a cause beyond PGandE's control.

* Includes ITCC tax at the rate of 22% and 22% for electric and gas facilities respectively.
** Interest at the rate presribed for deposits in Rule 7 will be applied to any unamoritized balance.

7. In the event that PGandE is prevented from completing the installation of the Special Facilities for reasons beyond its control within twelve (12) months following the date this Agreement, PGandE shall have the right to terminate this Agreement upon thirty (30) days' written notice to Applicant.

8. If this Agreement is terminated as set forth in paragraph 7, the provisions of paragraph 13 shall be applicable, based on that portion of the Special Facilities then completed, if any, including charges for any expenses incurred by PGandE for any engineering, surveying, right of way acquisition expenses and other associated expenses incurred by PGandE for that portion of the Special Facilities not installed or, in PGandE's sole judgment, not useful in supplying permanent service to PGandE's other customers.

9. Special Facilities provided by PGandE hereunder shall at all times be and remain the property of PGandE.

10. As provided in PGandE's applicable Electric Rule No. 14 or Gas Rules No. 14 and 21, copies attached, Applicant understands that PGandE does not guarantee electric or gas service to be free from outages, interruptions or curtailments and that the charges for the Special Facilities represent the additional cost associated with providing the Special Facilities rather than for a guaranteed level of service reliability.

11. If it becomes necessary for PGandE to alter or rearrange the Special Facilities, including, but not limited to the conversion of overhead facilities to underground, Applicant shall be notified of such necessity and shall be given the option to either terminate this Agreement in accordance with paragraphs 12 and 13, or pay to PGandE additional Special Facilities charges consisting of:

(a) A facility termination charge for that portion of the Special Facilities which is being removed because of alteration or rearrangement. Such charge to be determined in the same manner as described in paragraph 13; plus,

(b) An additional Advance and/or rearrangement costs, if any, for any new Special Facilities requested which shall be determined in the same manner as described in paragraph 1; plus,

(c) A revised Equivalent One-Time Payment or monthly charge based on the total net estimated additional installed costs of all new and remaining Special Facilities. Such revised Equivalent One-Time Payment or monthly charge shall be determined in the same manner as described in paragraphs 2 and 3.

12. This Agreement shall be effective when executed by the parties hereto and shall remain in effect until terminated by either party on at least thirty (30) days' advance written notice.

13. Upon discontinuance of the use of any Special Facilities due to termination of service, termination of this Agreement, or otherwise:

(a) Applicant shall pay to PGandE on demand (in addition to all other monies to which PGandE may be legally entitled by virtue of such termination) a facility termination charge defined as the estimated installed cost, plus the estimated removal cost, less the estimated salvage value for the Special Facilities to be removed, as determined by PGandE in accordance with its standard accounting practices. PGandE shall deduct from the facility termination charge the Advance plus the unamortized balance of the Equivalent One-Time Payment previously paid, if any. If the Advance paid plus the unamortized balance of the Equivalent One-Time Payment is greater than the facility termination charge, PGandE shall refund the difference, without interest, to the Applicant;

(b) PGandE shall be entitled to remove and shall have a reasonable time in which to remove any portion of the Special Facilities located on the Applicant's premises;

(c) PGandE may, at its option, alter, rearrange, convey or retain in place any portion of the Special Facilities located on other property off Applicant's premises. Where all or any portion of the Special Facilities located off Applicant's premises are retained in place and used by PGandE to provide permanent service to other customers, an equitable adjustment will be made in the facility termination charge.

14. Applicant may, with PGandE's written consent, assign this Agreement if the assignee thereof will agree in writing to perform Applicant's obligations hereunder. Such assignment will be deemed to include, unless otherwise specified therein, all of Applicant's rights to any refunds which might become due upon discontinuance of the use of any Special Facilities.

15. This Agreement shall be subject to all of PGandE's applicable tariffs on file and authorized by the Commission and shall at all times be subject to such changes or modifications as the Commission may direct from time to time in the exercise of its jurisdiction.

Dated this 9th day of OCTOBER, 2003.

The Regents of the UC
Applicant

BY: _____
Lindsay A. Desrochers

TITLE: Vice Chancellor for Administration

MAILING ADDRESS:
The Regents of the University of Calif.
P.O. Box 2039
Merced, CA 95344

PACIFIC GAS AND ELECTRIC COMPANY

BY: _____

for Manager, _____ Division

Attachments: Rules 2 and 14 (Electric), or
Rules 2, 14 and 21 (Gas)

Division
Applicant
Customer Operations
Plant Accounting
Customer Accounting

Reference: Schedule A

PACIFIC GAS AND ELECTRIC COMPANY
AGREEMENT FOR INSTALLATION OR ALLOCATION OF
SPECIAL FACILITIES

At the request of **The Regents of The University of California, A California Corporation** (Applicant), PACIFIC GAS AND ELECTRIC COMPANY (PGandE) hereby agrees, as an accommodation, to install at the Applicant's expense within a reasonable time, or allocate for Applicant's use at **Lake Road, Merced**, State of California, certain facilities consisting of **metering associated with second service** (Special Facilities), at an estimated total additional installed cost of **$5,000.00** over and above the cost of standard facilities which PGandE would normally provide or allocate for regular service in accordance with its tariffs on file with and authorized by the California Public Utilities Commission (Commission), subject to the following terms and conditions:

1. Applicant shall pay to PGandE, on demand and in advance of construction by PGandE, the initial sum of:

(a) **$6,100.00*** (Advance) which consists of a credit of **$0.00** for that portion of the facilities provided by and conveyed to PGandE by the Applicant, and Applicant's payment of **$6,100.00** representing PGandE's additional costs for Special Facilities; plus,

(b) **$0.00*** (Rearrangement) a nonrefundable amount representing PGandE's cost of rearranging existing facilities to accommodate the installation of the Special Facilities.

2. Applicant shall also pay to PGandE, in addition to the monthly rates and charges for service, at the option of PGandE, either:

(a) A monthly charge for the Special Facilities of **$N/A** (Cost of Ownership Charge) representing the continuing ownership costs of the Special Facilities (**N/A**% per month) as determined in accordance with the applicable percentage rate established in the Special Facilities section of PGandE's applicable Gas or Electric Rule No. 2, copy attached; or,

(b) **$3,024.00** (Equivalent One-Time Payment) which is the present worth of the monthly ownership costs (**0.46**%) for the Special Facilities in perpetuity. Refunds and adjustments, if any, of the Advance and Equivalent One-Time Payment will be made in accordance with paragraph 13. Interest at the rate of ** % annually will be added to the unamortized balance of the Equivalent One-Time Payment on each anniversary of the date the Special Facilities are first made available, as such date is established in PGandE's records, before the current year's Cost of Ownership Charges are deducted.

The monthly Cost of Ownership Charge shall commence on the date the Special Facilities are first available for Applicant's use, as such date is established in PGandE's records. PGandE will notify Applicant, in writing, of such commencement date.

3. The annual ownership cost used to determine the Equivalent One-Time Payment or used to determine the monthly charges in paragraph 2 above shall automatically increase or decrease without formal amendment to this agreement if the Commission should subsequently authorize a higher or lower percentage rate for monthly costs of ownership for Special Facilities as stated in Rule No. 2, effective with the date of such authorization. Thereafter, such revised annual ownership cost shall also be used to determine the unamortized balance of the Equivalent One-Time Payment, as provided in paragraph 13.(a).

4. Where it is necessary to install Special Facilities on Applicant's premises, Applicant hereby grants to PGandE:

(a) the right to make such installation on Applicant's premises along the shortest practical route thereon and of sufficient width to provide legal clearance from all structures now or hereafter erected on Applicant's premises for any facilities of PGandE; and,

(b) the right of ingress to and egress from Applicant's premises at all reasonable hours for any purposes reasonably connected with the operation and maintenance of the Special Facilities.

5. Where formal rights of way or easements are required on and over Applicant's property or the property of others for the installation of the Special Facilities, Applicant understands and agrees that PGandE shall not be obligated to install the Special Facilities unless and until any necessary permanent rights of way or easements, satisfactory to PGandE, are granted without cost to PGandE.

6. PGandE shall not be responsible for any delay in completion of the installation of the Special Facilities resulting from shortage of labor or materials, strike, labor disturbance, war, riot, weather conditions, governmental rule, regulation or order, including orders or judgments of any court or Commission, delay in obtaining necessary rights of way and easements, act of God, or any other cause or condition beyond the control of PGandE. PGandE shall have the right, in the event it is unable to obtain materials or labor for all of its construction requirements, to allocate materials and labor to construction projects which it deems, in its sole discretion, most important to serve the needs of its customers, and any delay in construction hereunder resulting from such allocation shall be deemed to be a cause beyond PGandE's control.

* Includes ITCC tax at the rate of 22% and 22% for electric and gas facilities respectively.
** Interest at the rate presribed for deposits in Rule 7 will be applied to any unamoritized balance.

7. In the event that PGandE is prev[illegible]d from completing the installation of the Sp[illegible]al Facilities for reasons beyond its control within twelve (12) months following the dat[illegible], this Agreement, PGandE shall have the righ[illegible] terminate this Agreement upon thirty (30) days' written notice to Applicant.

8. If this Agreement is terminated as set forth in paragraph 7, the provisions of paragraph 13 shall be applicable, based on that portion of the Special Facilities then completed, if any, including charges for any expenses incurred by PGandE for any engineering, surveying, right of way acquisition expenses and other associated expenses incurred by PGandE for that portion of the Special Facilities not installed or, in PGandE's sole judgment, not useful in supplying permanent service to PGandE's other customers.

9. Special Facilities provided by PGandE hereunder shall at all times be and remain the property of PGandE.

10. As provided in PGandE's applicable Electric Rule No. 14 or Gas Rules No. 14 and 21, copies attached, Applicant understands that PGandE does not guarantee electric or gas service to be free from outages, interruptions or curtailments and that the charges for the Special Facilities represent the additional cost associated with providing the Special Facilities rather than for a guaranteed level of service reliability.

11. If it becomes necessary for PGandE to alter or rearrange the Special Facilities, including, but not limited to the conversion of overhead facilities to underground, Applicant shall be notified of such necessity and shall be given the option to either terminate this Agreement in accordance with paragraphs 12 and 13, or pay to PGandE additional Special Facilities charges consisting of:

(a) A facility termination charge for that portion of the Special Facilities which is being removed because of alteration or rearrangement. Such charge to be determined in the same manner as described in paragraph 13; plus,

(b) An additional Advance and/or rearrangement costs, if any, for any new Special Facilities requested which shall be determined in the same manner as described in paragraph 1; plus,

(c) A revised Equivalent One-Time Payment or monthly charge based on the total net estimated additional installed costs of all new and remaining Special Facilities. Such revised Equivalent One-Time Payment or monthly charge shall be determined in the same manner as described in paragraphs 2 and 3.

12. This Agreement shall be effective when executed by the parties hereto and shall remain in effect until terminated by either party on at least thirty (30) days' advance written notice.

13. Upon discontinuance of the use of any Special Facilities due to termination of service, termination of this Agreement, or otherwise:

(a) Applicant shall pay to PGandE on demand (in addition to all other monies to which PGandE may be legally entitled by virtue of such termination) a facility termination charge defined as the estimated installed cost, plus the estimated removal cost, less the estimated salvage value for the Special Facilities to be removed, as determined by PGandE in accordance with its standard accounting practices. PGandE shall deduct from the facility termination charge the Advance plus the unamortized balance of the Equivalent One-Time Payment previously paid, if any. If the Advance paid plus the unamortized balance of the Equivalent One-Time Payment is greater than the facility termination charge, PGandE shall refund the difference, without interest, to the Applicant;

(b) PGandE shall be entitled to remove and shall have a reasonable time in which to remove any portion of the Special Facilities located on the Applicant's premises;

(c) PGandE may, at its option, alter, rearrange, convey or retain in place any portion of the Special Facilities located on other property off Applicant's premises. Where all or any portion of the Special Facilities located off Applicant's premises are retained in place and used by PGandE to provide permanent service to other customers, an equitable adjustment will be made in the facility termination charge.

14. Applicant may, with PGandE's written consent, assign this Agreement if the assignee thereof will agree in writing to perform Applicant's obligations hereunder. Such assignment will be deemed to include, unless otherwise specified therein, all of Applicant's rights to any refunds which might become due upon discontinuance of the use of any Special Facilities.

15. This Agreement shall be subject to all of PGandE's applicable tariffs on file and authorized by the Commission and shall at all times be subject to such changes or modifications as the Commission may direct from time to time in the exercise of its jurisdiction.

Dated this 9th day of OCTOBER, 2003.

The Regents of the UC
Applicant

BY: [signature]
Lindsay A Desrochers

TITLE: Vice Chancellor for Administration

MAILING ADDRESS:
The Regents of the University of Calif.
P.O. Box 2039
Merced, CA 95344

PACIFIC GAS AND ELECTRIC COMPANY

BY: [signature]

for Manager, _____ Division

Attachments: Rules 2 and 14 (Electric), or
Rules 2, 14 and 21 (Gas)

POWER PURCHASE AGREEMENT

Dated as of December ~~[7]~~ 23, 2008

by and between

Solar Star California XII, LLC,
as Provider

and

The Regents of the University of California, a California corporation,
as Customer

TABLE OF CONTENTS

1. Definitions....1

2. Purchase and Sale of Solar Services....5

3. Construction, Installation and Testing of Systems....5

   3.1 Installation....5
   3.2 Conditions Precedent to Commencement of Construction and Installation....7
   3.3 Utility Approvals....7
   3.4 Energy Delivery....8
   3.5 Risk of Loss; Exclusive Control....8

4. Operation and Maintenance of Systems....9

   4.1 O&M Work; Phone/Data Line....9
   4.2 Malfunctions and Emergencies....9
   4.3 Metering....10
   4.4 Title to Systems; Customer Not Operator....11
   4.5 Outages....11
   4.6 Compliance with Utility Specifications....11

5. Purchase of Solar Services....11

   5.1 Purchase Requirement....12
   5.2 Environmental Attributes; Environmental Financial Incentives....12

6. Price and Payment....13

   6.1 Price....13
   6.2 Taxes....13
   6.3 Billing and Payment....14

7. General Covenants....15

   7.1 Covenants of Provider....15
   7.2 Customer's Covenants....16

8. Insurance Requirements....17

   8.1 Provider's Insurance....17
   8.2 Customer's Insurance....18
   8.3 Waiver of Claims....19

9. Force Majeure Events. 19

10. Term; Customer Options; Termination. 19

10.1 Term. 19
10.2 Customer Options Upon Cessation of Business Operations at Site(s). 19
10.3 Customer Options Upon Expiration of Term. 20
10.4 Customer Purchase Option Prior to Expiration Date. 21
10.5 Payment of Termination Value on Termination Date. 22
10.6 Provider Termination. 22

11. Defaults. 23

11.1 Customer Default. 23

12. License Default. A material default by Customer under the License occurs. 24

12.1 Provider Default. 24
12.2 Customer's Remedies Upon Occurrence of a Provider Default. 25
12.3 Provider's Remedies Upon Customer Default. 25
12.4 No Consequential Damages. 26
12.5 Effect of Termination of Agreement. 26

13. Indemnification. 26

13.1 Indemnification by Provider. 26
13.2 Indemnification by Customer. 27
13.3 Notice of Claims. 27
13.4 Defense of Action. 27
13.5 Survival of Provisions. 28

14. Miscellaneous Provisions. 28

14.1 Notices. 28
14.2 Authority. 29
14.3 Assignment. 31
14.4 Successors and Assigns. 31
14.5 Entire Agreement. 31
14.6 Amendments to Agreement. 31
14.7 Waivers; Approvals. 31
14.8 Partial Invalidity. 32
14.9 Execution in Counterparts. 32
14.10 Governing Law; Jurisdiction; Forum. 32
14.11 Attorneys' Fees. 33
14.12 No Third Party Rights. 33

14.13 Treatment of Additional Amounts. 33
14.14 No Agency. 33
14.15 No Public Utility. 33
14.16 No Recourse to Affiliates 34
14.17 Cooperation with Financing 34
14.18 Setoff. 34
14.19 Service Contract. 34

15. Confidential Information. 34

16. Estoppel 35

Exhibits

Exhibit A - Standard System Design Package
Exhibit B - List of Sites
Appendices – Schedule A - Description of Site
Schedule B - Description of System
Schedule C - Pricing
Schedule D - Termination Values

POWER PURCHASE AGREEMENT

This POWER PURCHASE AGREEMENT (as amended, amended and restated, supplemented or otherwise modified from time to time, the "Agreement"), dated as of December [ ], 2008 (the "Effective Date"), is by and between Solar Star California XII, LLC, a Limited Liability Company formed under the laws of the State of Delaware ("Provider"), and The Regents of the University of California, a corporation formed under the laws of the State of California, on behalf of the University of California Merced ("Customer").

RECITALS:

WHEREAS, Customer owns facilities located in Merced County, California, as more fully described in Schedule A of the relevant Appendices hereto (the "Sites");

WHEREAS, Customer desires that Provider install, maintain and operate, and Provider desires to install, maintain and operate Systems (as hereinafter defined) to be located on the Sites; and

WHEREAS, Provider desires to sell, and Customer desires to purchase, the Solar Services (as hereinafter defined), consisting of the delivery of electrical energy (the "Energy") generated by the Systems to the Sites and other services pursuant to the terms and conditions set forth herein.

NOW THEREFORE, in consideration of the mutual promises set forth below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

AGREEMENT:

1. Definitions.

Unless otherwise required by the context in which any term appears: (a) capitalized terms used in this Agreement shall have the respective meanings set forth in this Section 1; (b) the singular shall include the plural and vice versa; (c) the word "including" shall mean "including, without limitation", (d) references to "Sections" and "Exhibits" shall be to sections and exhibits hereof; (e) the words "herein," "hereof" and "hereunder" shall refer to this Agreement as a whole and not to any particular section or subsection hereof; and (f) references to this Agreement shall include a reference to all exhibits hereto, as the same may be amended, modified, supplemented or replaced from time to time.

"Agreement" shall have the meaning set forth in the preamble.

"Annual Rate Escalator" shall mean the percentage set forth in Schedule C.

"Applicable Law" shall mean, with respect to any Governmental Authority, any constitutional provision, law, statute, rule, regulation, ordinance, treaty, order, decree, judgment, decision, certificate, holding, injunction, registration, license, franchise, permit, authorization, guideline, governmental approval, consent or requirement of such Governmental Authority, enforceable at law or in equity, along with the interpretation and administration thereof by any Governmental Authority.

"Claim Notice" shall have the meaning set forth in Section 13.3.

"Commercial Operation Date" shall have the meaning set forth in Section 3.4.1.

"Confidential Information" shall have the meaning set forth in Section 15.1.

"Customer" shall have the meaning set forth in the preamble.

"Customer Default" shall have the meaning set forth in Section 11.1.

"Effective Date" shall have the meaning set forth in the preamble.

"Energy" shall mean electrical energy generated by the Systems.

"Environmental Attributes" includes Tradable Renewable Certificates, green-e tags, or other transferable indicia denoting carbon offset credits or indicating generation of a particular quantity of energy from a renewable energy source by a renewable energy facility attributed to the Energy during the Term created under a renewable energy, emission reduction, or other reporting program adopted by a Governmental Authority, or for which a registry and a market exists (which, as of the Effective Date are certificates issued by Green-e in accordance with the Green-e Renewable Electric Certification Program, National Standard Version 1.3 administered by the Center for Resource Solutions) or for which a market may exist at a future time.

"Environmental Financial Incentives" shall mean each of the following financial rebates and incentives that is in effect as of the Effective Date or may come into effect in the future: (i) performance-based incentives under the California Solar Initiative or any other state's solar program or initiative, incentive tax credits (including investment tax credits arising under the Code) other tax benefits, and accelerated depreciation (collectively, "allowances"), howsoever named or referred to, with respect to any and all fuel, emissions, air quality, energy generation, or other environmental or energy characteristics, resulting from the use of solar generation or the avoidance of the emission of any gas, chemical or other substance into the air, soil or water attributable to the sale of Energy generated by the System; and (ii) all reporting rights with respect to such allowances.

"EPC Contract" shall mean the contract between Provider and a third party for engineering, procurement and construction of the System(s).

"Estimated Year 1 Production" shall mean the amount set forth in Schedule B of the relevant Appendices hereto.

"Expiration Date" shall have the meaning set forth in Section 10.1.

"Fair Market Value" shall have the meaning set forth in Section 10.3.2.

"Force Majeure Event" shall mean, when used in connection with the performance of a Party's obligations under this Agreement, any of the following events to the extent not caused by such Party or its agents or employees:

a) war, riot, acts of a public enemy or other civil disturbance;

b) acts of God, including but not limited to, storms, floods, lightning, earthquakes, hailstorms, ice storms, tornados, typhoons, hurricanes, landslides, volcanic eruptions, range or forest fires, and objects striking the earth from space (such as meteorites), sabotage or destruction by a third party (other than any contractor retained by or on behalf of the Party) of facilities and equipment relating to the performance by the affected Party of its obligations under this Agreement;

c) acts of federal, state or local government agencies, including changes in Applicable Law, that result in increasing Provider's costs of construction and installation, or continuing operation, of the Systems by 15% or more; and

d) strikes, walkouts, lockouts or similar industrial or labor actions or disputes.

"Governmental Authority" shall mean any federal, state, regional, county, town, city, or municipal government, whether domestic or foreign, or any department, agency, bureau, or other administrative, regulatory or judicial body of any such government.

"Indemnified Party" shall have the meaning set forth in Section 13.3.

"Indemnifying Party" shall have the meaning set forth in Section 13.3.

"Interconnection Point" shall have the meaning set forth in Section 3.5.

"kWh" shall have the meaning set forth in Section 4.3.1.

"kWh Rates" shall have the meaning set forth in Section 6.1.

"License" means that Site License Agreement in respect of the Site(s) entered into by Provider and Customer as of the date hereof.

"Liens" shall have the meaning set forth in Section 7.1.3.

"Meter" shall have the meaning set forth in Section 4.3.1.

"Monthly Period" shall mean the period commencing on the Commercial Operation Date and ending on the last day of the calendar month in which the Commercial Operation Date occurs, and, thereafter, all subsequent one (1) month periods during the Term.

"Monthly Production" shall mean, for each Monthly Period, the amount of Energy delivered during such Monthly Period.

"O&M Work" shall have the meaning set forth in Section 4.1.

"Party" shall mean each of Customer and Provider.

"Person" shall mean any individual, corporation, partnership, company, joint venture, association, trust, unincorporated organization or Governmental Authority.

"Provider" shall have the meaning set forth in the preamble. For purposes of access rights and other rights necessary for Provider to perform its obligations and responsibilities hereunder, the term "Provider" shall include Provider's authorized agents, contractors and subcontractors.

"Provider Default" shall have the meaning set forth in Section 11.2.

"Renewal Rate" shall mean the fair market price for electricity generated by solar PV systems as determined by agreement of the Parties or through the appraisal process applicable to the purchase option contained in this Agreement.

"Reporting Rights" means the right to report to any federal, state, or local agency, authority or other party, including without limitation under Section 1605(b) of the Energy Policy Act of 1992 and provisions of the Energy Policy Act of 2005, or under any present or future domestic, international or foreign emissions trading program "Representatives" shall have the meaning set forth in Section 15.1.

"Scheduled Outage" shall have the meaning set forth in Section 4.5.

"Site" shall have the meaning set forth in the first recital.

"Solar Services" shall mean all services provided to Customer by Provider hereunder, including the provision of Energy.

"Standard System Design Package" shall have the meaning set forth in Section 3.1.1.

"Standards" shall have the meaning set forth in Section 3.1.1.

"State Incentive" means revenue originating from state legislation and typically administered by electric utilities, such as the California Solar Initiative program.

"Systems" shall mean each of the solar photovoltaic systems installed pursuant to this Agreement at the Sites and more fully described in Schedule B hereto; provided, however, that the term "Systems" shall only include equipment and materials up to but not including the Interconnection Point of any such System.

"Term" shall have the meaning set forth in Section 10.1.

"Termination Date" shall have the meaning set forth in Section 10.1.

"Termination Value" shall mean for a given System, on any date of determination, the amount specified for such date on Schedule D of the relevant Appendix to this Agreement, under column A or B, as applicable.

"Transfer Taxes" shall have the meaning set forth in Section 6.2.

2. Purchase and Sale of Solar Services.

Customer engages Provider to provide the Solar Services to Customer at the Site or Sites as set forth in Exhibit B, and Provider agrees to provide the Solar Services to Customer at such Site or Sites, all in accordance with the terms and conditions set forth herein. Customer shall provide Provider with access to the Sites in accordance with the terms of the License. Provider may retain one or more contractors or subcontractors to fulfill its obligations hereunder; provided that Provider shall remain liable for performance of its obligations hereunder. In the event that Customer engages Provider to provide the Solar Services at more than one Site, the Parties acknowledge and agree that (a) any reference in this Agreement to (i) the "Site" shall mean each Site, as applicable, (ii) to the "Sites" shall mean to a given Site, as applicable (iii) to the "Systems" shall mean to the Systems furnished and installed at all Sites, as applicable and to the "System" shall mean to a given System furnished and installed at a given Site, as applicable; (b) except to the extent expressly provided, all provisions of the Agreement shall apply in respect of all such Sites, as applicable; and (c) this Agreement shall remain in full force and effect until terminated with respect to each and every Site to which Solar Services are provided hereunder.

3. Construction, Installation and Testing of Systems.

With respect to each Site on which a System is to be installed:

3.1 Installation.

Subject to Section 3.2, Provider will cause the applicable Systems to be designed, engineered, installed and constructed at each Site substantially in accordance with the terms of this Agreement and the License. Customer shall have the right to review and approve, such approval not to be unreasonably withheld or delayed, all construction plans, including engineering evaluations of the impact of the System on the structural integrity and strength of the locations where the Systems are

installed on or near Customer's buildings. Provider shall organize the procurement of all materials and equipment for the installation work and maintain the same at the applicable Site. Subject to the terms of the License, Provider shall perform installation work at the Site during the times set forth in Exhibit A and Schedule B of the applicable Appendix in a manner that minimizes inconvenience to and interference with Customer's and Customer's invitees' and Customers' use of the Site to the extent commercially practical. Notwithstanding the foregoing, in the event that Provider determines in its sole discretion that it is unable to install a System at a Site, it shall be under no obligation to do so, and this Agreement shall terminate and be of no further force and effect with respect to such Site upon written notice from Provider to Customer to that effect.

3.1.1 Standard System Design Package. Exhibit A sets forth the standard assumptions made by the Provider regarding the Site conditions, electrical conditions and System attributes for all Systems under this Agreement (the "Standards"). Schedule B sets forth for each individual System, the known actual conditions for that specific Site and System, including deviations from the Standards. The Standards are such that the described items for a given System will not need repair, replacement, modification or construction beyond that described in Exhibit A and the applicable Schedule B in order for Provider to properly construct and install such System. If the construction and installation of any System is required for any reason to deviate from the Standards and the applicable Schedule B, Provider will notify the Customer and provide an estimate of any incremental cost to Customer and Customer will have the option to (i) pay the incremental cost at the time the cost is incurred and billed to the Customer, (ii) pay the incremental cost over the Term through a calculated increase in the kWh Rate, or (iii) elect an alternative location subject to the conditions of Section 3.1.2. If Customer chooses none of these options, Provider will have the right to terminate the Agreement per Section 3.1 above and Customer will be deemed to have waived the right to cure per Section 3.1 above.

3.1.2 Alternative Location. If the Customer's interest in any site is a License hold interest and the Customer is unable to obtain the landlord's consent in accordance with corresponding Site License Agreement or Customer chooses an alternative location per Section 3.1.I, Customer will have the option to elect an alternative location if the Environmental Financial Incentives financially equivalent to or better than those associated with the original location are available for the alternative location, and if the expected System kWh output and construction cost at the alternative location are equivalent to or superior than those associated with the originally proposed location. Such alternative location is subject to Provider approval, not to be unreasonably withheld. If an alternative location cannot be established, Provider will have the right to terminate per Section 3.2.

3.2 Conditions Precedent to Commencement of Construction and Installation.

Commencement by the Provider of construction and installation activities with respect to a Site shall be subject to the satisfaction of the following conditions precedent (in addition to the condition set forth in Section 3.3):

3.2.1 Provider shall have closed full financing for the Solar Services to be performed at each of the Sites and, to the extent required pursuant to the applicable financing documentation, Provider shall have reached written agreement with the third party financing institution, pursuant to which Provider may assign some or all of its rights and obligations hereunder to such third party (or its designated corporate affiliate) under an amended and restated version of this Agreement to be negotiated prior to consummation of the financing for the Solar Services;

3.2.2 Provider and Customer shall have executed a License for each of the Sites and, with respect to any Site, if Customer's interest is a License hold interest, the consent of the Customer's landlord for such Site shall have been obtained in accordance with such License;

3.2.3 Provider shall have entered into the applicable contract(s) for construction and installation of each of the Systems, subject to the terms of the applicable financing, if any;

3.2.4 Provider shall have obtained the permits, licenses and other approvals required by Applicable Law to be obtained by Provider prior to such commencement; and

3.2.5 Provider shall have received satisfactory notice that the applications for Environmental Financial Incentives for the Systems at each Site have been accepted and approved by the appropriate governing agency;

provided, however, if the foregoing conditions precedent are not completed by April 30, 2009, Provider shall have the option to terminate this Agreement in whole or with respect to such Site(s) without triggering the default provisions of this Agreement or any liability under this Agreement. Alternatively, in the event that such conditions precedent are not satisfied by such date, the Parties may mutually agree to amend this Agreement to revise the Commercial Operation Date and term of this Agreement.

3.3 Utility Approvals.

Notwithstanding that Provider shall have the primary responsibility for preparing applications and obtaining all permits, licenses and approvals required for the performance of work under this Agreement, Customer agrees to assist Provider in obtaining necessary permits, licenses and approvals in connection with the installation, operation and maintenance of the Systems, including the submission

of applications for interconnection of the System with the local electric utility. Customer shall not make any material changes to its electrical equipment at any Site after the date on which the applicable utility interconnection application is submitted unless any such changes, individually or in the aggregate, would not adversely affect the approval by such utility of such interconnection. Should the local electric utility fail to approve the interconnection of any System(s) with respect to a Site or Sites or require equipment in addition to the equipment set forth in Schedule B in connection with such Site or Sites, Provider may, at Provider's option, terminate this Agreement in whole or with respect to such Site(s) immediately subsequent to notification from the local utility. The Parties shall not be obligated to go forward with installation of a System at a Site if the applicable utility approvals are conditioned upon material upgrades to the existing electrical infrastructure and neither Party elects to provide for such upgrades. Customer also agrees to assist Provider and make all necessary repairs or changes to the existing electrical infrastructure so that the Sites are eligible for the Environmental Financial Incentives.

3.4 Energy Delivery.

The date on which the delivery of Energy to the applicable Site commences (the "Commercial Operation Date") shall be the date on which all of the following shall have occurred: (a) Provider shall have certified to Customer that the System is substantially complete and available for commercial operation, (b) all permits and licenses required to be obtained under Applicable Law in connection with the operation of the System shall have been obtained and be in full force and effect, and (c) Customer shall have entered into an interconnection agreement with the local electricity utility. In no event shall Provider have any liability to Customer for a delay in the Commercial Operation Date.

3.5 Risk of Loss; Exclusive Control.

As between the Parties, at each Site, Provider will be deemed to be in exclusive control (and responsible for any property damage or injuries to persons caused thereby) of the Energy up to but excluding the point where the System is interconnected to Customer's electrical intertie (the "Interconnection Point") and Customer will be deemed to be in exclusive control (and responsible for any property damage or injuries to persons caused thereby) of the Energy at and from the Interconnection Point. Risk of loss related to Energy will transfer from Provider to Customer at the Interconnection Point.

4. Operation and Maintenance of Systems.

4.1 O&M Work; Phone/Data Line.

4.1.1 O&M Work. Provider shall provide operation, repair, monitoring and maintenance services to the Systems during the Term of this Agreement, including the monitoring and maintenance of metering equipment determining the quantity of electricity produced by the Systems (collectively, the "O&M Work"). Provider shall maintain during the Term of this Agreement the capability to provide such O&M Work, either directly or under contract with SunPower Corporation, Systems, or a third-party service provider capable of providing comparable services. Provider shall perform the O&M Work to ensure that each System is capable of delivering Energy in accordance with the specifications set forth in Schedule B. Provider shall have the obligation to use commercially reasonable efforts to enforce the terms of any O&M agreement and System warranty agreements.

4.1.2 Phone/Data Line. Customer shall properly maintain, pay for and provide access to the necessary phone, computer, or other communication lines necessary to permit Provider to record the electrical output of the Systems for the entire Term.

4.2 Malfunctions and Emergencies.

4.2.1 Each of Customer and Provider shall notify the other within twenty-four (24) hours following the discovery by it of (a) any material malfunction in the operation of the System or (b) an interruption in the supply of Solar Services. Provider and Customer shall each designate personnel and establish procedures such that each Party may provide notice of such conditions requiring Provider's repair or alteration at all times, twenty-four (24) hours per day, including weekends and holidays. Each Party shall notify the other Party immediately upon the discovery of an emergency condition in a System.

4.2.2 Provider shall commence repairs to any malfunctioning System and restore the supply of Energy as soon as reasonably possible after notice or upon its own discovery of any of the conditions specified in Section 4.2.1 during normal business hours and, subject to Section 2, take steps to mobilize personnel to commence repairs after notice or discovery of a condition requiring repair or other corrective action. If an emergency condition exists, Provider shall dispatch the appropriate personnel immediately upon becoming aware thereof to perform the necessary repairs or corrective action in an expeditious and safe manner. For routine and emergency repairs, the Parties shall contact the persons set forth below:

If to Provider:
Steve Hanawalt, Director of Operations and Maintenance
SunPower Corporation, Systems
1414 Harbour Way South
Richmond, CA 94804

(510) 540-0550

If to Customer:

John Elliott, Campus Energy Manager
PO Box 2039
Merced, CA 95344
(209) 228-4124
(209) 658-1080 (cell)

Sajid Mian, Chief of Central Plant
PO Box 2039
Merced, CA 95344
(209) 228-2970

Central Plant Control Room (staffed 24/7)
(209) 228-4218

4.3 Metering.

4.3.1 Maintenance and Testing. Provider shall install and maintain a utility-grade kilowatt-hour ("kWh") meter ("Meter") at each Site where a System is installed for the measurement of Energy provided to Customer at such Site, which shall measure the kWh output of such System on a continuous basis. Upon Customer's written request, Provider shall furnish a copy of all technical specifications and accuracy calibrations for each Meter, as well as all metering data and energy production calculations. Provider shall test the Meters in compliance with manufacturer's recommendations.

4.3.2 Customer Audits and Inspections. Once per calendar year, Customer shall have the right to audit all such Meter data upon reasonable notice, and any such audit shall be at Customer's sole cost. Customer shall have a right of access to all meters at reasonable times and with reasonable prior notice for the purpose of verifying readings and calibrations.

4.3.3 Adjustments. If testing of a Meter pursuant to Section 4.3.1 or Section 4.3.2 indicates that such Meter is in error by more than two percent (2%), then Provider shall promptly repair or replace such Meter. Provider shall make a corresponding adjustment to the records of the amount of Energy based on such test results for (a) the actual period of time when such error caused inaccurate Meter recordings, if such period can be determined to the mutual satisfaction of the Parties, or (b) if such period cannot be so determined, then a period equal to one-half ($^1/_2$) of the period from the later of (i) the date of the last previous test confirming accurate metering and (ii) the date the Meter was placed into service; provided, however, that such period shall in no case exceed two (2) years.

4.4 Title to Systems; Customer Not Operator.

Provider, or Provider's permitted assigns, shall at all time retain title to and be the legal and beneficial owner of all Systems, including the right to any tax credits available under federal or state law, and all Systems shall remain the property of Provider or Provider's assigns. Customer warrants and represents that it shall keep the System free from all liens, claims and encumbrances of its lenders and any other third parties (other than those created by Provider or its creditors). Provider shall be entitled to, and is hereby authorized to, file one or more precautionary UCC Financing Statements or fixture filings, as applicable, in such jurisdictions as it deems appropriate with respect to the Systems in order to protect its rights in the Systems. Systems shall be clearly marked and identified as being the property of the Provider or Provider's assigns. The Parties intend that neither Customer nor any party related to Customer shall acquire the right to operate any System or be deemed to operate any System.

4.5 Outages.

Customer shall be permitted two (2) twenty-four (24) consecutive hour days offline (each, a "Scheduled Outage") per Site per calendar year during the Term, during which days Customer shall not be obligated to accept or pay for Energy; provided, however, that Customer shall have notified Provider in writing of each such Scheduled Outage at least forty-eight (48) hours in advance of the commencement of such Scheduled Outage. In the event that Scheduled Outages at a given Site exceed two (2) days per calendar year for a reason other than a Force Majeure Event, and for all unscheduled outages, Provider shall reasonably estimate the amount of Energy that would have been delivered to Customer during each hour of such excess Scheduled Outages or unscheduled outages and shall invoice Customer for such amount, which shall be payable in accordance with Section 6.3.

4.6 Compliance with Utility Specifications.

Provider shall ensure that all Energy generated by each System conforms to applicable utility specifications for energy being generated and delivered to the applicable Site's electric distribution system, which shall include the installation of proper power conditioning and safety equipment, submittal of necessary specifications, coordination of utility testing and verification, and all related costs.

5. Purchase of Solar Services.

With respect to each System installed on a Site pursuant to this Agreement:

5.1 Purchase Requirement.

Customer agrees to purchase one hundred percent (100%) of the Energy delivered by such System during the Term of this Agreement. While the Solar Services are calculated and billed on the basis of kWh of Energy as set forth in Section 6.1, Customer acknowledges and agrees that such Solar Services represent a package of services including the production and supply of electrical energy output from the System together with any other services associated with solar energy production that Provider may provide to Customer. The payment for Solar Services is calculated to include all of the above services in the price per kWh of Energy provided to the Site through the System. Neither Party may claim that by this Agreement Provider is an electric utility subject to regulation as an electric utility or subject to regulated electricity rates. Provider shall not claim to be providing electric utility services to Customer and shall not interfere with Customer's ability to select an electric utility provider except that, to the extent Customer has a choice in selecting an electric utility provider or electricity provider, Customer shall not select an electric utility provider or electricity provider that requires, as part of their conditions for service, removal or discontinued operation of the System or the sales hereunder.

5.2 Environmental Attributes; Environmental Financial Incentives.

5.2.1 Environmental Attributes. All Environmental Attributes and associated Reporting Rights available in connection with the Systems installed at the Sites are retained and owned by Customer.

5.2.2 Environmental Financial Incentives. All Environmental Financial Incentives and associated Reporting Rights available in connection with the Systems installed at the Sites are retained and owned by Provider. Customer shall take all reasonable measures to assist Provider in obtaining all Environmental Financial Incentives currently available or subsequently made available in connection with the Systems installed at the Sites. At Provider's request and expense, Customer shall execute all such documents and instruments reasonably necessary or desirable to effect or evidence Provider's right, title and interest in and to the Environmental Financial Incentives. If the standards used to qualify the Environmental Financial Incentives to which Provider is entitled under this Agreement are changed or modified, Customer shall, at Provider's request and expense, use all reasonable efforts to cause the Environmental Financial Incentives to comply with new standards as changed or modified. If Customer fails to act in good faith in completing documentation or taking actions reasonably requested by Provider, and such failure results in the loss of an Environmental Attribute that would otherwise be available, Customer shall reimburse Provider for the full amount of such lost Environmental Attribute.

5.2.3 To avoid any conflicts with fair trade rules regarding claims of solar or renewable energy use, Customer, if engaged in commerce or trade, shall submit to

Provider for approval any press relicenses regarding Customer's use of solar or renewable energy and shall not submit for publication any such relicenses without the written approval of Provider, which approval shall not be unreasonably withheld or delayed. Customer and Provider may by mutual written agreement set forth specific statements that may be used by Customer in any press relicenses that address Customer's use of solar or renewable energy provided pursuant to this Agreement.

5.2.4 Customer shall not take any action or suffer any omission at any Site that would have the effect of impairing the value to the Provider of the Environmental Financial Incentives. Customer shall be solely responsible for notifying Provider of any action or omission that could impair such value and for consulting with Provider as necessary to prevent impairment of the value of Environmental Financial Incentives.

5.2.5 Provider will at all times retain all tax credits and depreciation associated with the Systems.

6. Price and Payment.

6.1 Price.

Customer shall pay Provider for the Energy provided pursuant to the terms of this Agreement at the rates per kWh (the "kWh Rates") set forth in Schedule C for the applicable Site, plus any adjustments required pursuant to Section 3.1.1, plus any additional amount required pursuant to Section 6.2. Notwithstanding the foregoing, in the event that Customer elects to renew this Agreement pursuant Section 10.3.1, Customer shall pay the Renewal Rate for Energy delivered during such renewal period.

6.2 Taxes.

6.2.1 Customer Taxes. Provider shall invoice Customer for, and Customer shall pay (and shall indemnify and hold Provider harmless on an after-tax basis from and against) all sales, use, excise, ad valorem, transfer and other similar taxes ("Transfer Taxes") lawfully imposed on Customer, but excluding in all events taxes based on or measured by net income, that are imposed by any taxing authority arising out of or with respect to the purchase or sale of the Solar Services (regardless of whether such Transfer Taxes are imposed on Provider or Customer), together with any interest, penalties or additions to tax payable with respect to such Transfer Taxes, unless such interest, penalties or additions to tax payable with respect to such Transfer Taxes are due to Provider's failure to timely remit any such Transfer Taxes or to file any returns required by the appropriate taxing authority, and Provider shall indemnify and hold Customer harmless in such excepted cases.. If Customer shall be required to by law to withhold or deduct any Transfer Taxes or other taxes imposed by any jurisdiction or any political subdivision from or in respect of any sum payable hereunder, the sum payable shall be increased as may be necessary so that, after taking all required deductions, Provider shall have received an amount equal to the sum it

would have received had no such deductions been made. Provider will pay any ad valorem property tax imposed by a taxing authority on the System.

6.2.2 Provider Taxes. Provider will pay and hold harmless Customer from any sales or use tax imposed upon Customer arising from this Agreement, other than as set forth in the preceding Section 6.2.1, including but not limited to Provider's manufacture, installation and acquisition of the Systems. Provider will pay and hold harmless Customer from property tax, if any, assessed on (i) Provider's use of the portion of the Sites on which the Systems are installed, to the extent described in the License; (ii) the Systems or Provider's ownership, installation or use thereof; or (iii) any other aspect of this Agreement. Notwithstanding the foregoing, Customer shall pay and hold harmless Provider from sales and use taxes, if any, arising upon the transfer, if any, of both legal and beneficial ownership of the Systems to Customer pursuant to this Agreement.

6.3 Billing and Payment.

Billing and payment for the Solar Services sold and purchased under this Agreement and any other amounts due and payable hereunder shall be as follows:

6.3.1 Payments. Subject to adjustment in accordance with the following sentences of this Section 6.3.1, Customer shall pay to Provider for each Monthly Period during the Term within thirty (30) days after receipt of any invoice a payment for the Energy delivered by each System during each such Monthly Period equal to the product of (a) Monthly Production for such System for the relevant month multiplied by (b) the relevant kWh Rate for Energy relating to such System, which payment shall be made by check to Solar Star California XII, LLC, c/o SunPower Corporation, Systems, Attn: Steve Hanawalt, 1414 Harbour Way South, Richmond, CA 94804 or by wire transfer of immediately available funds upon receipt of specific instructions by Provider.

6.3.2 Invoice Errors. Within thirty (30) days after receipt of any invoice, Customer may provide written notice to Provider of any alleged error therein. Customer shall pay all undisputed amounts, including the undisputed portion of any invoice, in accordance with the instructions set forth for payment under Section 6.3.1. If Provider notifies Customer in writing within thirty (30) days of receipt of such notice that Provider disagrees with the allegation of error in the invoice, the Parties shall meet, by telephone conference call or otherwise, within ten (10) days of Customer's response for the purpose of attempting to resolve the dispute. If the Parties are unable to resolve the dispute within thirty (30) days after such initial meeting, such dispute shall submitted to arbitration administered by the American Arbitration Association in accordance with its then-existing Commercial Arbitration Rules. The arbitration shall take place in Alameda County, California before a single arbitrator selected in accordance with the Commercial Arbitration Rules. The decision of the arbitrator in the matter shall be final and binding upon the Parties and judgment on the award rendered by the arbitrator may be entered in any court having jurisdiction. The Parties agree that the arbitrator shall have the power to award damages,

injunctive relief and reasonable attorneys' fees and expenses to either Party in such arbitration; provided that this arbitration provision does not prevent either Party from seeking interim injunctive relief from a court in order to preserve the status quo.

6.3.3 Late Payments. All payments hereunder shall be made without set-off or deduction. Any payment not made within the time limits specified in Section 6.3.1 shall bear interest from the date on which such payment was required to have been made through and including the date on which such payment is actually received by the Provider. Such interest shall accrue at a monthly rate equal to the lesser of the then prevailing prime rate of interest as published in *The Wall Street Journal* or the maximum interest rate permitted by Applicable Law.

7. General Covenants.

7.1 Covenants of Provider.

As a material inducement to Customer's execution and delivery of this Agreement, Provider covenants and agrees to the following:

7.1.1 Permits and Approvals. While providing Solar Services, Provider shall obtain and maintain all approvals, consents, licenses, permits, and inspections from relevant Governmental Authorities, utility personnel, and the Site's owners, if Customer is not the owner of such Site, and other agreements and consents required to be obtained and maintained by Provider and to enable Provider to perform such work. Provider shall deliver copies of all permits and approvals obtained pursuant to this Section to Customer.

7.1.2 Health and Safety. Provider shall take all reasonably necessary safety precautions in providing the Solar Services and shall comply in all material respects with all Applicable Laws pertaining to the safety of persons and real and personal property.

7.1.3 Removal of Liens. Provider shall not directly or indirectly cause, create, incur, assume or suffer to exist any mortgage, pledge, lien (including mechanics', laborers' or materialmen's liens), charge, security interest, encumbrance or claim of any nature ("Liens") on or with respect to the Site or any interest therein; provided that this Section 7.1.3 shall not limit Liens on all or any of the Systems. If Provider breaches its obligations under this Section, it shall immediately notify Customer in writing, shall promptly cause such Lien to be discharged and relicensed of record without cost to Customer, and shall defend and indemnify Customer against all costs and expenses (including reasonable attorneys' fees and court costs at trial and on appeal) incurred in discharging and releasing such Lien.

7.1.4 Provider Records. Provider shall keep complete and accurate records of its operations hereunder and shall maintain such data as may be necessary to determine with reasonable accuracy any item relevant to this Agreement. Customer shall have the right to examine all such records insofar as may be necessary for the purpose of ascertaining

the reasonableness and accuracy of any statements of costs relating to transactions hereunder.

7.2 Customer's Covenants.

As a material inducement to Provider's execution of this Agreement, Customer covenants and agrees as follows:

7.2.1 Health and Safety. Customer shall at all times maintain the areas of the Site consistent with all Applicable Laws pertaining to the health and safety of persons and property.

7.2.2 Security. Customer shall provide and take reasonable measures for security of the Systems, including commercially reasonable monitoring of the Site's alarms, if any.

7.2.3 Notice of Damage. Customer shall promptly notify Provider of any matters of which it becomes aware pertaining to any damage to or loss of the use of any System or that could reasonably be expected to adversely affect any System.

7.2.4 Liens. Customer shall not directly or indirectly cause, create, incur, assume or suffer to exist any Liens on or with respect to any System or any interest therein. Customer also shall pay promptly before a fine or penalty may attach to any System any taxes, charges or fees of whatever type of any relevant Governmental Authority for which Customer is responsible under Section 6.2. If Customer breaches its obligations under this Section, it shall immediately notify Provider in writing, shall promptly cause such Lien to be discharged and relicensed of record without cost to Provider, and shall indemnify Provider against all costs and expenses (including reasonable attorneys' fees and court costs at trial and on appeal) incurred in discharging and releasing such Lien.

7.2.5 Consents and Approvals. Customer shall obtain and maintain, and secure and deliver to Provider copies of, all consents, approvals, permits, licenses, and authorizations relating to the performance of Customer's obligations and the rights granted by Customer hereunder, and that are required by the terms, conditions or provisions of any restriction or any agreement or instrument to which Customer is a party or by which Customer is bound, including completing applications for interconnection with Customer's local electric utility. Customer shall use best efforts to assist Provider in fulfilling Provider's responsibilities under Section 7.1.1.

7.2.6 Maintenance of Interconnection. Customer shall ensure that all of the facilities to which Energy is delivered hereunder remain interconnected to the electrical grid during the entire Term, except as permitted under Section 4.5 and Section 9.

7.2.7 Solar Access. Customer shall ensure that each System remains free of overshadowing or other blocked access to sunlight during the Term, and it is

acknowledged and agreed by the Parties that the foregoing is a material obligation of the Customer for the purposes of this Agreement. Customer will use best efforts to secure a solar easement for each Site to prevent other buildings, structures or flora from overshadowing or otherwise blocking access of the sunlight to the System. Provider shall provide assistance to Customer in seeking a solar easement; however, Customer shall bear all costs and expenses related to obtaining any such easement.

7.2.8 Customer Records. Customer shall keep complete and accurate records of its operations hereunder and shall maintain such data as may be necessary to determine with reasonable accuracy any item relevant to this Agreement. Provider shall have the right to examine all such records insofar as may be necessary for the purpose of ascertaining the reasonableness and accuracy of any statements of costs relating to transactions hereunder.

8. Insurance Requirements.

8.1 Provider's Insurance.

Prior to Provider's access to the Site, Provider, at its sole cost and expense, shall insure its activities in connection with this Agreement and obtain, keep in force and maintain insurance as follows:

8.1.1 Comprehensive or Commercial Form General Liability Insurance (contractual liability included) with minimum limits as follows:

Each Occurrence: $2,000,000

Products/Completed Operations Aggregate: $5,000,000

Personal and Advertising Injury: $2,000,000

General Aggregate*: $5,000,000

* applicable to commercial form only

However, if such insurance is written on a claims-made form following termination of this Agreement, coverage shall survive for a period of not less than three years. Coverage shall provide for a retroactive date of placement coinciding with the Effective Date.

8.1.2 Business Automobile Liability Insurance for owned, scheduled, non-owned, or hired automobiles with a combined single limit no less than Two Million Dollars ($2,000,000.) per occurrence.

8.1.3 Worker's compensation and employer's liability insurance in a form and amount covering Provider's's full liability under the Worker's Compensation Insurance and Safety Act of the State of California, as amended from time to time.

8.1.4 Property insurance, fire and extended coverage form in an amount sufficient to reimburse PROVIDER for all of its System and personal property located on or in the Licensed Area including improvements hereinafter constructed or installed.

8.1.5 Such other insurance in such amount which from time to time may be reasonably required by the mutual consent of Customer and Provider against other insurable risks relating to performance.

8.1.6 Additional Insured. The insurance and the coverage referred to under 8.1.1 and 8.1.2 of this Section shall be endorsed to include "The Regents of the UNIVERSITY of California" as an additional insured. Such a provision, however, shall apply only in proportion to and to the extent of the negligent acts or omissions of Provider, its officers, agents, partners, employees; or any person or persons under Provider's's direct supervision and control. Provider, prior to the execution of this Agreement, shall furnish the Customer with Certificates of Insurance evidencing compliance with the requirements of this Section.

8.1.7 No Limitation. The coverage required herein shall not in any way limit the liability of Provider, its officers, agents, partners, or employees.

8.1.8 Waiver of Subrogation. Notwithstanding the provisions of Section 13 herein, Provider hereby waives any right of recovery against Customer due to loss of or damage to the property of Provider when such loss of or damage to property arises out of the acts of God or any of the property perils included in the classification of fire, extended perils ("all risk" as such term is used in the insurance industry) whether or not such perils have been insured or non-insured.

8.2 Customer's Insurance.

Customer shall provide and maintain "all-risk" property insurance covering each of the Systems installed on Customer's Sites during all periods (construction and operation) that Provider is the beneficial owner of such Systems, and naming Provider as the loss payee. Within thirty (30) days after execution of this Agreement and upon Provider's request annually thereafter, Customer shall deliver to Provider certificates of insurance evidencing such coverage, which shall specify that Provider shall be given at least thirty (30) days' prior written notice by the applicable insurer in the event of any material modification, cancellation or termination of coverage. Such insurance shall be primary coverage without right of contribution from any insurance of Provider.

8.3 Waiver of Claims.

Provider shall not be liable for any damage to the Site, or any equipment or personal property located thereon that results from perils that would be insured against in a so called "all-risk property damage" insurance policy, unless such damage is caused by Provider's gross negligence or willful misconduct.

9. Force Majeure Events.

If either Party is prevented from or delayed in performing any of its obligations under this Agreement by reason of a Force Majeure Event, such Party shall notify the other Party in writing as soon as practicable after the onset of such Force Majeure Event and shall be excused from the performance of its obligations under this Agreement to the extent that such Force Majeure Event has interfered with such performance. The Party whose performance under this Agreement is prevented or delayed as the result of a Force Majeure Event shall use reasonable efforts to remedy its inability to perform. If a Party's failure to perform its obligations under this Agreement is due to a Force Majeure Event, then such failure shall not be deemed a Provider Default or a Customer Default, as the case may be. Notwithstanding anything in this Section 9 to the contrary, no payment obligation of Customer under this Agreement may be excused or delayed as the result of a Force Majeure Event. In case a Force Majeure Event continues for at least one (1) year with respect to any System at any Site, then either Party may terminate this Agreement with respect to such Site by written notice to the other.

10. Term; Customer Options; Termination.

10.1 Term.

The term of this Agreement with respect to each System shall commence on the Effective Date and shall expire with respect to that System on the date (the "Expiration Date") that is twenty (20) years after the Commercial Operation Date (the "Term"), unless and until terminated earlier with respect to the applicable Site or all Sites pursuant to Sections 3.1, 3.3, 9, 10.2.3, 10.6 or 12 (the date of any such termination, the "Termination Date").

10.2 Customer Options Upon Cessation of Business Operations at Site(s).

If, prior to the end of the Term for a Site, Customer ceases to conduct business operations at such Site, vacates such Site, or Customer decides to designate the site for further campus development:

10.2.1 Substitute Site. So long as such event does not impair or reduce any Environmental Financial Incentives that may be available to the Provider, or otherwise have an adverse tax or economic effect, Customer shall have the right to provide Provider with a mutually agreeable substitute Site located within the same utility district, subject to requisite

governing agency approvals, to relocate the System(s), which agreement shall not be unreasonably withheld, or, if not available, in a location with similar solar insolation, utility rates, and Environmental Financial Incentives. If such alternate Site is available and is acceptable to Provider, the definition of Site set forth herein shall thereafter be deemed amended to delete the prior Site and add the new Site, but otherwise this Agreement shall remain in full force in accordance with its terms and shall not be deemed otherwise amended. Customer shall pay the reasonable costs arising in connection with the relocation(s) of any System(s), including removal costs, installation costs, any applicable interconnection fees, other costs of deployment at the substitute Site, and lost revenue due to such relocation(s) to Provider based on delivered Energy averaged over the prior twelve months for the applicable System(s).

10.2.2 "Move and Pay" Option. Customer may elect to pay or guarantee the payment of the remaining monthly amounts due under this Agreement to Provider, and cause the applicable System(s) to be kept in operation at such Site, in each case through the remainder of the Term.

10.2.3 Termination of Site(s) and Payment of Termination Value. If, beginning in the sixth year following the applicable Commercial Operation Date, a substitute Site cannot be located in accordance with Section 10.2.1 with respect to such System and Customer elects not to avail itself of the provisions of Section 10.2.2 with respect to such System, then Customer shall so notify Provider, Provider shall remove the applicable System(s) and Customer shall pay to Provider the then-applicable Termination Value specified in Column A of Schedule D of the relevant Appendix in respect of such System(s) as liquidated damages, whereupon this Agreement shall terminate with respect to the applicable Site(s). The Parties agree that actual damages to Provider if this Agreement is terminated with respect to a Site or Sites as contemplated in this Section 10.2 would be difficult to ascertain, and the applicable Termination Value is a reasonable approximation of the damages suffered by Provider as a result of early termination of this Agreement with respect to such Site or Sites.

10.3 Customer Options Upon Expiration of Term.

10.3.1 Extension of Term. Upon prior written notice to Provider at least one-hundred eighty (180) days prior to the Expiration Date with respect to a System, Customer shall have the option to renew the term of this Agreement with respect to such System for one (1) additional five (5)-year period at the Renewal Rate.

10.3.2 Purchase of System(s). With respect to a System, if Customer has not elected to renew the term of this Agreement with respect to such System in accordance with Section 10.3.1, Customer shall have the option to purchase such System by paying Provider the Fair Market Value thereof no later than one-hundred and eighty (180) days prior to the relevant Expiration Date. The "Fair Market Value" of a System shall be the value determined by the mutual agreement of Customer and Provider within ten (10) days after

receipt by Provider of Customer's notice of its election to purchase such System. If Customer and Provider cannot mutually agree to a Fair Market Value, then the Parties shall jointly select a nationally recognized independent appraiser with experience and expertise in the solar photovoltaic industry to value such equipment. Such appraiser shall act reasonably and in good faith to determine the Fair Market Value and shall set forth such determination in a written opinion delivered to the Parties. The valuation made by the appraiser shall be binding on the Parties in the absence of fraud or manifest error. The costs of the appraisal shall be borne by the Parties equally. To the extent transferable, the remaining period, if any, on all warranties for such System will be transferred from Provider to Customer at Customer's sole expense. If the Parties are unable to agree on the selection of an appraiser, such appraiser shall be jointly selected by the appraiser firm proposed by the Customer and the appraiser firm proposed by the Provider. Upon receipt by Provider of payment of the Fair Market Value, title to such System as well as available Environmental Financial Incentives shall transfer to Customer as-is, where-is.

10.3.3 Return of System(s). With respect to a System, if at the end of a Term, or an Extension of Term pursuant to Section 10.3.1, Customer does not exercise any of the options described in Sections 10.3.1 and 10.3.2, Provider shall remove all of its tangible property comprising such System from the Site by a mutually convenient date but in no case later than one hundred eighty (180) days after the Expiration Date with respect to that System. Such cost to remove such System shall be borne by the Customer. The portion of such Site on which such System was installed shall be returned to its original condition, except for System support structures, electric/wiring components and ordinary wear and tear, and Provider shall leave the portion of such Site on which such System was installed in neat and clean order.

10.4 Customer Purchase Option Prior to Expiration Date.

On the Fifteenth anniversary of the Commercial Operation Date with respect to a System, provided that no Customer Default shall have occurred and be continuing beyond any applicable period of cure, Customer may elect to purchase such System. If Customer elects to so purchase such System, the purchase price shall be the then Fair Market Value of such System (calculated in accordance with the definition of "Fair Market Value" set forth in Section 10.3.2), provided that if the then-current Fair Market value is less than the then-current Termination Value specified in Column B of Schedule D of the relevant Appendix, Provider shall not be obligated to sell the System to Customer and, in the event Provider determines not to sell the System to Customer, Customer will have the option to purchase the System subject to the terms of this Section 10.4 on the immediately ensuing anniversary of the Commercial Operation Date. Not less than one-hundred-and-eighty (180) days prior to the exercise of the purchase option for such System, Customer shall provide written notice to Provider of Customer's exercise thereof. Upon the exercise of the foregoing purchase option plus receipt of the Fair Market Value and all other amounts then owing by Customer to Provider, the Parties will

execute all documents necessary to cause title to such System to pass to Customer as-is, where-is; provided, however, that Provider shall remove any encumbrances placed on such System by Provider.

10.5 Payment of Termination Value on Termination Date.

In the event that the Termination Date for any System has occurred for reasons attributable to Customer, Customer shall be required to pay to Provider the then-applicable Termination Value specified in Column A of Schedule D of the relevant Appendix with respect to such System as liquidated damages. The Parties agree that actual damages to Provider in the event this Agreement terminates, as a whole or with respect to a System, prior to the expiration of the Term for causes attributable to Customer would be difficult to ascertain, and the applicable Termination Value is a reasonable approximation of the damages suffered by Provider as a result of early termination of this Agreement.

10.6 Provider Termination.

Provider shall have the right, in Provider's sole and absolute discretion, to terminate this Agreement either as a whole or with respect to a particular applicable Site upon written notice:

10.6.1 with respect to this Agreement as a whole, at any time until construction of the first System hereunder at the applicable Site commences and, with respect to any particular Site, at any time until construction of the System at such Site commences;

10.6.2 with respect to this Agreement as a whole or with respect to any particular Site, as applicable, if the occurrence of an unstayed order of a court or administrative agency having the effect of subjecting the sales of Energy to federal or state regulation of prices and/or service;

10.6.3 with respect to any particular Site, as applicable, of the elimination or alteration of one or more Environmental Financial Incentives or other change in law that results in a material adverse economic impact on Provider; or

10.6.4 with respect to this Agreement, if the aggregate annual level of direct beam solar resource availability is less than or equal to 90% of historical averages as measured by long-term weather data (minimum of five (5) years) collected at all Sites or other reliable calibrated and appropriate weather station representative of such Sites, or, with respect to each Site, if the annual direct beam solar resource availability is less than or equal to 90% of historical averages as measured by long-term weather data (minimum of five (5) years) collected at a Site and/or other reliable calibrated and appropriate weather station representative of such Site.

In the event of a Provider termination under this Section 10.6, Provider shall remove all of its tangible property comprising such System from the Site by a mutually convenient date but in no case later than one hundred eighty (180) days after the Expiration Date with respect to that System. Such cost to remove such System shall be borne by the Provider. The portion of such Site on which such System was installed shall be returned to its original condition, except for System support structures, electric/wiring components and ordinary wear and tear, and Provider shall leave the portion of such Site on which such System was installed in neat and clean order.

11. Defaults.

11.1 Customer Default.

The occurrence at any time of any of the following events shall constitute a "Customer Default":

11.1.1 Failure to Pay. The failure of Customer to pay on any three separate occasions during the Term any amounts owing to Provider on or before the day following the date on which such amounts are due and payable under the terms of this Agreement and Customer's failure to cure each such failure within fifteen (15) days after Customer receives written notice of each such failure from Provider;

11.1.2 Failure to Maintain Phone/Data Line. Unless due to a Force Majeure Event excused by Section 9, the failure of Customer to maintain and grant Provider access to the phone and other communications lines required to be maintained pursuant to Section 4.1.2 and Customer's failure to cure such failure within twenty (20) business days after Customer receives written notice of such failure from Provider; provided that in any event if such failure shall continue for at least five (5) days after notice to Customer and shall result in lost revenue to Provider, Provider shall be entitled to reasonably estimate the amount of revenue that would have been obtained and shall invoice Customer therefor;

11.1.3 Failure to Perform Other Obligations. Unless due to a Force Majeure Event excused by Section 9, the failure of Customer to perform or cause to be performed any other material obligation required to be performed by Customer under this Agreement, or the failure of any representation and warranty set forth herein to be true and correct as and when made; provided, however, that if such failure by its nature can be cured, then Customer shall have a period of thirty (30) business days after receipt of written notice from Provider of such failure to Customer to cure the same and a Customer Default shall not be deemed to exist during such period; provided, further, that if Customer commences to cure such failure during such period and is diligently and in good faith attempting to effect such cure, said period shall be extended for one hundred twenty (120) additional days; provided, finally, that in any event if such failure shall continue for at least five (5) days after notice to Customer and shall result in lost revenue to Provider, Provider shall be entitled to

reasonably estimate the amount of revenue that would have been obtained and shall invoice Customer therefor;

11.1.4 Bankruptcy, Etc. (a) Customer admits in writing its inability to pay its debts generally as they become due; (b) Customer files a petition or answer seeking reorganization or arrangement under the federal bankruptcy laws or any other Applicable Law; (c) Customer makes an assignment for the benefit of creditors; (d) Customer consents to the appointment of a receiver of the whole or any substantial part of its assets; (e) Customer has a petition in bankruptcy filed against it, and such petition is not dismissed within ninety (90) days after the filing thereof; (f) a court of competent jurisdiction enters an order, judgment, or decree appointing a receiver of the whole or any substantial part of Customer's assets, and such order, judgment or decree is not vacated or set aside or stayed within ninety (90) days from the date of entry thereof; or (g) under the provisions of any other law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of the whole or any substantial part of Customer's assets and such custody or control is not terminated or stayed within ninety (90) days from the date of assumption of such custody or control; or

12. License Default. A material default by Customer under the License occurs.

12.1 Provider Default.

The occurrence at any time of the following event shall constitute a "Provider Default":

12.1.1 Failure to Perform Obligations. Unless due to a Force Majeure Event excused by Section 9, the failure of Provider to perform or cause to be performed any obligation required to be performed by Provider under this Agreement or the failure of any representation and warranty set forth herein to be true and correct as and when made; provided, however, that if such failure by its nature can be cured, then Provider shall have a period of thirty (30) business days after receipt of written notice from Customer of such failure to Provider to cure the same and a Provider Default shall not be deemed to exist during such period; provided, further, that if Provider commences to cure such failure during such period and is diligently and in good faith attempting to effect such cure, said period shall be extended for one-hundred twenty (120) additional days;

12.1.2 Bankruptcy, Etc. (a) Provider admits in writing its inability to pay its debts generally as they become due; (b) Provider files a petition or answer seeking reorganization or arrangement under the federal bankruptcy laws or any other applicable law or statute of the United States of America or any State, district or territory thereof; (c) Provider makes an assignment for the benefit of creditors; (d) Provider consents to the appointment of a receiver of the whole or any substantial part of its assets; (e) Provider has a petition in bankruptcy filed against it, and such petition is not dismissed within ninety (90) days after the filing thereof; (f) a court of competent jurisdiction enters an order, judgment, or decree appointing a receiver of the whole or any substantial part of Provider's assets, and

such order, judgment or decree is not vacated or set aside or stayed within ninety (90) days from the date of entry thereof; or (g) under the provisions of any other law for the relief or aid of debtors, any court of competent jurisdiction shall assume custody or control of the whole or any substantial part of Provider's assets and such custody or control is not terminated or stayed within ninety (90) days from the date of assumption of such custody or control; or

12.1.3 License Default. A material default by Provider under the License occurs.

12.1.4 Remedies Following Default.

12.2 Customer's Remedies Upon Occurrence of a Provider Default.

12.2.1 Termination. If a Provider Default as described in Section 11.2 above has occurred and is continuing, and if Provider fails to correct or cure the conditions causing such Provider Default within ten (10) days after Provider shall have received Customer's written notice of Customer's intent to terminate this Agreement as a result of such Provider Default, then this Agreement shall terminate and be of no further force or effect as of the last day of such ten (10) day period.

12.2.2 Other Rights and Remedies. If any Provider Default described under Section 11.2 has occurred and Customer has terminated this Agreement as a result thereof in accordance with the terms of Section 12.1.1 above, then Provider's sole liability to Customer in respect of such Provider Default shall be the payment of an amount not to exceed the then-present value (discounted at the prevailing prime rate of interest as published in *The Wall Street Journal* on the day preceding the date of determination) of the cash flows equal to the product of (i) the positive difference, if any, of the price per kWh for commercially available, utility-provided energy in the applicable market(s) minus the kWh Rate of Energy hereunder (as such kWh Rate would have been escalated over time pursuant to the terms hereof) hereof, multiplied by (ii) the number of days remaining in the term of the Agreement times the expected daily number of kWh of Energy to be delivered under this Agreement, calculated by dividing the Estimated Year 1 Production set forth in Schedule B, adjusted for as-built System, by 365. Except as provided in Sections 10, 12.1.1, 13.1 and 14.11, Customer shall have no right to terminate this Agreement and shall have no other remedies.

12.3 Provider's Remedies Upon Customer Default.

In addition to any other remedies available under this Agreement or at law, if a Customer Default as described in Section 11.1 has occurred and is continuing, and if Customer fails to correct or cure the conditions causing such Customer Default within ten (10) days after the date on which Provider gives Customer written notice of Provider's intent to terminate this Agreement as a result of such Customer Default, then this Agreement shall terminate and be of no further force

or effect as of the last day of such ten (10) day period and Provider shall have the right to (a) cause Customer to pay (and Customer shall have the obligation to pay to Provider) the applicable Termination Value in Column A of Schedule D of the relevant Appendix and (b) enter onto the Sites and remove the Systems in accordance with the last sentence of Section 10.3.3. Customer's liability for payment of the Termination Value set forth in this Section 12.2 may be partially mitigated to the extent that Provider, in its sole discretion, is able to enter into alternative arrangements with another power purchaser to install the applicable System at another site and sell the energy output therefrom to the substitute power purchaser on equal or superior terms to those provided in this Agreement.

12.4 No Consequential Damages.

Nothing in this Agreement is intended to cause either Party to be, and neither Party shall be, liable to the other Party for any lost business, lost profits or revenues from others or other special or consequential damages, all claims for which are hereby irrevocably waived by Customer and Provider. Notwithstanding the foregoing, none of the payments for Energy or any other amount specified as payable by Customer to Provider under the terms of this Agreement upon the termination of this Agreement shall be deemed consequential damages. Provider's liability hereunder shall be in all respects limited to amounts paid to it hereunder during the most recent twenty-fourth (24)-month period.

12.5 Effect of Termination of Agreement.

Upon the Termination Date or the Expiration Date, as applicable, any amounts then owing by a Party to the other Party shall become immediately due and payable and the then future obligations of Customer and Provider under this Agreement shall be terminated (other than the indemnity obligations set forth in Section 13). Such termination shall not relieve either Party from obligations accrued prior to the effective date of termination or expiration.

13. Indemnification.

13.1 Indemnification by Provider.

Subject to Section 8, Provider shall fully indemnify, save harmless and defend Customer from and against any and all costs, claims, and expenses incurred by Customer in connection with or arising from any claim by a third party for physical damage to or physical destruction of property, or death of or bodily injury to any Person, but only to the extent caused by (a) the negligence or willful misconduct of Provider or its agents or employees or others under Provider's control at any Site or (b) a Provider Default; provided, however, that nothing in this Section 13.1 is intended to modify the limitation of Provider's liability set forth in Sections 12.1.2 and 12.3 above.

13.2 Indemnification by Customer.

Subject to Section 8, Customer shall fully indemnify, save harmless and defend Provider from and against any and all costs, claims, and expenses incurred by Provider in connection with or arising from any claim by a third party for physical damage to or physical destruction of property, or death of or bodily injury to any Person, but only to the extent caused by (a) the negligence or willful misconduct of Customer or its agents or employees or others under Customer's control at any Site or (b) a Customer Default; provided, however, that nothing in this Section 13.2 is intended to modify the limitation of Customer's liability set forth in Section 12.3 above.

13.3 Notice of Claims.

Any Party seeking indemnification hereunder (the "Indemnified Party") shall deliver to the other Party (the "Indemnifying Party") a notice describing the facts underlying its indemnification claim and the amount of such claim (each such notice a "Claim Notice"). Such Claim Notice shall be delivered promptly to the Indemnifying Party after the Indemnified Party receives notice that an action at law or a suit in equity has commenced; provided, however, that failure to deliver the Claim Notice as aforesaid shall not relieve the Indemnifying Party of its obligations under this Section 13, except to the extent that such Indemnifying Party has been prejudiced by such failure.

13.4 Defense of Action.

If requested by an Indemnified Party, the Indemnifying Party shall assume on behalf of the Indemnified Party, and conduct with due diligence and in good faith, the defense of such Indemnified Party with counsel reasonably satisfactory to the Indemnified Party; provided, however, that if the Indemnifying Party is a defendant in any such action and the Indemnified Party believes that there may be legal defenses available to it that are inconsistent with those available to the Indemnifying Party, the Indemnified Party shall have the right to select separate counsel to participate in its defense of such action at the Indemnifying Party's expense. If any claim, action, proceeding or investigation arises as to which the indemnity provided for in this Section 13 applies, and the Indemnifying Party fails to assume the defense of such claim, action, proceeding or investigation after having been requested to do so by the Indemnified Party, then the Indemnified Party may, at the Indemnifying Party's expense, contest or, with the prior written consent of the Indemnifying Party, which consent shall not be unreasonably withheld, settle such claim, action, proceeding or investigation. All costs and expenses incurred by the Indemnified Party in connection with any such contest or settlement shall be paid upon demand by the Indemnifying Party.

13.5 Survival of Provisions.

The provisions of this Section 13 shall survive the expiration or termination of this Agreement.

14. Miscellaneous Provisions.

14.1 Notices.

All notices, communications and waivers under this Agreement shall be in writing and shall be (a) delivered in person or (b) mailed, postage prepaid, either by registered or certified mail, return receipt requested or (c) sent by reputable overnight express courier, addressed in each case to the addresses set forth below, or to any other address either of the parties to this Agreement shall designate in a written notice to the other Party:

If to Provider:

Solar Star California XII, LLC
c/o SunPower Corporation, Systems – its member
1414 Harbour Way South
Richmond, CA 94804
Attention: Kevin Hennessy
Phone:510-540-0550
Fax:510-540-0552

If to Customer:

Cindi Deegan, C.P.M.
Director of Purchasing
UC Merced
1715 Canal Street
Merced, CA 95340
Phone: 209-228-4083
Fax: 209-228-2925

With a copy to:
John Elliott
Campus Energy Manager
University of California, Merced
P O Box 2039
Merced CA 95344
Phone: 209-228-4124
Fax: 209-228-4261

All notices, communications and waivers to Customer's lenders or other financiers under this Agreement shall be to the name and address specified in a notice from Customer to Provider. All notices sent pursuant to the terms of this Section 14.1 shall be deemed received (i) if personally delivered, then on the date of delivery, (ii) if sent by reputable overnight, express courier, then on the next business day immediately following the day sent, or (iii) if sent by registered or certified mail, then on the earlier of the third (3rd) Business Day following the day sent or when actually received.

14.2 Authority.

14.2.1 Provider Representations. Provider hereby represents and warrants that:

(a) It is a Delaware limited liability company duly organized, validly existing and in good standing under the laws of the state of its formation and has all requisite limited liability company power and authority to enter into this Agreement, to perform its obligations hereunder and to consummate the transactions contemplated hereby;

(b) The execution and delivery of this Agreement and the performance of its obligations hereunder have been duly authorized by all necessary limited liability company action;

(c) This Agreement is a legal, valid and binding obligation of Provider enforceable against Provider in accordance with its terms, subject to the qualification, however, that the enforcement of the rights and remedies herein is subject to (i) bankruptcy and other similar laws of general application affecting rights and remedies of creditors and (ii) the application of general principles of equity (regardless of whether considered in a proceeding in equity or at law);

(d) To the best knowledge of Provider, as of the date of execution hereof, no governmental approval (other than any governmental approvals that have been previously obtained or disclosed in writing to Customer) is required in connection with the due authorization, execution and delivery of this Agreement by Provider or the performance by Provider of its obligations hereunder which Provider has reason to believe that it will be unable to obtain in due course on or before the date required for Provider to perform such obligations; and

(e) Neither the execution and delivery of this Agreement by Provider nor compliance by Provider with any of the terms and provisions hereof (i) conflicts with, breaches or contravenes the provisions of the articles of formation or operating agreement of Provider or any contractual obligation of Provider or (ii) results in a condition or event that constitutes (or that, upon notice or lapse of time or both, would constitute) an event of default under any material contractual obligation of Provider.

14.2.2 Customer Representations. Customer hereby represents and warrants that:

(a) It is a California public corporation duly organized, validly existing and in good standing under the laws of the state of its formation and has all requisite corporate power and authority to enter into this Agreement, to perform its obligations hereunder and to consummate the transactions contemplated hereby;

(b) The execution and delivery of this Agreement and the performance of its obligations hereunder have been duly authorized by all necessary corporate action;

(c) This Agreement is a legal, valid and binding obligation of Customer enforceable against Customer in accordance with its terms, subject to the qualification, however, that the enforcement of the rights and remedies herein is subject to (i) bankruptcy and other similar laws of general application affecting rights and remedies of creditors and (ii) the application of general principles of equity (regardless of whether considered in a proceeding in equity or at law);

(d) No Governmental Approval (other than any Governmental Approvals which have been previously obtained or disclosed in writing to Provider) is required in connection with the due authorization, execution and delivery of this Agreement by Customer or the performance by Customer of its obligations hereunder which Customer has reason to believe that it will be unable to obtain in due course;

(e) Neither the execution and delivery of this Agreement by Customer nor compliance by Customer with any of the terms and provisions of this Agreement (i) conflicts with, breaches or contravenes the provisions of the standing orders or policies of Customer, or any contractual obligation of Customer, or (ii) results in a condition or event that constitutes (or that, upon notice or lapse of time or both, would constitute) an event of default under any contractual obligation of Customer;

(f) Customer has not entered into any contracts or agreements with any other person regarding the provision of the services at the Sites contemplated to be provided by Provider under this Agreement; and

(g) None of the electricity to be generated by the Provider will be used to generate energy for the purpose of heating a swimming pool.

14.3 Assignment.

Customer shall not assign this Agreement without the prior written consent of Provider and any such attempted assignment shall be void *ab initio*. Provider shall be permitted to assign this Agreement upon written notice thereof to Customer including, without limitation, to an entity owned in whole or in part by an institutional investor.

14.4 Successors and Assigns.

The rights, powers and remedies of each Party shall inure to the benefit of such party and its successors and permitted assigns.

14.5 Entire Agreement.

This Agreement (including all exhibits and schedules attached hereto) and the License represent the entire agreement between the parties to this Agreement with respect to the subject matter hereof and thereof and supersede all prior and contemporaneous oral and prior written agreements. In the event of any conflict between the provisions of this Agreement and the provisions of the License, the provisions of this Agreement shall govern and control.

14.6 Amendments to Agreement.

This Agreement shall not be amended, modified or supplemented without the written agreement of Provider and Customer at the time of such amendment, modification or supplement.

14.7 Waivers; Approvals.

No waiver of any provision of this Agreement shall be effective unless set forth in writing signed by the Party making such waiver, and any such waiver shall be effective only to the extent it is set forth in such writing. Failure by a Party to insist upon full and prompt performance of any provision of this Agreement, or to take action in the event of any breach of any such provisions or upon the occurrence of any Provider Default or Customer Default, as applicable, shall not constitute a waiver of any rights of such Party, and, subject to the notice requirements of this Agreement, such Party may at any time after such failure

exercise all rights and remedies available under this Agreement with respect to such Provider Default or Customer Default. Receipt by a Party of any instrument or document shall not constitute or be deemed to be an approval of such instrument or document. Any approvals required under this Agreement must be in writing, signed by the Party whose approval is being sought.

14.8 Partial Invalidity.

In the event that any provision of this Agreement is deemed to be invalid by reason of the operation of Applicable Law, Provider and Customer shall negotiate an equitable adjustment in the provisions of the same in order to effect, to the maximum extent permitted by law, the purpose of this Agreement (and in the event that Provider and Customer cannot agree then such provisions shall be severed from this Agreement) and the validity and enforceability of the remaining provisions, or portions or applications thereof, shall not be affected by such adjustment and shall remain in full force and effect.

14.9 Execution in Counterparts.

This Agreement may be executed in counterparts, and all said counterparts when taken together shall constitute one and the same Agreement.

14.10 Governing Law; Jurisdiction; Forum.

This Agreement shall be governed by and construed in accordance with the internal laws of the State of California. Customer irrevocably agrees that any action, suit or proceeding by or among Provider and Customer may be brought in whichever of the Superior Courts of the State of California, Contra Costa County has subject matter jurisdiction over the dispute and waives any objection that Customer may now or hereafter have regarding the choice of forum whether on personal jurisdiction, venue, *forum non conveniens* or on any other ground. Customer irrevocably consents to the service of process outside of the territorial jurisdiction of such courts by mailing copies thereof by registered or certified mail, postage prepaid, to Customer's address set forth herein with the same effect as if Customer were a resident of the State of California and had been lawfully served in such state. Nothing in this Agreement shall affect the right to service of process in any other manner permitted by law. Customer and Provider further agree that final judgment against either Party in any action or proceeding shall be conclusive and may be enforced in any other jurisdiction within or outside the State of California by suit on the judgment, a certified or exemplified copy of which shall be conclusive evidence of the fact and the amount of such judgment.

14.11 Attorneys' Fees.

If any action shall be instituted between Customer and Provider in connection with this Agreement, the Party prevailing in such action shall be entitled to recover from the other Party all of its reasonable costs and expenses incurred in connection with such action by arbitration or other legal proceeding, including reasonable attorneys' fees.

14.12 No Third Party Rights.

This Agreement is only for the benefit of the parties to this Agreement, their successors and permitted assigns and Persons expressly benefited by the indemnity provisions of this Agreement. No other Person (including, without limitation, tenants of the Site) shall be entitled to rely on any matter set forth in, or shall have any rights on account of the performance or non-performance by any Party of its obligations under, this Agreement.

14.13 Treatment of Additional Amounts.

The Parties hereto acknowledge and agree that any amounts payable by one Party to the other as a result of the payor's default shall constitute liquidated damages and not penalties. The Parties further acknowledge that in each case (a) the amount of loss or damages likely to be incurred is incapable or is difficult to precisely estimate, (b) the amounts specified hereunder bear a reasonable proportion and are not plainly or grossly disproportionate to the probable loss likely to be incurred by Customer or Provider as the case may be and (c) the Parties are sophisticated business parties and have been represented by sophisticated and able legal and financial counsel and negotiated this Agreement at arm's length.

14.14 No Agency.

This Agreement is not intended, and shall not be construed, to create any association, joint venture, agency relationship or partnership between the Parties or to impose any such obligation or liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act as or be an agent or representative of, or otherwise bind, the other Party.

14.15 No Public Utility.

Nothing contained in this Agreement shall be construed as an intent by Provider to dedicate its property to public use or subject itself to regulation as a "public utility" (as defined in the California Public Utilities Code or any other Applicable Law).

14.16 No Recourse to Affiliates.

This Agreement is solely and exclusively between the Parties, and any obligations created herein on the part of either Party shall be the obligations solely of such Party. No Party shall have recourse to any parent, subsidiary, partner, member, affiliated company, lender, director, officer or employee of the other Party for performance or non-performance of any obligation hereunder, unless such obligations were assumed in writing by the Person against whom recourse is sought.

14.17 Cooperation with Financing.

Customer acknowledges that Provider may be financing the Solar Services and the Systems and Customer agrees that it shall reasonably cooperate with Provider and its financing parties in connection with such financing, including (a) the furnishing of such information, (b) the giving of such certificates, and (c) providing such opinions of counsel and other matters as Provider and its financing parties may reasonably request; provided, that the foregoing undertaking shall not obligate Customer to materially change any rights or benefits, or materially increase any burdens, liabilities or obligations of Customer, under this Agreement (except for providing notices and additional cure periods to the financing parties with respect to Events of Defaults with respect to Provider as a financing party may reasonably request).

14.18 Setoff.

Except as otherwise set forth herein, each Party reserves to itself all rights, set-offs, counterclaims and other remedies and/or defenses to which it is or may be entitled, arising from or out of this Agreement or arising out of any other contractual arrangements between the Parties. All outstanding obligations to make, and rights to receive, payment under this Agreement may be offset against each other.

14.19 Service Contract.

The Parties intend this Agreement to be a "service contract" within the meaning of Section 7701(e)(3) of the Internal Revenue Code of 1986.

15. Confidential Information.

Each Party (the "Receiving Party") shall not use for any purpose other than performing the Work under this Agreement or divulge, disclose, produce, publish, or permit access to, without the prior written consent of the other Party (the "Disclosing Party"), any confidential information of the Disclosing Party. Confidential information includes, without limitation, this Agreement and exhibits hereto, all information or materials prepared in

connection with the Work performed under this or any related subsequent Agreement, designs, drawings, specifications, techniques, models, data, documentation, source code, object code, diagrams, flow charts, research, development, processes, procedures, know-how, manufacturing, development or marketing techniques and materials, development or marketing timetables, strategies and development plans, customer, supplier or personnel names and other information related to customers, suppliers or personnel, pricing policies and financial information, and other information of a similar nature, whether or not reduced to writing or other tangible form, and any other trade secrets. Confidential information does not include (a) information known to the Receiving Party prior to obtaining the same from the Disclosing Party; (b) information in the public domain at the time of disclosure by the Receiving Party; or (c) information obtained by the Receiving Party from a third party who did not receive same, directly or indirectly, from the Disclosing Party. The Receiving Party shall use the higher of the standard of care that the Receiving Party uses to preserve its own confidential information or a reasonable standard of care to prevent unauthorized use or disclosure of such confidential information. Notwithstanding anything herein to the contrary, the Receiving Party has the right to disclose Confidential Information without the prior written consent of the Disclosing Party: (i) as required by any court or other Governmental Authority, or by any stock exchange on which the shares of any Party are listed, (ii) as otherwise required by law, (iii) as advisable or required in connection with any government or regulatory filings, including without limitation, filings with any regulating authorities covering the relevant financial markets, (iv) to its attorneys, accountants, financial advisors or other agents, in each case bound by confidentiality obligations, (v) to banks, investors and other financing sources and their advisors, in each case bound by confidentiality obligations; or (vi) in connection with an actual or prospective merger or acquisition or similar transaction where the party receiving the Confidential Information is bound by confidentiality obligations. If a Receiving Party believes that it will be compelled by a court or other Governmental Authority to disclose confidential information of the Disclosing Party, it shall give the Disclosing Party prompt written notice, and in all cases not less than five (5) business days notice in advance of disclosure, so that the Disclosing Party may determine whether to take steps to oppose such disclosure.

Subject to the foregoing, the Parties shall jointly agree upon the necessity and content of any press relicense in connection with the matters contemplated by this Agreement. Any other publication, news relLicense or other public announcement by a Party relating to this Agreement or to the performance hereunder shall first be reviewed and consented to in writing by the other Party, such consent not to be unreasonably withheld.

16. Estoppel.

Either Party hereto, without charge, at any time and from time to time, within five (5) business days after receipt of a written request by the other party hereto, shall deliver a written instrument, duly executed, certifying to such requesting party, or any other person, firm or corporation specified by such requesting party:

a) That this Agreement is unmodified and in full force and effect, or if there has been any modification, that the same is in full force and effect as so modified, and identifying any such modification;

b) Whether or not to the knowledge of any such party there are then existing any offsets or defenses in favor of such party against enforcement of any of the terms, covenants and conditions of this Agreement and, if so, specifying the same and also whether or not to the knowledge of such party the other party has observed and performed all of the terms, covenants and conditions on its part to be observed and performed, and if not, specifying the same; and

c) Such other information as may be reasonably requested by a Party hereto.

Any written instrument given hereunder may be relied upon by the recipient of such instrument, except to the extent the recipient has actual knowledge of facts contained in the certificate.

[THE REMAINDER OF THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, the parties hereto have duly executed and delivered this Agreement as of the date set forth above.

PROVIDER:

SOLAR STAR CALIFORNIA XII, LLC

By: SunPower Corporation, Systems
Its Member

By: _____
Name: _____
Title: _____

CUSTOMER:

THE REGENTS of the UNIVERSITY of CALIFORNIA

By: _____
Name: _____
Title: _____

IN WITNESS WHEREOF, the parties hereto have duly executed and delivered this Agreement as of the date set forth above.

PROVIDER:

SOLAR STAR CALIFORNIA XII, LLC

By: SunPower Corporation, Systems
Its Member

By: _____
Name: Howard Wenger
Title: President, GSC

CUSTOMER:

THE REGENTS of the UNIVERSITY of CALIFORNIA

By: _____
Name: Mary Miller
Title: Vice Chancellor, Administration
U.C. Merced

EXHIBIT A

STANDARD SYSTEM DESIGN PACKAGE

The following are the standard assumptions made by the Provider regarding the existing condition at each Site, including but not limited to the ground conditions, electrical system including panels, inverter installation location, and security fencing. The Standard System Design Package assumes that there are no Site easements or encumbrances that will affect the cost of system design or construction.

System Size:	1,121 kWp or 1,000 kWcec-ac
System Type:	SunPower Standard Ground System
System Components:	Modules, mechanical attachment assemblies, DC wiring, DC combiner boxes, DC-AC inverters, data acquisition system, system performance monitoring accessible to customer via web interface, and interconnection related equipment on the Customer side of the meter, including panel circuit breakers, utility lockable disconnect switches, NGO metering, conduit, and wiring. Metal materials are galvanized or non-corrosive; conduit is EMT with rain-tight compression fittings for above-ground installations, and schedule 40 PVC for below-ground installations.
System Description:	Photovoltaic modules installed in a single contiguous area, facing south, with DC cable runs no more than 50 feet from the array to the concrete, ground-mounted inverter equipment pad. Equipment pad located approximately ½ mile from the electrical interconnection point. Standard system does not include painting, or landscaping.
Interconnection point:	Main electrical panel interconnect at 12 kV with ample current capacity to accept the system.

Standard system assumes the following conditions, which Provider and Customer will verify:

1. Overtime and special shift requirements are excluded.
2. Any taxes or fees, other than sales tax, are excluded.
3. Payment and performance bonds for Site Restoration only are included. No other performance or payment bonds are included.
4. Removal and disposal of any existing hazardous waste materials, contaminated soils, or any other unforeseen site conditions that require special handling are excluded. Changes

to design or construction as a result of utilities and or hazards, underground or above ground, or any undocumented building upgrades are excluded.

5. Proposal assumes that all utility-owned electrical equipment serving the facility has adequate capacity to handle the PV system output. Any costs associated with unforeseen utility interconnection requirements, including but not limited to, utility owned equipment upgrades or additions, relay protection equipment external to the inverters, and system impact studies are excluded.
6. Proposal assumes there will be no issues in obtaining all required permits and approvals for construction of the solar electric system such as conditional use permits, environmental impact reports, dust control permits, etc. Special permits, approval requirements, fees and certifications (such as environmental impact report, wetlands, water quality, archeological, endangered species, water rights, mineral rights, etc.) are excluded. SunPower includes a duration of three (3) weeks for approvals in the Project Schedule. SunPower will not be responsible for construction delays caused by permit and approval requirements. Such delays will entitle SunPower a time extension change order to the contract in the amount of time over our plan for obtaining required permit and approvals. Proposal assumes a $5,000 allowance for building permits, conditional use permit, electrical permit and all other potential required permits such as but not limited to Environmental Control, Storm water, Soil Erosion and Sediment Control, etc.
7. Proposal assumes a single contiguous area is available to install the PV array.
8. Proposal assumes the existing panel has provisions to accept cable connections on the primary side of the main service breaker without requiring panel or bus bar reconfiguration. SunPower's proposal includes all standard interconnection related equipment on the customer side of the meter, including panel circuit breakers, utility lockable disconnect switches, NGO metering, conduit, and wiring. We assume there is no additional customer-side protection required by the utilities above that provided by the certified inverters.
9. SunPower assumes standard weather patterns and site conditions for planning the project schedule. Instances of excessive climate, weather (greater than the most adverse conditions in the last 3 years) or natural disasters may result in delays and or unplanned costs (i.e. additional labor, shipping, storage, and logistics costs) which will be the responsibility of the client.
10. Special requirements from client's insurance company are excluded.
11. Site landscaping (e.g. plant restoration or long term weed abatement) is excluded.
12. Proposal assumes electrical equipment such as the inverter and transformer will be installed on the ground with a standard SunPower service concrete pad. Proposal also assumes use of standard dig trenching, without issues related to underground utilities, and use of EMT conduit with rain-tight compression fittings for above ground installations and schedule 40 PVC below ground installations.
13. Proposal assumes site access for construction. We expect existing roads can handle all required construction equipment such as drilling rigs, concrete trucks, delivery trucks, cranes, other lifting equipment, etc. If access roads must be built, a change order will be required for construction of the roads per the contract change order terms. Proposal assumes site access for construction activities and deliveries during all hours of the week.

Proposal assumes that there is 24/7 access to existing electric utility meter and the utility lockable disconnect location.

14. Proposal assumes existing site is zoned for solar electric installation per SunPower's design requirements and will not have to be re-zoned and that there will be no issues with any easements such as roads, bridges, utility power lines, etc.
15. Proposed construction complies with local geographic Wind requirements of 85 mph wind zone.
16. Existing site soils are assumed to have the following characteristics as reflected on the required Geotechnical report:
    a. Soil friction coefficient at surface = 0.35
    b. Soil bearing capacity at surface = 2000 lbs/ft^2
    c. Passive pressure resistance = 300 lb/ft^3
    d. Depth of water table = Assumed to not influence the soil capacity
17. Notwithstanding any provision herein to the contrary, in the event that, during the performance of this Agreement, the price of labor, materials or other items increases, the price of such items to be furnished under this Agreement shall be equitably adjusted by an amount reasonably necessary to cover any such price increases. As used herein, a price increase shall mean with respect to items purchased for the project, any substantial increase in the prices of those items following the date of the Agreement based on respected cost indices or documented evidence produced by SunPower. Substantial increase is defined as an increase greater than 1% per month of the cost of an item/category over the course of the project.
18. For purposes of such price adjustments, the parties shall assume that photovoltaic modules comprise 60% of the Contract Price and that steel comprises 10% of the Contract Price and the copper wire comprises 2% of the Contract Price and that PVC comprises 2% of the Contract Price and that Concrete comprises 2% of the Contract Price and Labor comprises 6% of the Contract Price.
19. No Kiosk has been included.
20. Sales tax is calculated at 7.25 %
21. It is assumed that parking passes at the construction site will be provided at no cost to SunPower.
22. Integration of monitoring system to University EMCS is not included.
23. Projected electrical output assumes there is no shading from future buildings or landscaping.
24. PV mounting system is galvanized steel. No painting of the mounting system is included.
25. Permanent 6' chain link fencing is included.
26. Transmission lines from array to Central Plant will be overhead. We assume we will connect overhead conductors to existing spare conduits in existing utility vault outside Central Plant.
27. An allowance of $ 40,000 for site lighting is included.
28. An allowance of $ 90,000 is included for site grading work.
29. Full Operations and Maintenance support is available to UC Merced through the Provider during the term of this agreement. This support through the Provider includes 24/7 phone

support as well technicians being deployed to correct problems that cannot be sorted out over the phone.

30. All maintenance and repair costs are borne by the Provider for the term of this Agreement.
31. Full training of UC Merced staff is included in all SunPower installations.
32. All Warranties are passed through to the Provider. The inverters contain extended 10 year warranty. PV modules are warranted for 25 years.
33. An allowance of $1,000 for connection to the University's Energy Management System (EMS) is included.

System shall comply with minimum system specifications (or equivalent) as follows:

Modules

- PV modules specified must be listed on the California Energy Commission's PTC list and must qualify for eligibility under the California Public Utilities Solar Generation Incentive Program
- System must comply with IEEE 1262 "Recommended Practice for Qualifications of Photovoltaic Modules"
- Modules shall use crystalline silicon technology. Thin film/amorphous technologies will not be allowed.

Electric Power Requirements:

- Power provided must be compatible with the onsite distribution system.
- Power capacity should be measured at the inverter AC output using the PVUSA Test Conditions (PTC), i.e. corrected to 1,000 Watts/m220 degree C ambient temperature and wind speed of 1 m/s.
- The system must include all the hardware needed for the solar PV
- All systems must be installed in accordance with all applicable requirements of local electrical codes and the National Electrical Code (NEC), including but not limited to Article 690, "Solar Photovoltaic Systems" and Article 705 – "Interconnected Electrical Power Production Sources."
- Systems must be designed and installed using UL or ETL listed components, including mounting systems
- Modules must be certified to UL 1703 – "Flat-Plate Photovoltaic Modules and Panels"
- Inverters must comply with the following requirements:
    - IEEE 929-2000 – "Recommended Practice for Utility Interface of Photovoltaic Systems" and
    - UL 1741 – "Standard for Static Inverters and Charge Controllers for use in Photovoltaic Systems"
    - Listed on the CEC list of eligible inverters
- Other acceptable PV system listing for components and electrical hardware recognized labs include ETL Semko, CSA, and FM Global

- Other technical codes that will apply include:
    - AMSE PTC 50 (solar PV performance)
    - ANSI Z21.83 (solar PV performance and safety)
    - NFPA 853 (solar PVs near buildings)
    - NEPA 70 (electrical components)
    - IEEE 1547 (interconnections)
    - National Electrical Safety Code – ANSI C2 - 1999
    - All applicable State Building Codes and requirements
- All Balance of Systems (wiring, component, wiring, conduits, and connections) must be suited for conditions for which they are to be installed. Inverters shall be installed in all-weather enclosures (NEMA 3R and/or NEMA 4) suitable for exterior location. An interval data meter must be installed to measure the AC output of the inverter. This meter should be located in close proximity to the existing billing meter and in a location accessible to University facilities personnel.
- Interconnection must comply with "Rule 21" affecting the IOUs in California. Interconnection must be acceptable to the distribution utility. Licensee will assist the University in preparing and submitting appropriate interconnection agreements with the local utility company. This shall be done at no cost or liability to the University.

Meters

- Licensee will provide revenue grade Interval Data Recording (IDR) meters complete with industry standard telemetry for communication with Ethernet, cellular or other common output capabilities.
- Licensee will provide capability to connect to the University's Energy Management System (EMS) for the purposes of metering, monitoring and data collection of solar production.
- Meters must connect to a monitoring/data collection recording solar production through Time of Use (TOU) increments applicable to the local utility standards, with a minimum 15 minute intervals.
- Licensee will provide local data on ambient temperature, wind speed, and irradiance.

The University will require review of all system design and construction documents, as described under Project Submittals (Section 3.13). The project design will be reviewed by a campus design committee that advises the Campus Architect. The seismic component of the design will also be subject to a peer review, which will be arranged by the University. Plans must be approved by the Campus Fire Marshal, and the University's Representative (a building official). Finally, the project is subject to review by the University of California Office of the President who will determine if further review is required within the University. Any costs associated with the reviews will be the responsibility of the contractor. The University will assist in taking the design through any required review.

The Proposer shall make use of standard specifications provided by the University, UC Merced's Division 1 standard construction specifications, to the greatest practical extent. The University will oversee construction quality and completeness in the field through the University's Representative and the University's Inspector of Record (IOR). The construction will also be inspected by the Campus Fire Marshal.

System design documents will include, but not be limited to, the following:

1. Site plan
2. Conceptual plan/System layout
3. System schematics
4. System capacity calculations
5. System single line electrical diagram
6. Point of interconnection single line electrical diagram
7. Construction documents-plans, elevations, sections, details, specifications, etc.
8. Lighting plan with schedule and illumination levels
9. Structural calculations and structural and mounting details
10. Wind loading and seismic calculations
11. List of equipment and materials schedule
12. Manufacturers' data and cut sheets on solar photovoltaic panels, inverters and balance of systems equipment
13. Geotechnical report
14. Construction specifications

Project management documents will include, but not be limited to, the following:

1. Contact list
2. Construction schedule
3. Meeting notes for regular status meetings
4. Issues log

Post-construction and maintenance documents will include, but not be limited to, the following:

1. Record drawings for the system
2. Commissioning documentation, demonstrating startup and testing to verify proper operation of the system
3. Manufacturers' data and cut sheets on solar photovoltaic panels, inverters and balance of systems equipment
4. Operation and Maintenance Guide for work that must be performed by University personnel

EXHIBIT B

LIST OF SITE(S)

Schedule Reference Number	Site Name	Site Address
1	Site 2A	5200 N. Lake Road, Merced, CA 95343

APPENDIX 1

to

Power Purchase Agreement

This Appendix consists of four (4) schedules. A separate Appendix will be prepared for each System serving each separate Site.

1. **Schedule A**: Description of Site. The Site for the installation of a System pursuant to this Agreement are described in Schedule A to this Appendix.

2. **Schedule B**: Description of System. The System to be installed at the Site subject to this Agreement shall be as described in Schedule B to this Appendix.

3. **Schedule C**: Pricing. The kWh Rates with respect to the System to be installed pursuant to this Agreement shall be as specified in Schedule C to this Appendix.

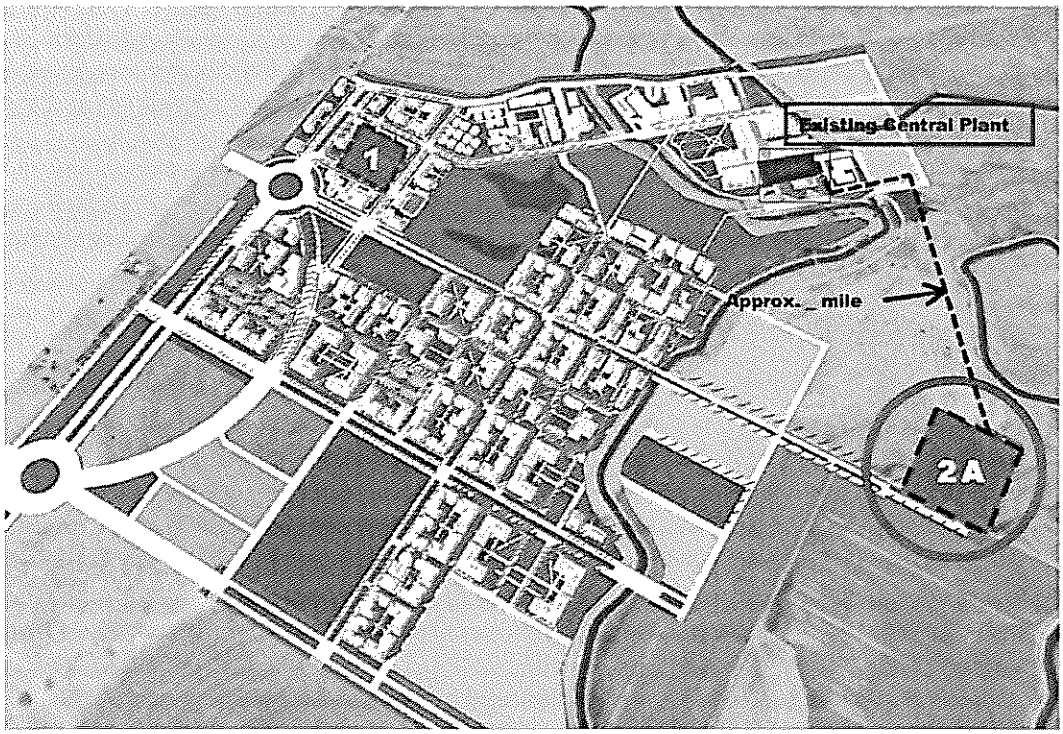
4. **Schedule D**: Termination Values. The kWh Rates with respect to the System to be installed pursuant to this Agreement shall be as specified in Schedule C to this Appendix.

Appendix 1—Schedule A

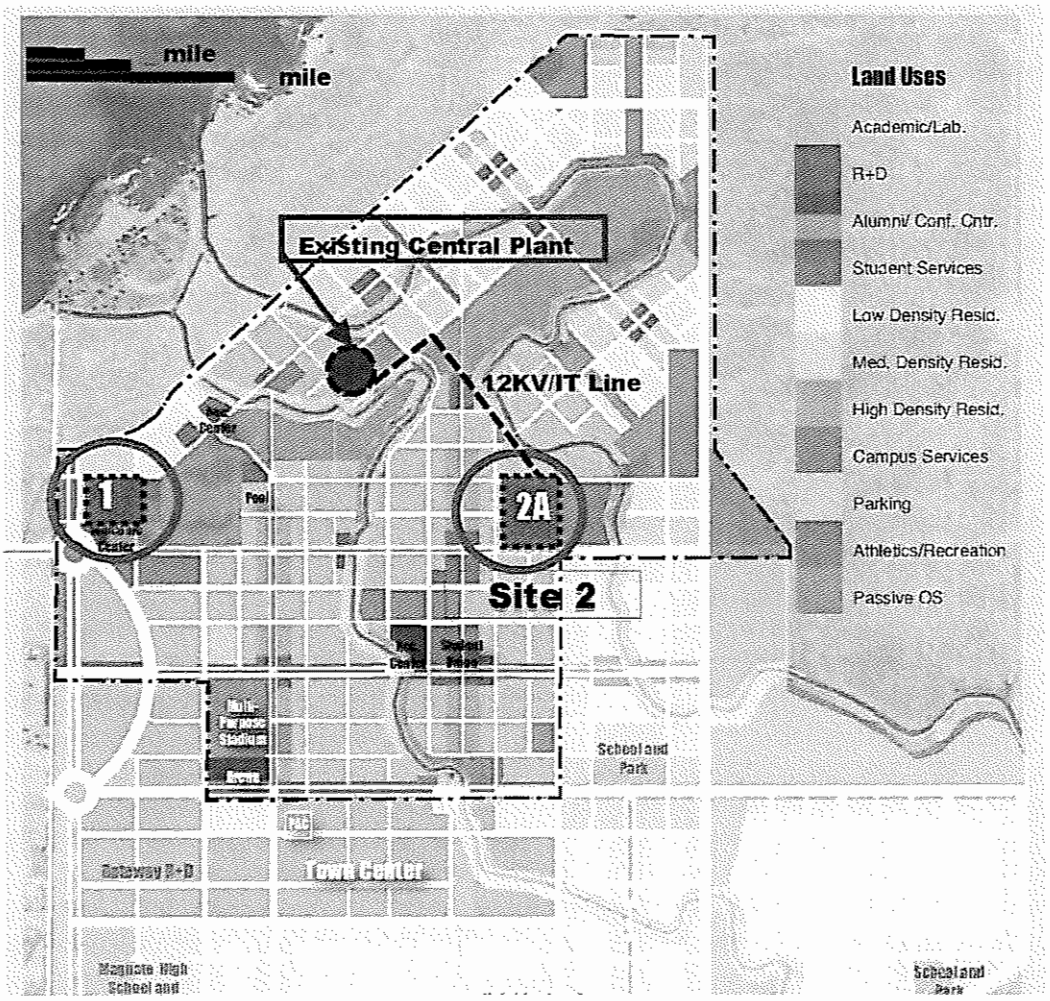
DESCRIPTION OF SITE

Address : 5200 N. Lake Road, Merced, CA 95343

Picture of Property: See following pages



Phase 2.0 from SE

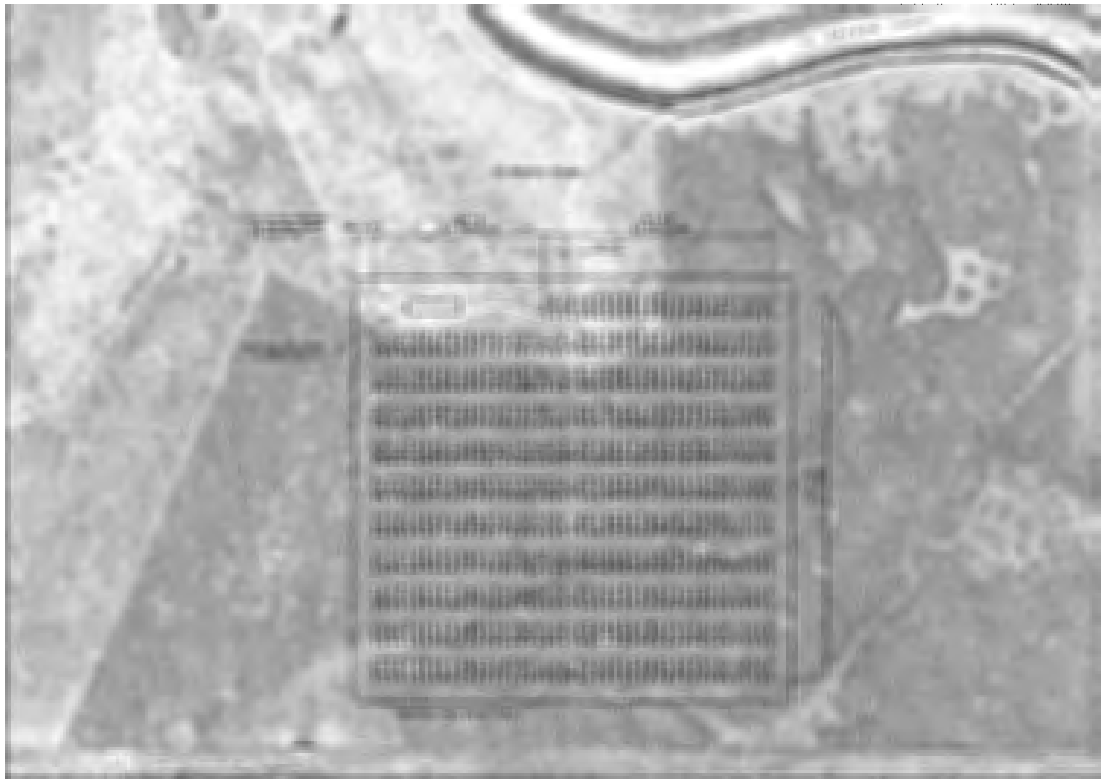

mile
mile
Existing Central Plant
12KV/IT Line
1
2A
Site 2
Land Uses
Academic/Lab.
R+D
Alumni/ Conf. Cntr.
Student Services
Low Density Resid.
Med. Density Resid.
High Density Resid.
Campus Services
Parking
Athletics/Recreation
Passive OS
Pool
School and Park
Gateway R+D
Town Center
Maquoketa High School and
School and Park

Appendix 1—Schedule B

DESCRIPTION OF SYSTEM

Specifications:

CSI System Output AC rating:	1,000 kWcec-ac
Estimated Year 1 Production:	2,365,651 kWh



NOTES:

1. THE PROPOSED SYSTEM ASSUMES INTERCONNECTION TO CAMPUS 12 kV ELECTRICITY DISTRIBUTION SYSTEM AT UNDERGROUND VAULT NEAR CENTRAL PLANT VIA OVERHEAD LINE ALONG UTILITY CORRIDOR, PER WAPA SPECIFICATION, FOR DISTANCE OF APPROXIMATELY 0.5 MILES NORTHWEST. UTILITY LINES ARE NOT TO CROSS AN IRRIGATION CHANNEL.
2. PRINCIPAL DESIGN STEMS ASSUMES SITE WILL BE GRADED, CLEARED AND OTHERWISE PREPARED TO MEET DESIGN TOLERANCES OF T20 TRACKER (E.G. SLOPE < 3%)
3. APPROXIMATE ACREAGE OF PV ARRAY PROPOSED IS 8.03 ACRES.
4. PERIMETER SECURITY FENCE PER CLIENT SPECIFICATIONS TO BE INSTALLED SUCH THAT FENCE DOES NOT SHADE PROPOSED PV ARRAY, NOT SHOWN.

1 ARRAY LAYOUT
SCALE: 1/64"=1'-0"

PROPOSED SYSTEM SPECIFICATIONS:

1170 kWP / 1000 kWac
(4875) 240W STP, (330W) MODULES
10 MODULES/TRACKER, 488 STRINGS
11 DRIVE MOTORS, GCR=0.2
AZIMUTH ANGLE: 0°

NOTE: THE PROPOSED ARRAY LAYOUT SHOWN IS DESIGNED TO FIT EXISTING CONDITIONS AS THEY ARE DESCRIBED ON THIS DRAWING. THE ARRAY AND MODULE QUANTITY, TYPE AND LAYOUT ARE SUBJECT TO CHANGE BASED ON SUNPOWER VERIFICATION OF ACTUAL SITE CONDITIONS, AS WELL AS ON MODULE AVAILABILITY AT THE DATE OF ORDER.

SUNPOWER

UC MERCED
ALTERNATE SOLAR SITE

T20 POWERTRACKER
ARRAY LAYOUT

REVISIONS			
REV	DESCRIPTION	BY	DATE
1	90% DESIGN		06-27-08

DRAWN BY	06-27-08

SHEET 2

Appendix 1—Schedule C

PRICING

The following pricing is based on the Standard System Design Package.

Site Address	PPA Rate ($/kWh)	PPA Term (Years)	PPA Escalator (% / Year)
5200 N. Lake Road, Merced, CA 95343	$0.1178	20	2.5%

Appendix 1—Schedule D

TERMINATION VALUES

The following Termination Values are based on the Standard System Design Package.

Applicable Date: Commercial Operation Date plus	Column A:	Column B:
0 Year	10,407,042	0
1 Year	8,912,217	0
2 Years	7,522,044	0
3 Years	6,174,770	0
4 Years	4,769,788	0
5 Years	3,382,158	0
6 Years	3,348,161	0
7 Years	3,304,249	0
8 Years	3,250,149	0
9 Years	3,184,519	0
10 Years	3,106,250	0
11 Years	3,013,628	0
12 Years	2,906,331	0
13 Years	2,782,462	0
14 Years	2,640,483	0
15 Years	2,477,983	3,301,544
16 Years	2,294,570	3,219,614
17 Years	2,087,588	3,124,074
18 Years	1,854,901	3,014,314
19 Years	1,593,136	2,886,528

DRAINAGE CONTRACT

This Contract is entered into between Merced Irrigation District, hereafter "MID" for **MERCED IRRIGATION DISTRICT - DRAINAGE IMPROVEMENT DISTRICT I,** hereafter "District", and THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, on behalf of its Merced campus, whose address is P.O. Box 2039, Merced, California, 95344 hereafter "University". Further, the term "University" shall include, on a pro rata basis any successor in interest of all or any portion of the Property.

RECITALS

WHEREAS, pursuant to California Water Code 22981, the Merced Irrigation District has formed a California Drainage District known as Merced Irrigation District Drainage Improvement District I; and

WHEREAS, the District has certain canals, laterals, pumps, wells, gates, valves, rights-of-way, easements, fee property and other tangible and intangible interests and facilities for the distribution of water (herein collectively "facilities" of District); and

WHEREAS, University is vested in fee certain real property located outside District boundaries (hereafter the "Property") legally described in Exhibit "A" attached hereto and incorporated herein by this reference; and

WHEREAS, University is constructing the University of California, Merced campus on said Property and desires to use certain facilities of the District for drainage of storm waters from said Property; and

WHEREAS, certain of the facilities of District can accommodate storm water discharges from the University's campus; and

WHEREAS, development by University using District facilities to provide storm drainage, adds, expands, modifies, creates and enlarges facilities; or adds, expands, modifies, creates or enlarges burdens, obligations and/or responsibilities of the District.

THEREFORE, IT IS AGREED AS FOLLOWS:

CONTRACT

1. Real Property Being Developed. University is constructing the University of California, Merced campus on the Property, as set forth on Exhibit "A" attached hereto and incorporated herein.

2. Modification of MID Facilities. University's development will be discharging storm water through University's storm drainage system to the District's Fairfield Canal.

Some modifications to District facilities are necessary as set forth on Exhibit "B" attached hereto and incorporated herein.

3. Drainage Request. University specifically requests the District provide said Property, located outside District boundaries, a means to convey storm drainage water from University's storm drainage system to natural drainage channels.

4. Consent of District. The District consents and agrees to receive the storm water drainage of said Property to the facilities as hereinafter set forth, subject to all terms and conditions of this Contract. Such storm water must traverse areas contained in the District. Therefore, it is in the District's best interests to protect its facilities and manage this storm water as it enters the District.

5. Work of University. University agrees to install, at University's sole cost and expense, to District's reasonable satisfaction, the drainage improvements described in Exhibit "B".

6. Contract Fee. University agrees to pay to the District a non-refundable sum of THREE HUNDRED AND 00/100 DOLLARS ($300) for the engineering and administrative costs associated with the preparation and filing of this Contract.

7. Capital Fees. University agrees to pay or cause to be paid to the District as and for consideration of such drainage acceptance and capacity reservation the following one time only fees under this section:

a. A sum equal to Two-hundred Percent (200%) of the District's hook-up fee which at the execution of this Contract is TWO-THOUSAND ONE-HUNDRED THIRTEEN DOLLARS ($2,113.00) per impermeable acre of the Property. Impermeable acreage is any surface that has been improved, such as building roof tops and parking lots paved with concrete or asphalt.

b. The hook-up fees set forth in subparagraph "a" above shall be paid by University to the District upon approval by the District of the drainage improvements to be constructed by the University in accordance with paragraph 5, above. This contract will be recorded with the Merced County Recorder

8. Annual Maintenance Fees

a. University acknowledges that the Property is not contained within the Merced Irrigation District Drainage Improvement District I, which is a validly established Drainage Improvement District of the District. University is aware that execution of this Contract, construction and/or modification of District facilities and connection of University's Property to such drainage facilities, singly or jointly constitute consent by University to the annual drainage fee levied by the District at a rate of

one-hundred percent (100%) of the District's annual storm drainage maintenance fee which at the execution of this Agreement is ONE HUNDRED TWENTY-SIX AND 76/100 DOLLARS ($126.76) per acre of impermeable area within the Property. Such fees are subject to annual review by the Directors of the District.

b. By execution of this Contract, University consents and agrees upon development of the Property to provide the District with a site plan generally designating the final "footprint" of the improvements on the Property which are impermeable to drainage percolation.

c. University shall notify the District of any proposed increases in the total impermeable area creating additional storm drainage. Said notice shall constitute a request for an adjustment of fees. All notices shall be in writing and require the approval by the District. All fees as specified in sections 7 and 8 of this agreement shall be payable by University to the District at the rates in effect at the time of the request.

d. University will be billed for the annual maintenance fee on or before July 1 of each year. Fee is due and payable within 90 days of receipt of bill.

9. Limitations on Discharge. In consideration of the consent of District to permit the combined discharge of storm waters from the Property through University's storm drainage system into the facilities of the District in the manner and amount as herein specified and at the location as herein shown, University agrees that at no time shall the rate of discharge into facilities of the District exceed 225 gallons per minute (G.P.M.).

10. Improvements. University agrees to complete all development and improvements of said Property specifically in accordance with the plans and specifications for said development approved by The Regents of the University of California.

11. Changes. No modification, change, or alteration of the facilities of the District or to the planned drainage method, facilities, plans or the rate and manner of drainage set forth herein, will be made by University without the specific written approval and consent of the District first had and received.

12. Drainage Defined. Drainage as used herein includes only storm water runoff and surface drainage through the stormwater drainage system, and excludes any and all other types of drainage, including but not limited to sewage, recycled water (Title 22 water or any other treated sewer effluent), industrial drainage and hazardous waste. Swimming pool water may not be drained into facilities of the District without the specific consent of the District first had and obtained. Such consent shall be conditioned, as a minimum, upon a satisfactory water report of the quality of said water prior to discharge.

13. Injunctions/Remedies. In the event University is in breach of any aspect of this Contract, the District may cause all discharge from the parcel for which, or upon which, or from which, a breach has occurred into the facilities of the District to terminate, and may seek and obtain through appropriate court an injunction precluding all further use of facilities of the District for the purpose herein set forth. This remedy is in addition to any and all other remedies the District may have in law or equity and in addition to any damages to which the District may be entitled for any breach hereof by University into facilities of the District from the Property subject hereto. In the event the District establishes a wrongful discharge of water or breach of this Contract, District shall be entitled to damages from such parcel owner in an amount according to proof.

14. Liability for Hazardous Discharge. No discharge of waters into the facilities of the District shall occur, which discharges are not environmentally safe and harmless to flora and fauna as reasonably determined by the District. All discharges of water effluent or materials of any nature into facilities of the District by University shall meet water quality standards established by the United States Environmental Protection Agency, the State of California, the County of Merced and the District. All discharges shall be free and clear of noxious odor and particulate matter other than as satisfies the applicable water quality standards. In addition to having water quality sufficient for discharge, such discharges shall be safe and nondeleterious to any agrarian or husbandry use.

15. Pumping Charges and Costs. In connection with any reservoir impounding of drainage water for the purposes of regulation prior to discharge into facilities of the District, University shall be entirely responsible for any and all costs of installing any necessary pump, its operation and maintenance, including but not limited to power charges and repair.

16. Indemnification.

a. University shall defend, indemnify, and hold the District, its officers, employees, and agents harmless from and against any and all liability, loss, expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Contract but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of University, its officers, employees, agents or invitees.

b. The District shall defend, indemnify, and hold University, its officers, employees, and agents harmless from and against any and all liability, loss, expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Contract but only in proportion to and to the extent such liability, loss, expense, attorneys' fees or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of the District, its officers, employees, agents or invitees.

17. Maintenance Requirement of Ditches, Fences. University shall be responsible for the specific maintenance and repair of the Property, and any impound facilities, discharge facilities and fences or other safety measures owned by University connected therewith.

18. Title to Improvements. All improvements placed in fee title, easements, rights-of-way, or other title properties of District by University pursuant to this Contract and for the use and benefit of District shall, upon acceptance thereof by the District, become the Property of District, and University shall have no claim thereon.

19. Development. Development as used herein means the conversion of Property to use as a University campus.

20. Severability. It is intended that each paragraph of this Contract shall be viewed as separate and divisible, and in the event that any paragraph shall be held to be invalid, the remaining paragraphs shall continue to be in full force and effect.

21. Attorney's Fees. Should any litigation be commenced between the parties to this Contract concerning this Contract or the rights and duties of either in relation thereto, the party prevailing in such litigation shall be entitled, in addition to such other relief as may be granted in the litigation, to a reasonable sum as and for its attorney's fees in such litigation or in a separate action brought for that purpose.

22. Successors and Assigns. This Contract shall be binding on and shall inure to the benefit of the successors and assigns of the parties hereto, and shall run with the land.

23. Notices. Except as otherwise expressly provided by law, any and all notices or other communications required or permitted by this Contract or by law to be served on or given to any party hereto by any other party hereto shall be in writing and shall be deemed duly served and given when personally delivered to the party to whom they are directed, or in lieu of such personal service, when deposited in the United States mail, first class postage prepaid, addressed as follows:

MERCED IRRIGATION DISTRICT
DRAINAGE IMPROVEMENT DISTRICT I
744 West 20th St.(95340)
P. O. Box 2288
Merced, CA 95344-0288

UNIVERSITY:
Vice Chancellor for Administration
University of California, Merced
P.O. Box 2039
Merced, CA 95344

Either party hereto may change its address for the purpose of this paragraph by giving written notice of such change to the other parties in the manner provided in this paragraph.

24. Governing Law. This Contract, and all matters relating to the Contract, shall be governed by the laws of the State of California in force at the time any need for interpretation of this Contract or any decisions or holding concerning this Contract arises.

25. Amendments. This Contract may be amended only by a writing signed by all of the parties to this Contract.

26. Titles. The titles of paragraphs of this Contract are solely for the convenience of the parties, and are not part of the Contract.

27. Termination. In the event that alternate facilities become available for storm water discharges from the University's campus, then University may terminate this contract following twelve (12) months prior written notice. Any fees paid in advance by University shall be refunded pro-rata by MID.

EXECUTED at Merced, California this 20th day of July, 2005.

MERCED IRRIGATION DISTRICT
DRAINAGE IMPROVEMENT DISTRICT I

By: Garith W. Krause
Garith W. Krause, General Manager

THE REGENTS OF THE
UNIVERSITY OF CALIFORNIA

By:
Lindsay A. Desrochers,
Vice Chancellor for Administration

STATE OF CALIFORNIA }
COUNTY OF MERCED }ss

On this 20 day of July, 2005 before me, the undersigned, a Notary Public in and for said State, personally appeared Lindsay A. Desrochers proved on the basis of satisfactory evidence to be the persons whose names are subscribed to the within STORM WATER DRAINAGE CONTRACT and acknowledged to me that they executed the same in their authorized capacities, and that by their signatures on the instrument the persons, or the entity upon behalf of which the persons acted, executed the instrument.

WITNESS my hand and official seal.

SST1 DIANE CATON
Comm. # 1436457
NOTARY PUBLIC-CALIFORNIA
MERCED COUNTY
MY COMM. EXPIRES AUG 26, 2007 SST1

Diane Caton
Notary Public in and for said State

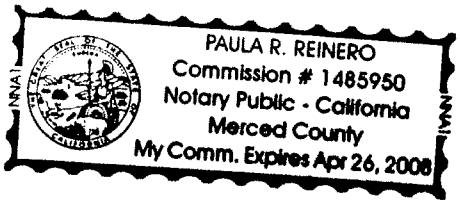
Job 99538

STATE OF CALIFORNIA }
COUNTY OF MERCED }ss

On August 19, 2005, before me, PAULA R. REINERO, NOTARY PUBLIC, in and for said State, personally appeared GARITH W. KRAUSE, personally known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

WITNESS by my hand and official seal.

PAULA R. REINERO
Commission # 1485950
Notary Public - California
Merced County
My Comm. Expires Apr 26, 2008



Paula R. Reinero
Notary Public signature

-OPTIONAL-

The below is not required by law, however it may prove valuable could prevent fraudulent removal and reattachment of this form to another document.

Description of Notarized Document

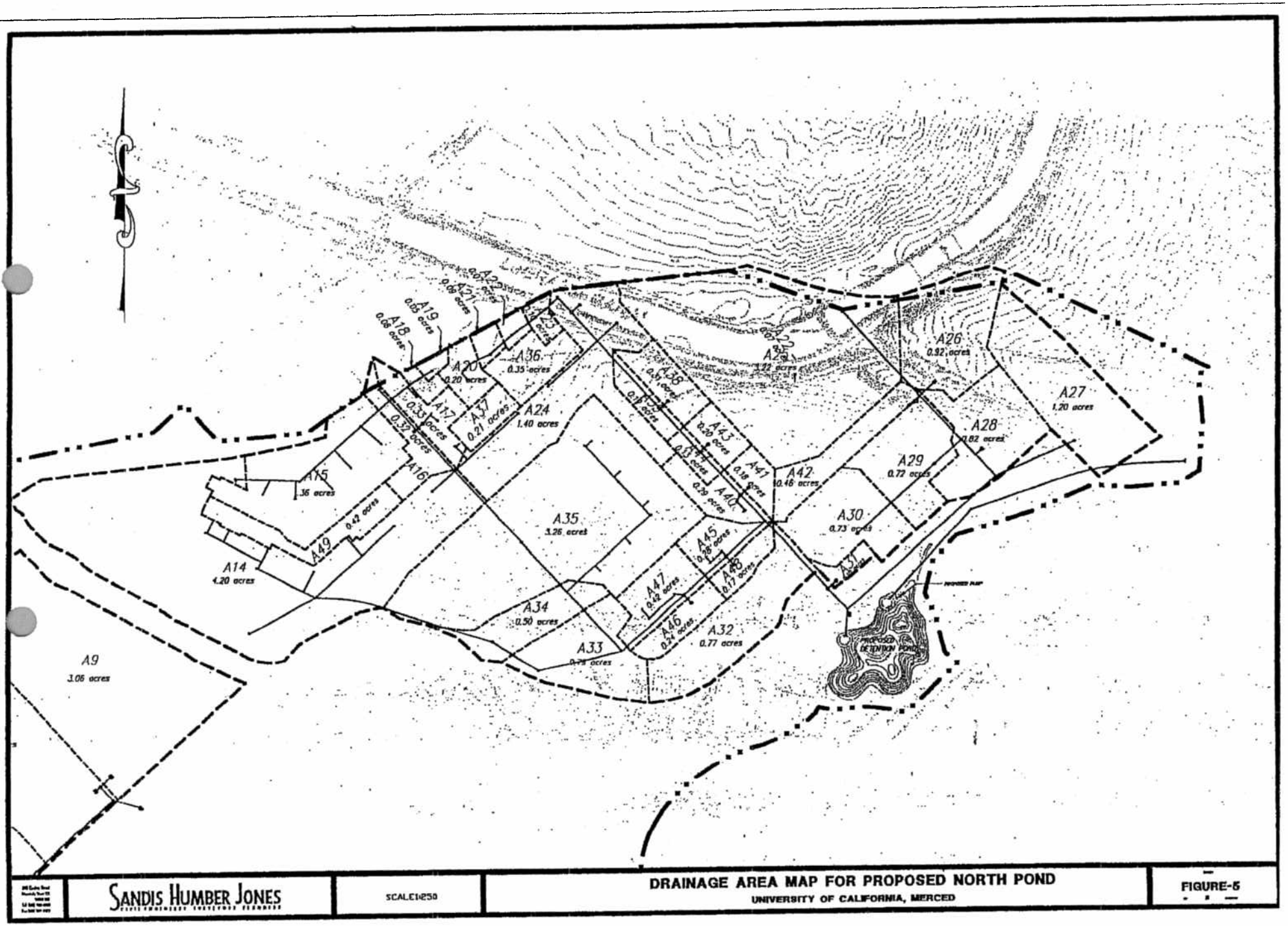
Title or Type of Document: Drainage Contract

Document Date: July 20, 2005 Number of Pages

EXHIBIT "A"

DESCRIPTION

The "Property" is that area of the site designated as "North Drainage Area" and "Proposed North Detention Pond" on the attached maps. The site areas designated as "North Drainage Area" and "Proposed North Detention Pond" are the entirety of the storm drain runoff area that will be discharged into MID facilities.



SANDIS HUMBER JONES

SCALE1:250

DRAINAGE AREA MAP FOR PROPOSED NORTH POND

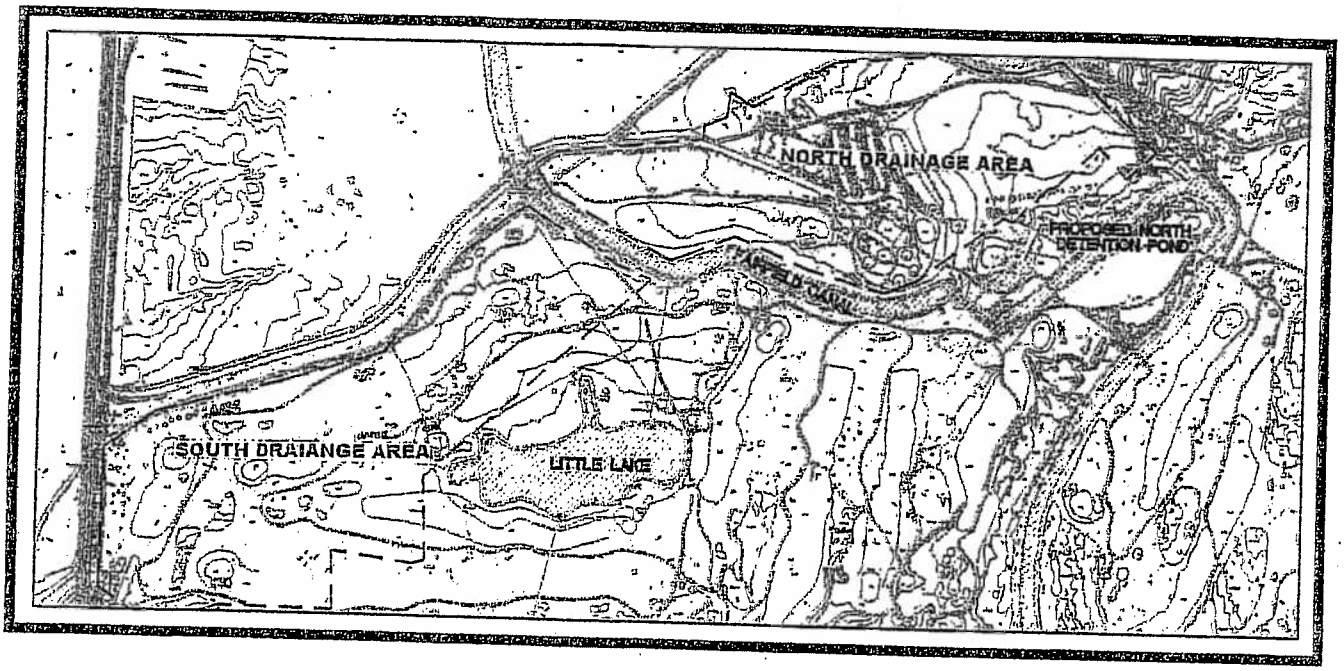
UNIVERSITY OF CALIFORNIA, MERCED

FIGURE-5

OVERALL SITE DRAINAGE AREA

This map shows how the entire site is divided into 2 stormwater drainage areas. The South Drainage area flows into Little Lake. The North Drainage area drains into the Proposed North Detention Pond/Basin. Upon reaching the specified level in the Pond/Basin, the stormwater is pumped into Fairfield Canal.

Hydrology and Hydraulic Calculations for Development of Phase I



UNIVERSITY OF CALIFORNIA
MERCED, CALIFORNIA

RECEIVED
MAR 2 2005
UNIVERSITY OF CALIFORNIA
MERCED

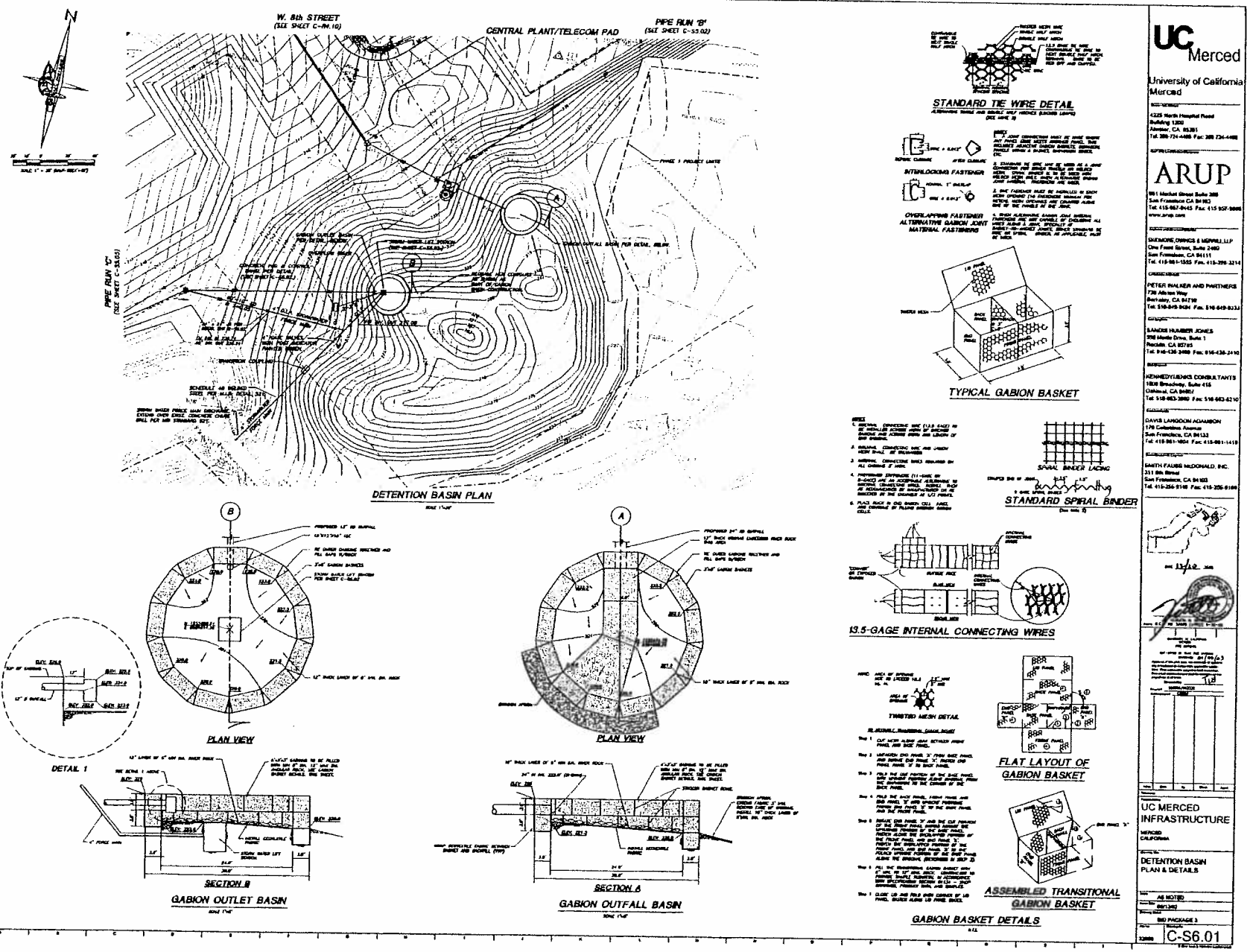
SANDIS HUMBER JONES
CIVIL ENGINEERS SURVEYORS PLANNERS

EXHIBIT "B"

MODIFICATIONS TO DISTRICT FACILITIES

Currently the affected reach of the District's Fairfield Canal is located within the boundaries of the subject Property . Storm drainage is initially discharged to North Detention Basin within the subject site and then discharged into the Fairfield Canal al at a rate not to exceed 225 GPM.

See also, attached Civil Plan for Detention Basin.



UC Merced
University of California
Merced

ARUP

PETER WALKER AND PARTNERS

KENNEDY/JENKS CONSULTANTS

DAVIS LANGDON ADAMSON

SMITH FAUBS McDONALD, INC.

UC MERCED
INFRASTRUCTURE
MERCED
CALIFORNIA

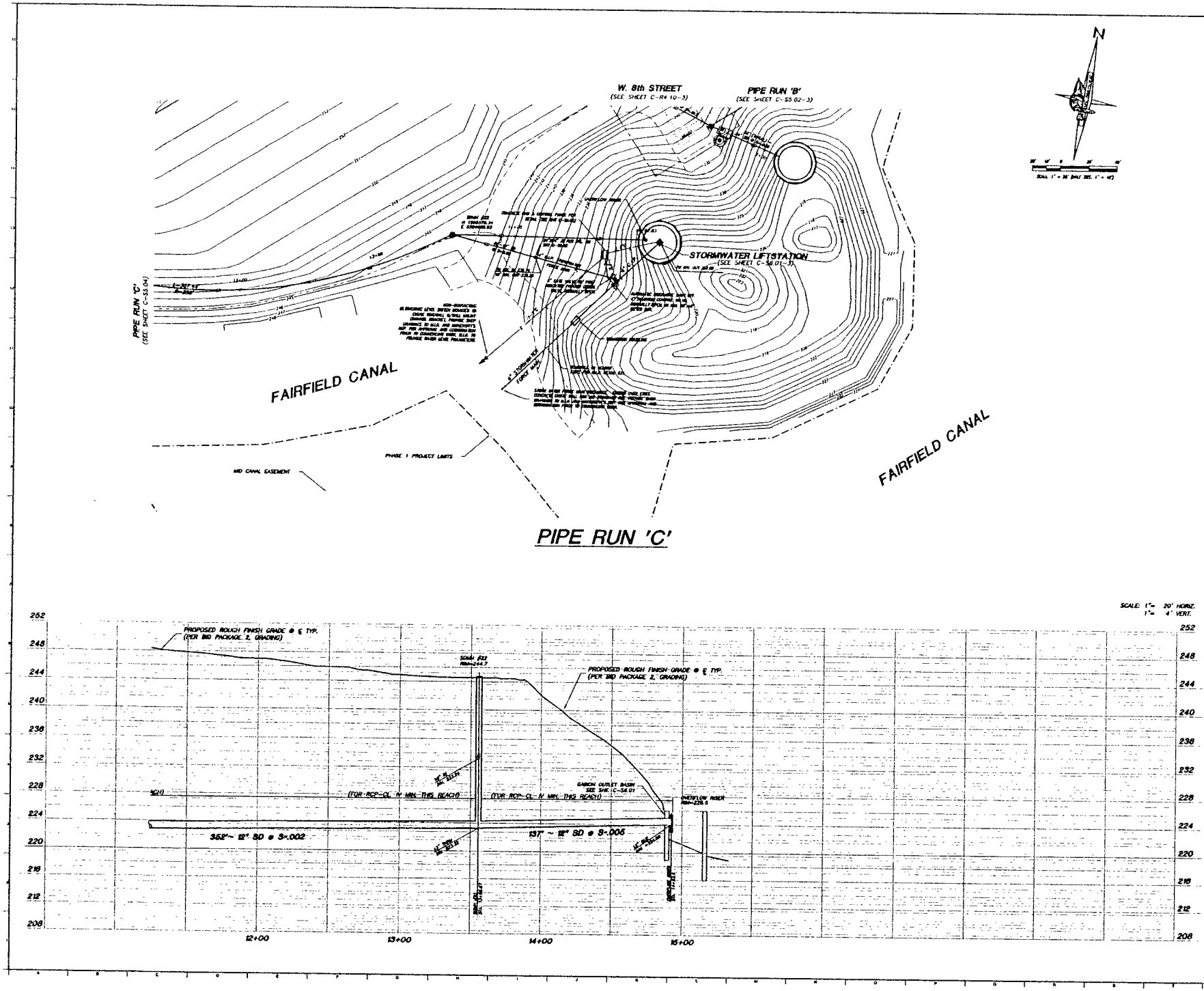
DETENTION BASIN
PLAN & DETAILS

AS NOTED

BID PACKAGE 3

C-S6.01

CIVIL PLAN FOR DETENTION BASIN 1 OF 2)



UC Merced

University of California Merced

4225 North Hospital Road
Building 1200
Atwater, CA 95301
Tel. 209-724-4400 Fax 209-724-4468

ARUP

901 Market Street Suite 260
San Francisco CA 94103
Tel 415-957-9445 Fax. 415-957-9096
www.arup.com

SKIDMORE OWINGS & MERRILL LLP
One Front Street, Suite 2400
San Francisco, CA 94111
Tel. 415-981-1555 Fax. 415-398-3214

PETER WALKER AND PARTNERS
739 Allston Way
Berkeley, CA 94710
Tel 510-849-9494 Fax

SANDIS HUMBER JONES
580 Menlo Drive, Suite 1
Rocklin, CA 95765
Tel. 916-435-2400 Fax. 916-435-2410

KENNEDY/JENKS CONSULTANTS
1000 Broadway, Suite 415
Oakland, CA 94607
Tel. 510-663-3660 Fax. 510-663-8210

DAVIS LANGDON ADAMSON
170 Columbus Avenue
San Francisco, CA 94133
Tel. 415-861-1004 Fax. 415-861-1419

SMITH FAUSE McDONALD, INC
351 8th Street
San Francisco, CA 94103
Tel. 415-255-8140 Fax. 415-256-8180

03/12/03 ADDENDUM 1
02/14/03 ISSUED FOR BID

UC MERCED INFRASTRUCTURE

MERCED CALIFORNIA

STORM SEWER PLAN & PROFILE - PIPE RUN "C" STA. 12+00 TO STA. 15+00

AS NOTED

BID PACKAGE 3

C-S5.05

UNIVERSITY OF CALIFORNIA, MERCED
with
MERCED IRRIGATION DISTRICT

JOINT USE AND MAINTENANCE AGREEMENT

THIS JOINT USE and MAINTENANCE AGREEMENT (herein "Agreement") is made and entered on the last date hereinafter written and affixed by the parties executing this agreement. This agreement is entered by the Regents of the University of California, on behalf of its Merced campus (herein "University") and Merced Irrigation District, a California irrigation district, a political subdivision of the State of California, operating under its elected Board of Directors (herein "District").

RECITALS

A. The University is the owner of certain lands located in eastern Merced County commonly referred to as the UC Merced Campus site more specifically referred to and described in Exhibit A attached hereto and incorporated herein by this reference (hereinafter "UC Properties").

B. The District owns easements upon certain lands ("District Properties") in water conveyance facilities (facilities) which in turn traverse the UC Property in a meandering fashion. The easements are described as follows:

Fairfield Canal:	150' Easement, Volume 2299, Page 963; Recorded 10/7/1981
Le Grand Canal:	150' Easement, Volume 2299, Page 963; Recorded 10/7/1981
Papazian Powerplant:	110' Easement Volume 2299, Page 963; Recorded 10/7/1981
Yosemite Lateral:	Existing Lateral inclusive of toes and banks Volume 12, Page 1

These facilities are commonly known to the District and the general public as the Yosemite Lateral, the Le Grand Canal and the Fairfield Canal. These facilities are more fully described in Exhibit B attached hereto and incorporated herein by this reference. The purpose of these facilities is to deliver water for multiple uses, principally agriculture, from the District regulating and storage reservoir, Lake Yosemite, adjacent to the UC Property, to lands within the southern and southeastern portions of the District. The LeGrand and Fairfield Canals are vital arteries, and comprise the only means of water conveyance by District to much

of the District's service area. These canals also operate as flood control facilities. The canals are large, require significant periodic maintenance, are vital to District operations and the economic well being of the region, and must therefore be preserved and eventually modified to improve capacity. The Yosemite Lateral, which also requires periodic maintenance, provides surface water to agricultural lands in the local area west of Lake Road and north of Yosemite Avenue.

C. The University will be constructing the Merced campus of the University of California on UC Property. As such the University will need to construct bridges and other crossings such as utilities, walk/bike ways, across the facilities at various locations determined from time to time. The University may also need storm drainage agreements and other construction, deferred construction or service agreements. The University also wishes to change the landscape of the campus area consistent with its design including some of the land occupied by district canals. The University's current plans regarding crossings are as described in the Plans and Specifications dated November 8, 2002 (revision 1). The University's plans regarding landscaping are currently under development. University's landscaping Plans and Specifications will be available to District upon completion

D. Both parties recognize that District also operates a small hydroelectric plant within a District easement located on the Fairfield Canal (a portion of district properties) This plant is operated by the passage of water released from the Le Grand Canal through a pipeline easement on the UC Property to the Fairfield Canal using the elevation difference to generate power. Occasionally, for a series of operational reasons, the power plant trips "off line". When this occurs the pipeline penstock from the higher Le Grand canal is automatically closed and the head-gate of the Le Grand canal automatically adjusts to maintain downstream flow. The head-gate instantly opens to increase the flow in the Fairfield Canal at Lake Yosemite between Lake Yosemite and the power plant to replace the water previously directed from the Le Grand canal to the Fairfield canal via the power plant pipeline/penstock.

The parties shall work together cooperatively to develop and implement mitigation measures which, while ensuring the preservation for the timely water delivery capacity of all of the canals, shall address the issue of significant sudden increases in flow in all of the canals, including the Fairfield Canal. The parties expect that the mitigation measures to be undertaken by the parties will be decided upon and in place prior to the opening of

the UC Merced campus. Mitigation measures which are solely intended to address the water flow issue and which do not also serve to upgrade District's facilities shall be at no cost to the District.

E. The District for its part desires to access District properties and facilities for operations and maintenance utilizing its easements by crossing UC Property using streets and pathways which shall be designated by University.

F. The parties intend to use their best efforts to use the UC Property and District properties together to meet their joint goals without interference with the main purposes each party has for its own property.

WITH THESE PURPOSES, and in consideration of the promises and the mutual covenants hereinafter set forth, University and District do hereby mutually agree as follows:

AGREEMENT

1.0 Use of Properties.

1.1 University and District agree that each party shall have a joint use in common, of certain areas where the District (fee titled, and easement) Property used for canals, pipelines, laterals and appurtenant structures, traverses, divides, or abuts the University property.

1.2 The University shall not have joint use of any facility used for the generation of electricity, nor shall it have any joint use of District facilities inside the banks of any canal, lateral or other water delivery system nor any pipeline or water delivery structure.

1.3 The purpose of the joint use is limited on the part of the University to landscaping and maintenance thereof on certain portions of District easements that will be further described from time to time by the parties and reduced to written form as the campus develops. Such further written description when executed by the University and the General Manager of District specifically referencing this agreement shall act as an amendment to this agreement thereafter.

The purpose of the joint use is limited on the part of the District to those easements described in paragraph B of the

Recitals to this Agreement and the access to those easements contemplated in Recital E.

1.4 In no event shall the joint use of the property of one party by the other under this agreement in any way unreasonably impact or interfere with such other party's use of its own property to carry out the obligations and purposes of such party.

1.5 Any action or use by the University of District Properties which the University could reasonably foresee as having the effect of materially delaying or preventing management or maintenance of District facilities; materially impairing in any way the ability of District to convey the maximum design capacity of water through its canals, laterals and pipelines; or delaying or preventing an increase to the design capacity of such facilities within District properties; shall be deemed an unreasonable use by University if undertaken without the prior separate written consent of the District.

1.6 In a like fashion any action or use by District of UC Property for any reason other than access to District property across routes to be designated by the parties in a process substantially similar to that set forth in Section 1.3, or the occasional incursion of a minor nature upon UC Property in the operation and maintenance of District's property, shall be deemed unreasonable if undertaken without the prior written consent of University separately obtained.

1.7 Where either party seeks prior written consent for a joint use as required herein, such permission shall not be unreasonably withheld.

1.8 The parties have tentatively agreed that, as the university campus grows, the University may find it desirable to relocate the Yosemite Lateral, described as item 4 of Exhibit B, "District Properties". To the extent that relocation is completed pursuant to District property specifications, then in effect for projects of a similar nature, is constructed at University cost and at a time of year which does not interfere with District operations of the Yosemite Lateral, such relocation will be granted.

2.0 Costs of Use.

2.1 Neither party shall be obligated to pay the other party for the joint uses contemplated herein. However, in all uses hereunder, including but not limited to uses pursuant to future amendments of this agreement or construction agreements provided

for herein, should either party damage the property of the other during the joint use of such property, the party whose act or omission directly resulted in the damage shall repair, cause to be repaired or pay for repairs reasonably necessary to eliminate the damage. It is anticipated that from time to time such damage could include but is not hereby limited to, canals, canal banks, water delivery fixtures, sidewalks, pavement, pipelines or other conduits or infrastructure, and landscaping.

2.2 The parties contemplate that Landscaping may be placed by the University upon a portion of District properties as the parties may agree pursuant to section 1.3 hereof. The maintenance by District of its facilities often requires heavy equipment to traverse the banks of such canals/laterals and results in the extraction from the facilities of silt, weed vegetation, and other debris. The usual practice of District is to place the debris on the banks of the canal/lateral to dry, followed days later by disking the material into the banks thereby preserving their elevation and the hydraulic capacity of the conveyance facility. This process could result in damage to landscaping. If such damage is on UC Property, outside District Easements, it will be repaired or replaced by District. If such landscaping is damaged within District Properties, District shall have no obligation to repair or replace such damage.

Similarly, University shall not be required to repair or replace any improvements placed upon its property by District should damage occur to such improvements from the use of University Property by University for its own purposes, even if written permission for such improvements was previously granted.

University and District will use their best efforts within their customary and usual practices for the operation/maintenance and use of their property to avoid any damage to the property of the other party.

3.0 Facilities Construction and Maintenance.

3.1 The parties acknowledge that several infrastructure improvements by university, crossings and/or relocating District facilities/easements, must occur to accommodate University development. Such improvements and/or relocations or alterations shall be undertaken according to the then current process for facility impacts established by District.

3.2 Each facility and/or improvement shall be engineered to the then current specifications established by District and

undertaken pursuant to a construction agreement properly executed by the parties. A copy of such construction agreement, in the usual form is attached hereto and incorporated herein by this reference as Exhibit C as an example only.

3.3 University is aware that District intends, and reserves to itself the right, to increase the maximum water conveyance capacities of both the Le Grand and Fairfield Canals, which may involve extending the canals to the boundaries of the easements. Facilities crossing such canals shall therefore be designed with a view to accommodating such additional capacity.

3.4 University will appoint a specific University representative as a primary contact point for purposes of this agreement. The District shall likewise appoint its representative. Each representative shall inform the other representative of his or her agency's activities under this agreement. The representatives are encouraged to, but shall not be required to, create a joint schedule for routine and periodic activities in the joint use areas. However, no prior permission shall be required from the other party prior to either party conducting operations maintenance or management upon its own property.

3.5 Should University determine that it is required or desirable to relocate the District Yosemite Lateral, University and District will work cooperatively to achieve such relocation. All costs of relocation and/or removal shall be done by University.

4.0 Indemnity.

4.1 District shall defend, indemnify, and hold University, its officers, employees, and agents harmless from and against any and all liability, loss, expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of District, its officers, employees or agents.

4.2 University shall defend, indemnify, and hold District, its officers, employees, and agents harmless from and against any and all liability, loss, expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the

negligent or intentional acts or omissions of University, its officers, employees, agents or invitees.

5.0 Insurance Requirements.

5.1 District, at its sole cost and expense, shall insure its activities in connection with this agreement and obtain, keep in force and maintain insurance as follows:

a. Commercial Form General Liability Insurance (contractual liability included) with minimum limits as follows:

1.	Each Occurrence	$1,000,000
2.	Products/Completed Operations Aggregate	$5,000,000
3.	Personal and Advertising Injury	$1,000,000
4.	General Aggregate	$5,000,000

b. Business Automobile Liability Insurance for owned, non-owned, or hired automobiles with a combined single limit of not less than one million dollars ($1,000,000) per occurrence.

c. Workers' Compensation as required by California law.

d. Such other insurance in such amounts which from time to time may reasonably be required by the mutual agreement of the University and the District against other insurable hazards relating to this agreement.

The coverages referred to under a. and b. of this Section 5.1 of Article 5 shall include University as an additional insured. Such a provision shall apply only in proportion to and to the extent of the negligent acts or omissions of District, its officers, agents or employees.

The coverages required herein shall not limit the liability of District.

5.2 University, at its sole cost and expense, shall insure its activities in connection with this agreement and obtain, keep in force and maintain insurance as follows:

a. General Liability Self-Insurance Program (contractual liability included) with minimum limits as follows:

1.	Each Occurrence	$1,000,000
2.	Products/Completed Operations Aggregate	$5,000,000
3.	Personal and Advertising Injury	$1,000,000
4.	General Aggregate	$5,000,000

b. Business Automobile Liability Self-Insurance Program for owned, non-owned, or hired automobiles with a combined single limit of not less than one million dollars ($1,000,000) per occurrence.

c. Workers' Compensation as required by California law.

d. Such other insurance in such amounts which from time to time may reasonably be required by the mutual agreement of the University and the District against other insurable hazards relating to this agreement.

The coverages referred to under a. and b. of this Section 5.1 of Article 5 shall include District as an additional insured. Such a provision shall apply only in proportion to and to the extent of the negligent acts or omissions of University, its officers, agents, employees and invitees.

The coverages required herein shall not limit the liability of University.

6.0 Dispute Resolution.

6.1 Should a dispute arise between the parties in the application and/or interpretation of this agreement, the parties agree to attempt a good faith settlement of such dispute. The representative of the University shall initially be the Vice Chancellor for Administration and for the District, the General Manager. Either party may nominate a replacement representative by written notification to the other party.

7.0 Term.

7.1 This agreement shall continue from its commencement until otherwise terminated.

7.2 This agreement may be terminated by mutual agreement of the parties.

7.3 This agreement may be terminated by either party upon the material breach of the other party, provided that the breaching party fails to cure the material breach after written notice of such material breach by a party to the other party setting forth the facts of the breach. The party alleged to have committed such material breach shall have not less than thirty (30)

days to cure such breach. If such breach is cured this agreement shall not terminate.

7.4 If this Agreement does terminate the rights of District to traverse the designated access points across University Property to access the District Properties where reasonably required because of the presence of a University improvement (such as a bridge) on the District Easement blocking or impeding Districts prior access, shall survive the termination. The rights and obligations of Article 4 shall also survive such termination.

8.0 Miscellaneous.

8.1 This document represents the entire agreement of the parties and supercedes any and all other agreements regarding the joint use of property (except previously approved construction agreements, if any) whether oral or written.

8.2 This agreement may not be assigned by either party without the prior written consent of the other.

8.3 Should a dispute arise regarding this agreement each party shall bear its own costs and attorney's fees.

8.4 The failure of either party to exercise its rights hereunder or to defend such rights shall not constitute a waiver thereof.

8.5 This agreement is subject to ratification of the governing boards of each party. When signed the person executing this agreement represents that he or she has full authority to do so.

8.6 Notices required hereunder shall be considered given when personally delivered on the third day after deposit to the U.S. Mail first class postage prepaid to:

University The University of California, Merced
Attn: Lindsay A. Desrochers,
Vice Chancellor for Administration
P.O. Box 2039
Merced, CA 95344

Facsimile No. (209) 724-4424

District: Merced Irrigation District
744 W. 20th Street
P.O. Box 2288
Merced, CA 95344-0288

Facsimile No. (209) 722-0935

Notice may not be given by electronic device except by facsimile (fax) delivery as set forth above.

IN WITNESS WHEREOF, the Parties have caused these presents to be executed in duplicate by their respective officers previously duly authorized.

MERCED IRRIGATION DISTRICT
an Irrigation District

Date: 4.15.03

By: Jack F. Hooper
President

Date: 4.15.03

By:
General Manager

Approved as to form:

General Counsel

UNIVERSITY OF CALIFORNIA, MERCED
a campus of the Regents of
the University of California

Date: April 11, 2003

By:
Vice Chancellor
Administration

Exhibit A

Description of
UC Merced Campus Site

EXHIBIT "A"

Parcel A:
Parcel 1 as shown on that "Parcel Map for Merced County Board of Education as Trustee of the Testamentary Trust of Virginia Smith" recorded June 10, 1987 in Book 59 of Parcel Maps, Pages 1 & 2, Merced County Records, and being a division of Sec. 13, 24, 25, 26, 35, 36 and portions of 27 and 34, T. 6 S. R.14E., M.D.B. & M. and Sec. 19 and portions of Sections 17, 18, 20, 29, 30 and 31 T. 6 S. R. 15 E. M.D.M., Merced County Records.

Assessors Parcel No.: 052-270-012 and 052-270-014

Parcel B:
Parcels 1, 2 and 3 and all that portion shown as remainder Parcel as per map for "Merced Community Golf Association" recorded November 5, 1997 in Book 83 of Parcel Maps, Pages 9, 10, 11 and 12, Merced County Records, being a division of Parcel 2 recorded in Book 59 of Parcel Maps, Page 1, Merced County Records.

Assessors Parcel No.: 052-270-010/ Portion Parcel B; 052-270-012/ Portion parcel B; 052-270-015/Portion Parcel B; 052-300-003/Portion Parcel B; 052-300-006/Portion Parcel B; 052-300-016/ Portion Parcel B; 053-030-001/ Portion Parcel B; 053-030-002/ Portion Parcel B; 053-030-005/ Portion Parcel B; 053-030-006/ Portion Parcel B; 053-050-011/ Portion Parcel B; 053-050-012/Portion Parcel B; 053-050-013/Portion Parcel B; 053-300-020 Old/ 053-300-018 new Portion Parcel B/ 053-300-005 old/ 052-300-019 new portion Parcel B; 052-300-014 old/ 052-300-020 new/ 052-300-021 new; 052-300-022n new portion of Parcel B/ 052-300-016 old; 052-300-017 new portion of Parcel B.

Parcel C:
All that portion of Section 12, Township 6 South, Range 14 East, M.D.B.&M., lying Southerly of the Northerly line of Hornitos Road as said road was conveyed to Merced County by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Excepting the interest of the County of Merced in and to the Northerly 60 feet as acquired for road purposes by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Assessors Parcel No.: 052-250-010

Parcel D:
All that portion of Section 7, Township 6 South, Range 15 East, M.D.B.&M., lying Southerly of the Northerly line of Hornitos Road as said road was conveyed to Merced County by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Excepting therefrom all that portion of said Section 7, which lies Easterly and Northeasterly of a line commencing at the Northwest corner of the Southwest quarter of Section 6, Township 6 SOuth, Range 15 East, M.D.B.&M.; thence South 9 1/2 deg. East 27.25 chains, thence South 33 1/2 deg. East 135.97 chains to the Southeast corner of the Northeast quarter of Section 18, Township 6 South, Range 15 East, M.D.B.&M.

Also excepting therefrom the interest of the County of Merced in and to the Northerly 60 feet

as acquired for road purposes by Deed recorded June 5, 1929 in Book 254, Official Records, Page 260, Merced County Records.

Assessors Parcel No.: 053-010-011

Exhibit B

Description of
District Facilities

Description of District Facilities

1. Fairfield Canal: 150' Easement, Volume 2299, Page 963;Recorded 10/7/1981

2. Le Grand Canal: 150' Easement, Volume 2299, Page 963;Recorded 10/7/1981

3. Papazian Powerplant: 110' Easement Volume 2299, Page 963; Recorded 10/7/1981

4. Yosemite Lateral: Existing Lateral inclusive of toes and banks, Volume 12, Page 1

Exhibit C

Sample Construction Agreement

Recorded at the Request of
and Return to:

Merced Irrigation District
Engineering Department
744 W. 20th Street
P. O. Box 2288
Merced, California 95344

CONSTRUCTION AGREEMENT

THIS CONSTRUCTION AGREEMENT (herein "AGREEMENT") is made this _____ day of _____, 2003, by and between the MERCED IRRIGATION DISTRICT, an irrigation district existing by virtue of the laws of the State of California, whose address is 744 W. 20th Street, Merced, California 95340, (hereinafter called the "MID"), and, The Regents of the University of California, on behalf of its Merced Campus whose address is, P.O. Box 2039, Merced, California 95344 (herein "University").

RECITAL

WHEREAS, University has submitted to MID a University of California, Merced Campus 2008 Site Development (Bid Package 2-Addendum #1) for the development of land owned by University (herein "development"); and

WHEREAS, University has entered into an agreement with Swinerton Builders, Inc. to perform pre-construction and construction services for the UC Merced Site and Infrastructure project;

WHEREAS, University desires to construct, through its contract with Swinerton Builders, Inc. certain permanent improvements hereinafter specified for the following described parcel of land (herein said "real property"), as shown on Exhibit "A" and as described on Exhibit "B", attached hereto and incorporated herein; and

WHEREAS, the MID consents to said development, to the extent of the proposed permanent improvements hereinafter specified, and subject to the terms herein set forth; and

WHEREAS, the MID's consent is conditioned upon the University's improvement of a portion of the Fairfield Canal, as hereinafter set forth; and

WHEREAS, MID now enjoys the following interest and improvements in or adjacent to said real property:

An earthen channel within a 150-foot wide permanent easement as described in Volume 2299 of Official Records, Page 963 and filed for record October 7, 1981, Merced County Records; and

WHEREAS, University and MID anticipates the execution of a Joint Use Agreement, which will also impact this project; and

WHEREAS, University and MID anticipate the execution of a Joint Use and Maintenance Agreement which will govern this agreement; and

WHEREAS, the MID's consent is conditioned upon;

A. The construction by University of a reinforced concrete bridge and appurtenances spanning the MID's Fairfield Canal right-of-way in accordance with the latest applicable MID Standards, all in conjunction with the approval of the MID Engineer and as shown on the MID approved plans, called University of California, Merced Campus 2008 Site Development (Bid Package 2-Addendum #1), Main Street Bridge Over Fairfield Canal.

NOW, THEREFORE, in consideration of MID's consent to said construction conditioned upon University's promises hereinafter set forth, the University and the MID do hereby mutually agree as follows:

AGREEMENT

I. AGREEMENT BINDING ON SUCCESSORS IN INTEREST

This Agreement is an instrument affecting the title or possession of the real property described herein. All the terms, covenants and conditions herein imposed shall be an interest of University, and upon the subsequent sale or division of the property described herein the terms of this Agreement shall apply and the University or owners of said property or parcel or any part thereof shall succeed and be bound by the obligations imposed on University by this Agreement.

II. FLOOD CONTROL-USE OF SUBJECT FACILITY

University specifically agrees and represents to MID that University acknowledges and understands that the Fairfield Canal subject to this Agreement serves a vital and important function as a storm drainage and flood control facility pursuant to the requirements of State and Federal agencies for the run-off of natural and artificial waters. Use of the waterway as such is therefore continuous and year round including the non-irrigation season when rains are heaviest.

University therefore agrees to conduct all work hereunder in a manner that will not interfere with the use of said canal as a flood control channel or water conveyance facilities and agrees to defend, indemnify and save the MID harmless as set forth in Paragraph VIII hereunder.

III. MID IMPROVEMENTS

A. University agrees to construct the following permanent improvements (herein "said improvements"), on the property described herein, and as shown on Exhibit "C", attached hereto and made a part hereof, in the manner set forth in this Agreement, namely University shall provide and construct:

1. A reinforced concrete bridge and appurtenances spanning the MID's Fairfield Canal right-of-way in accordance with the latest applicable MID Standards, all in conjunction with the approval of the MID Engineer and as shown on the MID approved plans, called University of California, Merced Campus 2008 Site Development (Bid Package 2-Addendum #1), Main Street Bridge Over Fairfield Canal.

2. The bridge shall be single span with no flow restrictions.

3. The bridge span shall accommodate for future MID widening of the Fairfield Canal within the above described MID existing 150-foot wide easement.

B. University shall provide said improvements at University's sole expense, without notice, upon the commencement of improvements to said property and in all events prior to any subsequent property divisions, subdivisions or splits of said property, or sale of any parcel of said property or the whole of said property.

C. University shall cause a signature/approval block, for the signature of the MID Engineer, to be placed on the cover sheet of the University of California, Merced Campus 2008 Site Development (Bid Package 2-Addendum #1), Main Street Bridge Over Fairfield Canal of said real plans.

D. An on-site pre-construction meeting between MID representatives and the construction manager, and the project engineer if deemed necessary, shall take place not less than 2 working days and not more than 10 working days prior to the commencement of construction. University, or construction manager, shall notify MID at least 2 working days prior to said meeting. The parties acknowledge that a preconstruction meeting has taken place as of the execution of this agreement. The parties acknowledge that future meetings may be required to facilitate proper execution of the work described in paragraph III.A

E. Construction between March 1, 2003 and October 31, 2003 shall not encroach into existing MID embankments, levees, or rights-of-way without express written approval from the MID Manager of Engineering, Water Resources or his designee. The parties acknowledge that encroachment is taking place as of the execution of this document, with the approval of the MID

F. Construction shall not commence without written consent of MID. MID shall not unreasonably withhold consent to commence construction. MID acknowledges that time is of the

essence and that the University will incur monetary damages as the result of withholding said consent.

G. Approved "As Built" plans shall be submitted to MID prior to the release of the "Warranty Bond" of item VI following. Failure to provide said "As Built" plans may defer or affect the amount and the release time of said "Warranty Bond".

H. University agrees that this agreement shall also be governed by the term of the Joint Use and Maintenance Agreement executed, or to be executed by the University and MID, unless the terms of the two agreements are inconsistent on any matter, in which case the terms of this agreement shall apply exclusively to such inconsistent matter.

IV. PERFORMANCE OF THE IMPROVEMENTS

University agrees to perform the improvements set forth herein, or as may be reasonably modified by the MID. University shall cause, at University's expense, plans and specifications for the improvements to be prepared by competent persons legally qualified and licensed by the State of California to do the work and to submit improvement plans and specifications for approval prior to commencement of the work described in the notice and to pay all City/County and Merced Irrigation District review, study, map and inspection fees. The work shall be done in accordance with Merced Irrigation District Standards in effect at the time said improvements are proposed. University agrees to commence the work as soon as possible following the execution by University and MID of this Agreement and complete the work on or before April 30, 2003, or this Agreement shall terminate. MID acknowledges that delays resulting from actions by MID, including withholding consent to begin construction, shall be added to said completion date, so long as no interference to MID operations occurs. All work within the channel wetted perimeter and adjacent structural support embankment(s) shall be completed by March 15, 2003. MID acknowledges that delays resulting from actions by MID, including withholding consent to begin construction, shall be added to said completion date, so long as no interference to MID operations occurs. Under no circumstances shall the construction described in this agreement compromise the structural integrity of the Fairfield Canal. University shall notify the MID at least 2 working days prior to the start of any work, and 2 working days prior to the re-start of any work after any work stoppages. MID shall also be notified a minimum of 2 working days prior to all construction scheduled on a holiday or weekend [Phone: (209) 722-5761]. In no event will the work of said improvements interfere with the delivery or drainage of water by the MID, or be done between March 1 and October 31 without the written approval from the MID Engineering Department, Water Resources.

V. REVIEW OF REQUIREMENTS

If University disagrees with the requirements set forth in any notice to commence installation of improvements, University shall, within ten (10) days of the date the notice was mailed, request a review of the requirements by the Merced Irrigation District Board of Directors. The decision of the Merced Irrigation District Board of Directors shall be binding upon both MID and University.

VI. BONDS

University is a self-insured agency of the State of California for which construction bond is waived.

VII. INSURANCE

A. University shall provide, and shall require any contractor engaged to perform the work to maintain, at all times during the performance of the work called for herein and for all periods for which liability insurance for the work hereunder may exist, public liability insurance, or an equivalent program of self insurance that will fully protect the MID against claims of any and all persons for personal injury, death or property damage. The following minimum requirements must be met in respect to insurance required under this Agreement:

Minimum Scope of Insurance, or an equivalent program of self insurance:

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001.)
2. Insurance Services Office form number CA 0001 (ed. 1/87) covering Automobile liability, code 1 (any auto).
3. Employer's Liability insurance and Workers' Compensation insurance as required by the State of California.
4. Course of Construction insurance form providing coverage for "all-risks" of loss.

Minimum Limits of Insurance, or an equivalent program of self insurance:

Owner shall maintain limits no less than:

1. General Liability: **$1,000,000** per occurrence for bodily injury, personal injury, and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: **$1,000,000** per accident for bodily injury and property damage.
3. Employer's Liability: **$1,000,000** per accident for bodily injury or disease.

Self-Insurance

University is self-insured, with a self-insured retention of five million dollars ($5,000,000). MID is aware that University is self-insured and agrees to accept

University's program of self-insurance. University's General and Automobile Liability program of self-insurance is described in University of California Business and Finance Bulletin No. 75, which is attached hereto as Exhibit D.

Other Insurance Provisions:

The general liability and automobile policies are to contain, or be endorsed to contain the following provisions:

1. The MID, its officers, officials, employees, agents and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the University, products and completed operations of the University; premises owned, occupied or used by the University; or automobiles owned, leased, hired or borrowed by the University, but only in proportion to and to the extent that such liability is caused by or results from the negligent or intentional acts or omissions of University, its officers, employees or agents. For the purposes of this agreement the Hallmark Group, LLC shall be considered an agent of the University.
2. For any claims related to this project, the University insurance shall be primary insurance as respects the MID, its officers, officials, employees, agents or volunteers, but only in proportion to and to the extent that such liability is caused by or results from the negligent or intentional acts or omissions of University, its officers, employees or agents. .
3. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the MID, its officers, officials, employees, agents or volunteers.
4. The University's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
5. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested has been given to the MID.

Course of Construction policies shall contain the following provisions:

1. MID shall be named as loss payee.
2. The insurer shall waive all rights of subrogation against the MID.

Acceptability of Insurers:

University's program of self-insurance is acceptable.

Verification of Coverage:

Contractor shall furnish the MID with certificates of coverage and endorsements effecting coverage required by this clause. The MID reserves the right to request

original policies. All documents are to be received and approved by the MID prior to the commencement of work.

Subcontractors:

University shall include all contractors or subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each contractor or subcontractor involved in the project.

B. No cancellation provision in any insurance policy shall be construed in degradation of the continuous duty of University or Contractor to furnish insurance during the term of this Agreement. At least thirty (30) days prior to the expiration of any such policy, a signed complete certificate of insurance, with all endorsements required by Section VI. Insurance, of this Agreement, showing that such insurance coverage has been renewed or extended shall be filed by University or Contractor with the MID.

C. University or Contractor shall be solely liable for and shall pay and all deductible amounts provided for in said policies of insurance and for any self-insured amounts of such policies as maintained by University or Contractor.

VIII. INDEMNITY

University shall defend, indemnify, and hold MID, its officers, employees, and agents harmless from and against any and all liability, loss, expense (including reasonable attorneys' fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorneys' fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of University, its officers, employees, agents or invitees.

IX. PAYMENT OF FEES

University agrees to pay to the MID the following amounts:

1. $200.00 non-refundable for engineering and administrative costs associated with the preparation and filing of this agreement.

2. $500.00 deposit for engineering services, including but not limited to site review, plan checking, construction inspection, testing, and follow-up, to be charged at the following MID Engineering Department rates: $52.00/hour for engineering time, $42.00/hour for technical time, and $0.35 per mile for vehicle usage. The fees charged, may or may not exceed deposit amount. Balance of any funds are refundable at the satisfactory completion of the job. Fees charged in excess of the deposit will be billed by MID and payable by University upon receipt.

X. ATTORNEY'S FEES

In the event of any action, legal or equitable, by either party hereto to enforce the within Agreement or any of its provisions, the prevailing party shall be allowed a reasonable attorney's fee to be fixed by the Court and their costs in said action.

XI. JOINT AND SEVERAL LIABILITY

The obligations of University and successors in interest shall be joint and several, and the MID shall pursue remedy against Owner or anyone or more owners or successors in interest without suit against them all. In the event litigation is required, any cross-complaint or offset for indemnity by one owner against the other shall be severed from the initial MID action and no delays shall occur thereby to the MID in pursuit of remedy.

XII. AMENDMENTS

The provisions of this Agreement may be waived, altered, amended, or repealed, in whole or in part, only on the written consent of all parties to this Agreement.

* * * * * * * * * *

IN WITNESS WHEREOF, the University has executed this Agreement as of the _____ day of _____, 200___

UNIVERSITY:

By: _____
Lindsay A. Desrochers
Vice Chancellor for Administration

IN WITNESS WHEREOF, the MID has executed this Agreement as of the _____ day of _____, 200___.

MERCED IRRIGATION DISTRICT

By: _____
Ross Rogers
General Manager

EXHIBIT D

FORM ROADWAY REPAIR AGREEMENT

THIS ROAD REPAIR AGREEMENT ("Agreement") is made and entered into this day of , 20__ by and between the Regents of the University of California, on behalf of the Merced Campus (hereinafter referred to as "UC") and the CITY OF MERCED (hereinafter referred to as "City") collectively referred to herein as "Parties." .

RECITALS

WHEREAS, UC and/or its agents are building the Revised 2020 Project ("Project") on the property comprised of Assessor Parcel Number 052-300-026, 052-300-024 and 052-300-021 ("Site"); and,

WHEREAS, in Section 1(d) of the Transportation Improvement Funding Agreement, the Parties agreed that (1) if the City provides written notice, based on the monitoring data produced pursuant to Section 1(b) of the Transportation Improvement Funding Agreement that Project Heavy Construction Traffic (defined as transportation of import construction equipment and materials and construction waste by FHWA Vehicle Classifications 6-12 vehicles, as shown on Exhibit 2 attached hereto, used for the Revised 2020 Project) is traveling to or from the UC Merced campus on any City truck routes designated in Exhibit 1 attached hereto or (2) observes and advises UC in writing (with evidence of the Project Heavy Construction Traffic truck vehicle license number and either the company name or company truck number) that the truck traveled on the truck routes designated in Exhibit 1 and drove directly to or from the Revised 2020 construction entrance on that same day provided, however, if UC provides substantial evidence that such truck was not recorded as either entering or leaving through the Revised 2020 Project Construction entrance on that same day then the following requirement shall not apply, then the Parties would immediately enter into this Roadway Repair; and,

WHEREAS, CITY is a public entity and is responsible for maintaining the City Roadways; and,

WHEREAS, cumulatively, Project Heavy Construction Traffic on the City Roadways designated in Exhibit 1 could cause damage to the pavement of the City Roadways; and,

WHEREAS, if said impacts to the City Roadways designated in Exhibit 1 result from the Project Heavy Construction Traffic, repair of the City Roadways pavement on the roads designated in Exhibit 1 will be required; and,

WHEREAS, to mitigate said potential negative impacts to the City Roadways pavement on the roads designated in Exhibit 1 that stem from Project Heavy Construction Traffic, UC has entered into this Agreement.

NOW, THEREFORE, UC and City do hereby mutually agree as follows:

1. Road Condition Surveys

(a) As required by the Transportation Improvement Funding Agreement, not later than thirty (30) days prior to commencement of construction on the Revised 2020 Project, UC shall prepare and submit a Baseline Report to the City that includes a video log and a pavement condition survey, including a Pavement Condition Index, for all City truck routes designated in Exhibit 1 UC shall prepare a Completion Report using the same methodology as described herein for the Baseline Report.

2. UC Responsibility

(a) UC shall be responsible for damage to the City Roadways pavement on the truck routes designated in Exhibit 1 that is caused by Project Heavy Construction Traffic from the Revised 2020 Project that occurs between the date of the Baseline Report and the date of the Notice of Completion for the entire Revised 2020 Project, but UC shall not be responsible for any damage to the City Roadways pavement on the truck routes designated in Exhibit 1 caused by other use of those City Roadways during that time period or for any damage that occurs outside of that time period. Damage to City Roadways pavement caused by Project Heavy Construction Traffic shall be determined by comparing the condition of the City Roadways pavement on the truck routes designated in Exhibit 1 as of the date of the Notice of Completion to the documented baseline condition of the City Roadways pavement in the Baseline Report, by reviewing the proportionate share of the UC Project Heavy Construction Traffic identified by the Periodic Monitoring Plan data as set forth herein and provided for by UC, and by the parties mutually agreeing on the level of damage caused by Project Heavy Construction Traffic from the Revised 2020 Project and UC's proportionate share, if any, of the cost of repairing that damage.

(b) If the parties disagree as to the level of damage and UC's proportionate share of the cost of repairing the damage, the parties agree within 10 days of the disagreement that each party shall select a representative of that party to make a final determination and if they cannot jointly agree on a final determination, they will select a third person and together the three will make a final determination by majority vote. The parties agree that the third person shall have at least five years of experience as a civil engineer with experience in pavement management practices. In the event that the two representatives are not able to mutually select one person within 10 days of commencing the selection process, the third person will be selected from a list of three individuals that meet the qualifications specified hereinabove and that are approved by both representatives. Each representative will strike one person from the list and the remaining person will serve with the representatives from each party. The cost of the third person shall be shared by the parties.

3. Periodic Monitoring Plan

As provided for in the Transportation Improvement Funding Agreement, from the commencement of the construction of the Revised 2020 Project through completion of construction activities for the Revised 2020 Project, UC shall monitor Project Heavy Construction Traffic trips at one location for each of the City truck routes designed in Exhibit 1, at the 2020 Project construction entrance and on the County truck route designated in Exhibit 3 attached hereto to determine whether Project Heavy Construction Traffic is using the City truck routes designated in Exhibit 1. The monitoring shall comply with the following requirements:

1. Truck classification counts shall be taken for FHWA Vehicle Classifications 6-12 vehicles as shown on Exhibit 2 attached hereto, pursuant to the following schedule, on the City streets designated in Exhibit 1. The truck classification counts shall be taken at one location on each street designated in Exhibit 1 at a location mutually acceptable to the City and UC. The truck classification counts shall be taken on a Tuesday, Wednesday or Thursday, provided that day is not a federal holiday.

Monitoring Schedule	**Testing Frequency**
First two months of 2020 Project construction activity	One day every two weeks
3rd through 12th Month of Construction	One day every other month
13th Month through Completion of 2020 Project	One day every four months unless Revised 2020 Project related Project Heavy Construction Traffic is Using Truck Routes Designated in Exhibit 1 at a level higher than the first 12 months of construction in which case monitoring shall return to one day every two weeks.

2. For the same schedule as set forth in subsection (1) above, classification counts for FHWA Vehicle Classification 6-12 vehicles shall be taken at the 2020 Project construction entrance.

3. The data from 1 and 2, above, along with data obtained from the County truck route designated in Exhibit 3, shall be used to determine the proportional share of Project Heavy Construction Traffic trips for the 2020 Project that are using the City truck routes designated in Exhibit 1. UC shall, within ten (10) days of receipt by UC, provide City a copy of any report including the raw data prepared by UC or its consultants describing the monitoring data. In determining the share, if any, allocated to City truck routes designated in Exhibit 1, the number of Heavy Construction Traffic Trips allocated to designated County Truck Routes shall first be calculated and deducted from the number of trips counted at the 2020 Project Construction entrance.

4. At the end of construction, the periodic proportions are averaged to determine the proportionate share of the roadway repair costs allocated to UC.

2. Repair Work.

Within sixty (60) days after the Repair Scope of Work is finalized, UC shall apply to City for, and City shall issue with reasonable terms, an Encroachment Permit to undertake repair work to the City Roadways designated in Exhibit 1 as described in the Repair Scope of Work ("Repair Work"). Within sixty (60) days after issuance of such Encroachment Permit, UC or its Master Developer ("Developer") shall commence and thereafter within a commercially reasonable time complete the Repair Work at UC's own cost. All repair work shall be done in a workmanlike manner in accordance with the Encroachment Permit. In the event that the City desires to make improvements to the City Roadways designated in Exhibit 1 beyond the scope identified in the Repair Work, UC and the City may agree that the UC will pay the estimated costs of the Repair Work, in an amount that is mutually agreed upon by the City and UC, to the City not later than sixty (60) days after the City issues a Notice to Proceed to a City contractor to construct the improvements including the Repair Work. If the CITY and UC agree to this approach, UC's payment shall fully satisfy its obligation to perform the Repair Work.

3. Preventative Work.

At UC's sole discretion, it may elect to undertake work to portions of the City Roadways designated in Exhibit 1 before the commencement of Project Heavy Construction Traffic and during construction, which work may avoid damage that otherwise might be attributed to the Project Heavy Construction Traffic and that might require repair work pursuant to Section 1, above ("Preventative Work"). In such event, UC shall apply to City for, and City shall issue with reasonable terms, an Encroachment Permit to undertake the Preventative Work.

4. City Approval of Repair Work.

City shall inspect Repair Work performed by UC as it is being constructed to ensure the work is proceeding in accordance with the Encroachment Permit, and shall complete a final inspection within ten business (10) days of UC's request. Following the final inspection, the City shall either (i) issue a written acceptance of UC's completion of the Repair Scope of Work, or (ii) notify UC of further Repair Work City believes is necessary to complete the Repair Scope of Work.

5. Modification of Truck Routes and Restriction of Use of Other Streets.

Nothing in this Roadway Repair Agreement or the Transportation Improvement Funding Agreement shall be deemed to authorize the UC or its agents to use any truck route designated in Merced Municipal Code Section 10.40.010 for Project Heavy Construction. UC shall use best efforts to enforce the contract requirements related to use of the designated truck route.

6. Assignment.

UC shall not have the right to assign or transfer this Agreement, or any part hereof, without prior written consent of City.

7. Indemnity.

UC has the contracted duty (hereinafter "the duty") to indemnify, defend and hold harmless, City, its City Council, officers, employees, agents and assigns from and against any and all claims, demands, liability, judgments, awards, interest, attorney's fees, costs, experts' fees and expenses of whatsoever kind or nature, arising out of or resulting from UC's performance of Repair Work pursuant to this Agreement prior to, and for one year period thereafter, City's issuance of a notice of acceptance pursuant to Section 4 above, whether in tort, contract or otherwise, but solely in proportion to and to the extent of the willful misconduct, or negligent acts or omissions of UC's officers, employees or agents.

In addition, UC shall include in its contract with the Developer selected by UC to develop the Revised 2020 Project a requirement that the Developer indemnify, defend and hold harmless City, its City Council, officers, employees, agents, and assigns from and against any and all claims, demands, liability, judgments, awards, interest, attorney's fees, costs, experts' fees and expenses of whatsoever kind or nature, including claims for bodily injury, property damage, personal injury and contractual damages arising out of or resulting from the Developer's, its officers, employees, agents or contractors performance of Repair Work pursuant to this Agreement, but solely in proportion to and to the extent caused by: (a) a breach or alleged breach by the Developer, its officers, employees, agents or contractors of the requirements of this Agreement with respect to the Repair Work; or (b) any actual or alleged willful misconduct or negligence of the Developer or its officers, employees, agents or contractors.

This clause for indemnification shall be interpreted to the broadest extent permitted by law; provided, however, that nothing contained in this Section 7 shall be construed to require UC or Developer to indemnify the City against any responsibility or liability in contravention of Section 2782 of the Civil Code.

8. Insurance.

The parties acknowledge that UC is self-insured. Prior to the of Repair Work or Preventative Work, and as a precondition to commencement of such work, UC shall require that its Developer purchase and maintain, for the period from the commencement to the completion of such Repair Work or Preventative Work, as the case may be, the following types of insurance for the stated minimum limits indicated. UC shall provide a certificate of insurance and endorsements naming City as an additional insured on each policy. Each certificate of insurance as to the UC shall specify if UC has a self-insured retention ("SIR"), and if so, UC shall be required to provide the entire policy of insurance with which it has a SIR.

(a) Commercial General Liability. $1,000,000 per occurrence and $2,000,000 annual aggregate covering bodily injury, personal injury and property damage. The City and its officers, employees and agents shall be endorsed to above policies as additional insured, using ISO form CG2026 or an alternate form that is at least as broad as form CG2026, as to any liability arising from the performance of this Agreement.

(b) Automobile Liability. $1,000,000 per accident for bodily injury and property damage, or alternatively split limits of $500,000 per person and $1,000,000 per accident for bodily injury with $250,000 per accident for property damage.

(c) Workers Compensation, Statutory coverage, if and as required according to the California Labor Code, including Employers; Liability limits of $1,000,000 per accident. The policy shall be endorsed to waive the insurer's subrogation rights against the City.

Insurance is to be placed with admitted insurers rated by A.M. Best Co. as A:VII or higher. Lower rated, or approved but not admitted insurers, may be accepted if prior approval is given by the City Attorney of the City.
Each of the above required policies shall be endorsed to provide City with 30 days prior written notice of cancellation. City is not liable for the payment of premiums or assessments on the policy. No cancellation provisions in the insurance policy shall be construed in derogation of the continuing duty of UC to furnish insurance during the term of this Agreement.

9. Counterparts; Delivery.

This Agreement may be executed in counterparts. All executed counterparts shall constitute one agreement, and each counterpart shall be deemed an original. Delivery of this Agreement may be effected by telefax, electronic mail PDF, or U.S. Mail transmittal of the signed counterparts.

10. Entire Agreement.

This Agreement contains the entire agreement between the parties hereto with respect to the subject matter hereof, and any prior agreements, discussions or understandings, written or oral, are superseded by this Agreement and shall be of no force or effect.

11. No Third Party Beneficiaries.

This Agreement shall be for the benefit of the named parties and their agents only and shall not be interpreted, directly or by implication, to provide any rights, assurances or benefits to any third parties.

12. Amendment.

City and UC may amend this Agreement in writing signed by both parties as they may agree to address matters related to the subject hereof. No addition or modification of any term or provision of this Agreement shall be effective unless set forth in such an amendment.

13. Section Headings.

The section headings contained in this Agreement are for convenience and identification only and shall not be deemed to limit or define the contents to which they relate.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

CITY OF MERCED

By:_____

Approved as to form:

_____
City Attorney

REGENTS OF THE UNIVERSITY OF CALIFORNIA

By:_____
2529551.2

EXHIBIT 1

City Truck Routes

Exhibit 2

FHWA Vehicle Classifications 6-12 vehicles

Exhibit 3

County Truck Routes

Legal Description:

All that real property situate in the County of Merced, State of California, lying and being within Sections 26, 34 and 35, Township 6 South, Range 14 East, M.D.M., being a portion of the lands granted to the Regents of the University of California, a California public corporation in that certain grant deed filed in the office of the County Recorder of Merced County as Document No. 2002-012594 and as shown on that certain Record of Survey for the "University of California Merced Campus", filed in the office of the County Recorder of Merced County in Book 37 of Surveys, Pages 23-26 and further being a portion of Parcels 1, 2, 3 and Remainder Parcel as shown on that certain Parcel Map for "Merced Community Golf Association, being a Division of Parcel 2 according to Parcel Map for Merced County Board of Education as Trustee of the Testamentary Trust of Virginia Smith Book 59 Parcel Maps, Page 1 M.C.R.", filed in the office of the County Recorder of Merced County in Book 83 of Parcel Maps, Pages 9-12 and being more particularly described as follows:

Beginning at a 2" iron pipe set in a monument well and accepted as the Southwest corner of said Section 34 as shown on said Record of Survey; thence along the West and Northwesterly line of said lands of the Regents of the University of California, being also the West and Northwesterly line of said Parcel 2 as shown in Book 59 of Parcel Maps, Page 1 the following nine (9) courses:

1. North 01°07'48" East, 871.56 feet; thence
2. North 55°13'43" East, 243.36 feet; thence
3. North 72°47'31" East, 822.80 feet; thence
4. North 54°05'52" East, 159.13 feet; thence
5. North 35°48'37" East, 372.62 feet; thence
6. North 48°18'50" East, 373.01 feet; thence
7. South 41°40'18" East, 52.28 feet; thence
8. North 49°00'21" East, 1071.50 feet; thence
9. North 46°18'50" East, 148.01 feet;

thence continuing along said Northwesterly boundary and the Northeasterly projection thereof, North 46°47'49" East, 4269.02 feet; thence East, 1613.35 feet; thence South 4598.23 feet; thence South 38°04'51" East, 1188.32 feet; thence South 74.99 feet more or less to a point on the South line of said lands of the Regents of the University of California, being also the South line of said Parcel 2 as shown in Book 59 of Parcel Maps, Page 1 and the South line of Section 35 and said Remainder parcel; thence along said South line, North 89°50'14" West, 336.57 feet to the Southeast corner of said Parcel 3; thence along said South line and the South line of Sections 35 and 34, North 89°50'14" West, 7700.65 feet to the Point of Beginning.

EXCEPTING THEREFROM, all that portion granted to the City of Merced, a municipal corporation, by Grant Deed recorded February 6, 2004 as Series No. 2004-007904 of Official Records, Merced County.

Notes:

1. The address of the property shown hereon is:
   5200 N. Lake Road
   Merced, CA 95343

2. The following Title Insurance Policy and Preliminary Report have been used in the preparation of this ALTA/ACSM Land Title Survey:

   A) Chicago Title Company
      2540 W. Shaw Lane, Suite 112
      Fresno, CA 93711
      Title No: 14-58508861-E-LM
      Dated: October 3, 2014

3. The subject property contains 608.71 acres more or less. The boundary shown and described hereon does not reflect the entire ownership of The Regents of the University of California in this area, but rather the area being defined as the "University of Merced 2015 REGENTS CAMPUS AREA SURVEY", as developed in conjunction with University staff.

4. Distances shown hereon are in feet and decimals thereof stated as "grid" distances. Refer to the Basis of Bearings for conversion to "ground" distances.

5. The property shown hereon may be subject to the various ordinances, codes, rules and regulations of applicable governmental agencies, and it is not the intent of this survey to verify compliance with any/all of those items.

6. The property shown hereon may be subject to various agreements, covenants, conditions, restrictions, and terms as may be disclosed in the above noted title policy and report and any other unrecorded leases or rent agreements that may exist.

7. The utilities shown hereon are based upon a combination of aerial photogrammetric mapping, field locations of un-obstructed physical features and digital drawing files of various utilities provided by the University of California, Merced. The depiction of underground utilities shown hereon is not to be taken as actual as-built field locations, but rather a general indications of the extent and location of such facilities.

The vertical datum for this mapping is NAVD 88, based upon control monuments shown on Merced County Record of Survey Book 37, Pages 23-26.

Legend

Symbol	Description
○	Dimension Point
●	Found monument as noted
△	Control monument found as noted
------	Easement Line
------	Water Lines
------	Irrigation/Raw Water Lines
------	Storm Drainage Lines
------	Sanitary Sewer Lines
------	Gas Lines
------	Electrical/Communication Lines
	Water Valves
	Fire Hydrant
	Irrigation/Raw Water Valves
	Gas Valves
Ⓢ	Sewer Manhole
◇	Sewer Cleanout
Ⓓ	Drain Manhole
	Drain Inlet
E	Electrical/Communication Vault
(XXX)	Building Number
(#)	Title Exception Reference
—X— —¤—	Fence
☼	Street/Parking light

Title Exceptions listed in Chicago Title Co. Preliminary Report:

8 Easement for road Book 34, Deeds, Page 534

9 Easement for public road and bicycle path Book 2298, Official Records, Page 8.

11 Easement for canal Book 2299, Official Records, Page 963

12 Non-exclusive easement for roadway, Book 3653, Official Records, Page 432.

13 Easements for street, access, canal, lateral and incidental purposes Book 83 Parcel Maps, Pages 9-12.

19 Easement for underground pipes, ingress, egress and incidental purposes Series No. 2003-083541.

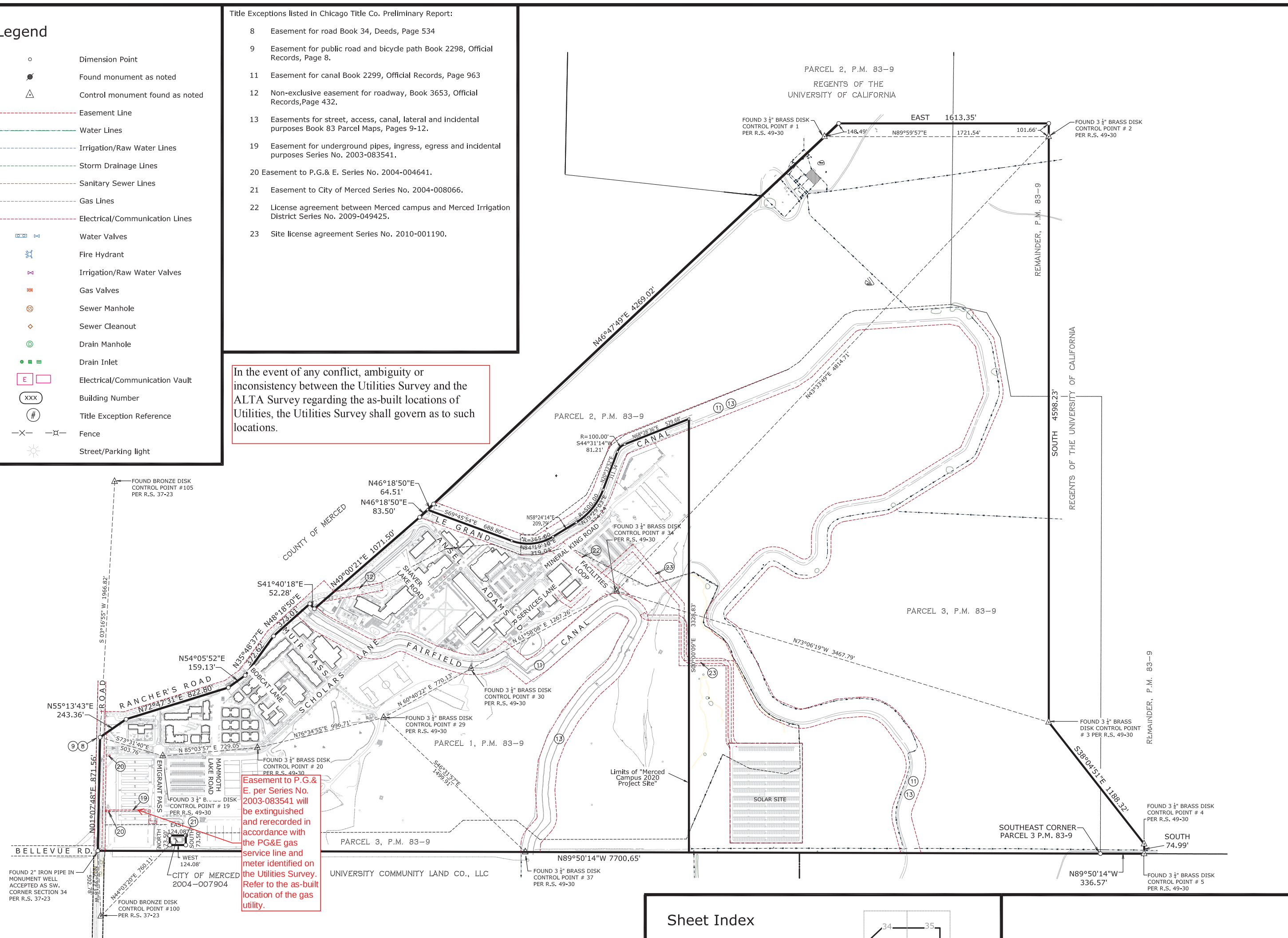
20 Easement to P.G.& E. Series No. 2004-004641.

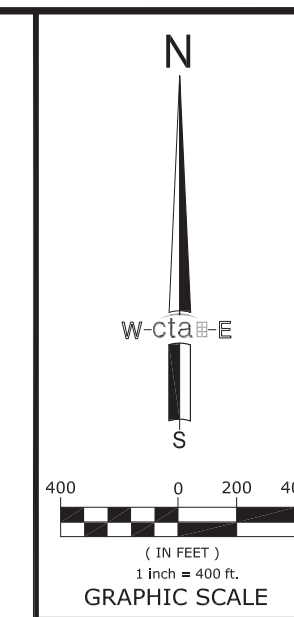
21 Easement to City of Merced Series No. 2004-008066.

22 License agreement between Merced campus and Merced Irrigation District Series No. 2009-049425.

23 Site license agreement Series No. 2010-001190.

In the event of any conflict, ambiguity or inconsistency between the Utilities Survey and the ALTA Survey regarding the as-built locations of Utilities, the Utilities Survey shall govern as to such locations.



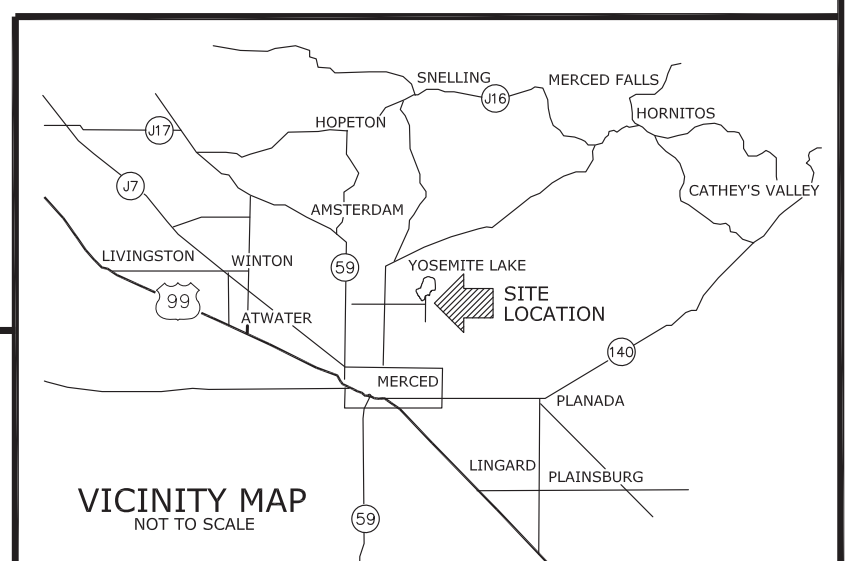


Basis of Bearings

The Basis of Bearings for this description is the California Coordinate System, NAD 83, Zone 3 as defined on that certain Record of Survey filed in the office of the County Recorder of Merced County in Book 37 of Surveys, Pages 23-26. Distances given herein are grid distances. Multiply the grid distance by 1.000045 to obtain ground distances.

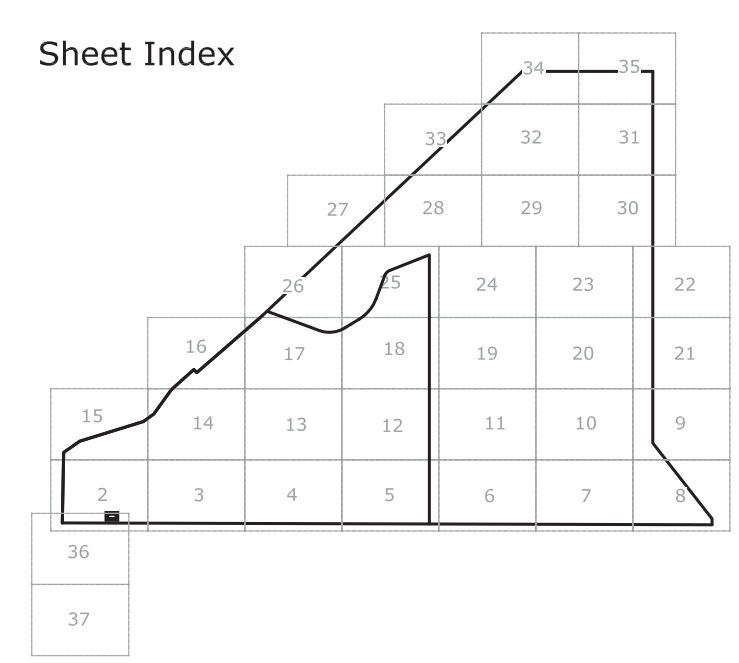
Flood Zone Classification:

The property shown hereon lies within Zone 'X' (areas determined to be outside the 0.2% annual chance floodplain) as shown on FEMA Flood Insurance Rate Map No. 06047C0435G. It's effective date shown as December 2, 2008



VICINITY MAP
NOT TO SCALE

Sheet Index



Surveyor's Certificate

To: The University of California

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2011 Minimum Standard Detail Requirements for ALTA/ACSM Land title Surveys, jointly established and adopted by ALTA and NSPS, and includes items 2, 3, 4, 5, 8, 9 and 11(b) of Table A thereof. The field work was completed on February 26, 2015.

Date:

Digitally signed by Kevin Heeney
DN: cn=Kevin Heeney, o=CTA Engineering & Surveying, ou, email=kheeney@ctaes.net, c=US
Date: 2015.07.10 15:07:54 -07'00'

Kevin A. Heeney, L.S. 5914

LICENSED LAND SURVEYOR KEVIN A. HEENEY NO.5914 Exp.12–31–2016 STATE of CALIFORNIA

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12 County of Merced, State of California

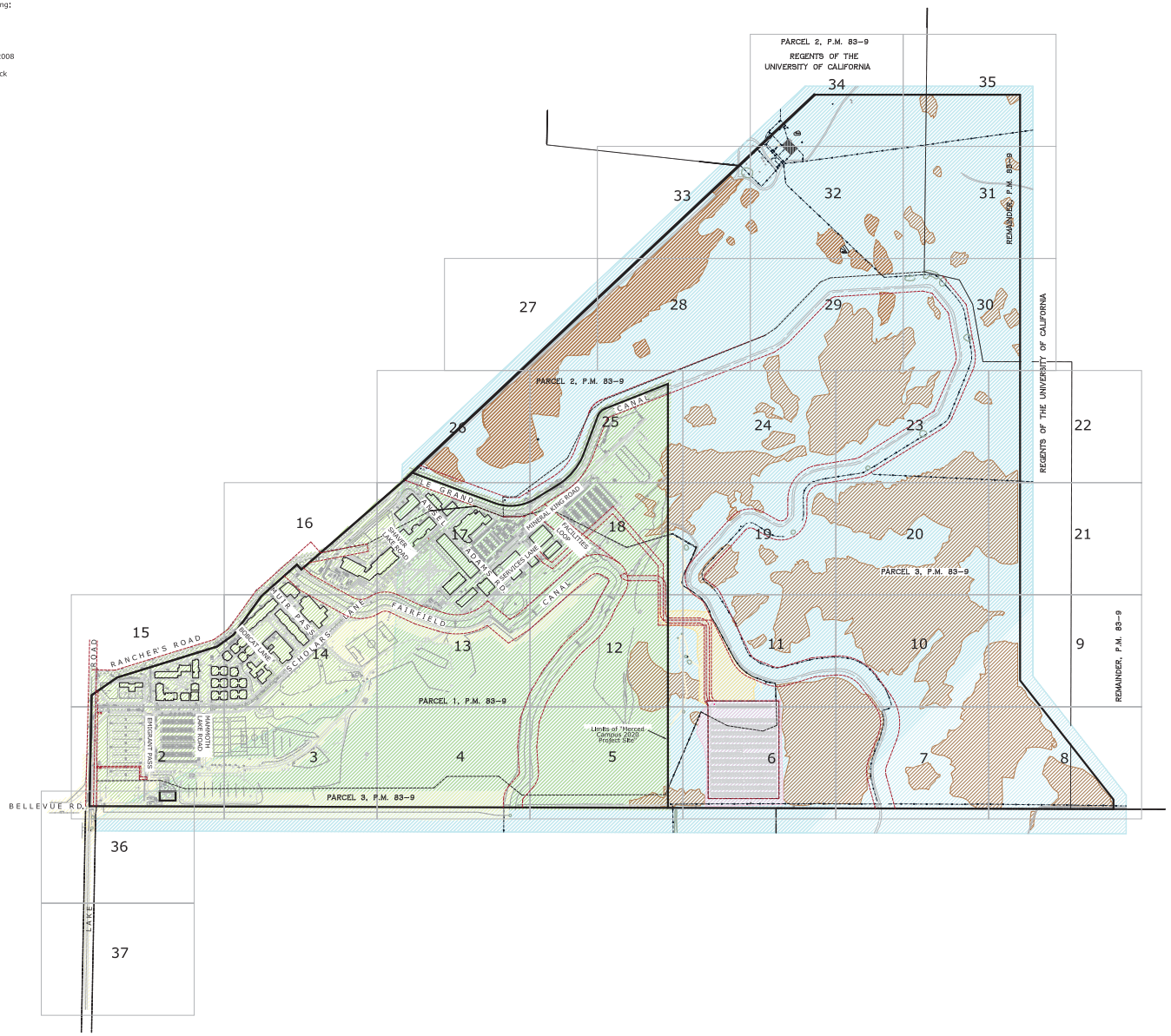
cta Engineering & Surveying
Civil Engineering ■ Land Surveying ■ Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-0919 ■ F (916) 638-2479 ■ www.ctaes.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

Sources of topography:

The topography shown hereon was developed from several sources which include the following:

- Aerial photogrammetric methods, based upon aerial photography by Radman Aerial Surveys taken on October 23, 2013.
- Aerial photogrammetric methods, based upon aerial photography by Golden Valley Surveying & subcontract with Aerial Photomapping taken on October 15, 2008
- Grading and Drainage plans for "Sunpower T-20 Tracker Solar System" by Bedrock Engineering, Project No. 09-1131 dated August 2, 2009
- Supplemental field surveys performed by Stantec Consulting Services, Inc & Mozaffari Engineering - Project No. 1843333408 between 2009 to 2012.
- Supplemental field surveys performed by CTA in 2015.
- Supplemental field surveys performed by CTA in 2014.



N

W-cta-E

S

400 0 200 400

(IN FEET)

1 inch = 400 ft.

GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

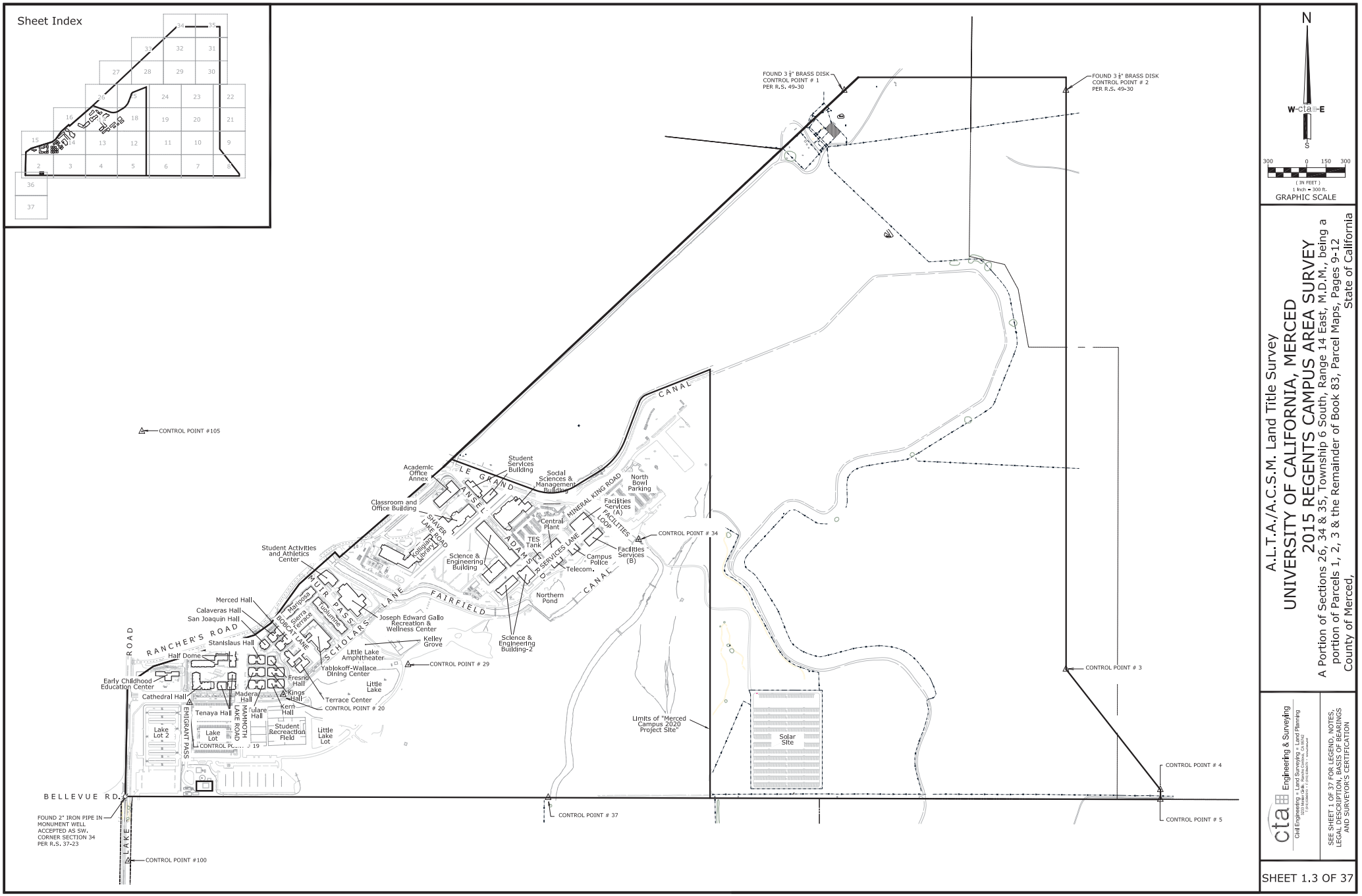
County of Merced, State of California

cta Engineering & Surveying

Civil Engineering • Land Surveying • Land Planning

(209) 656-0464 • (209) 656-0479 (fax) • www.ctaeng.com

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION



A.L.T.A./A.C.S.M. Land Title Survey

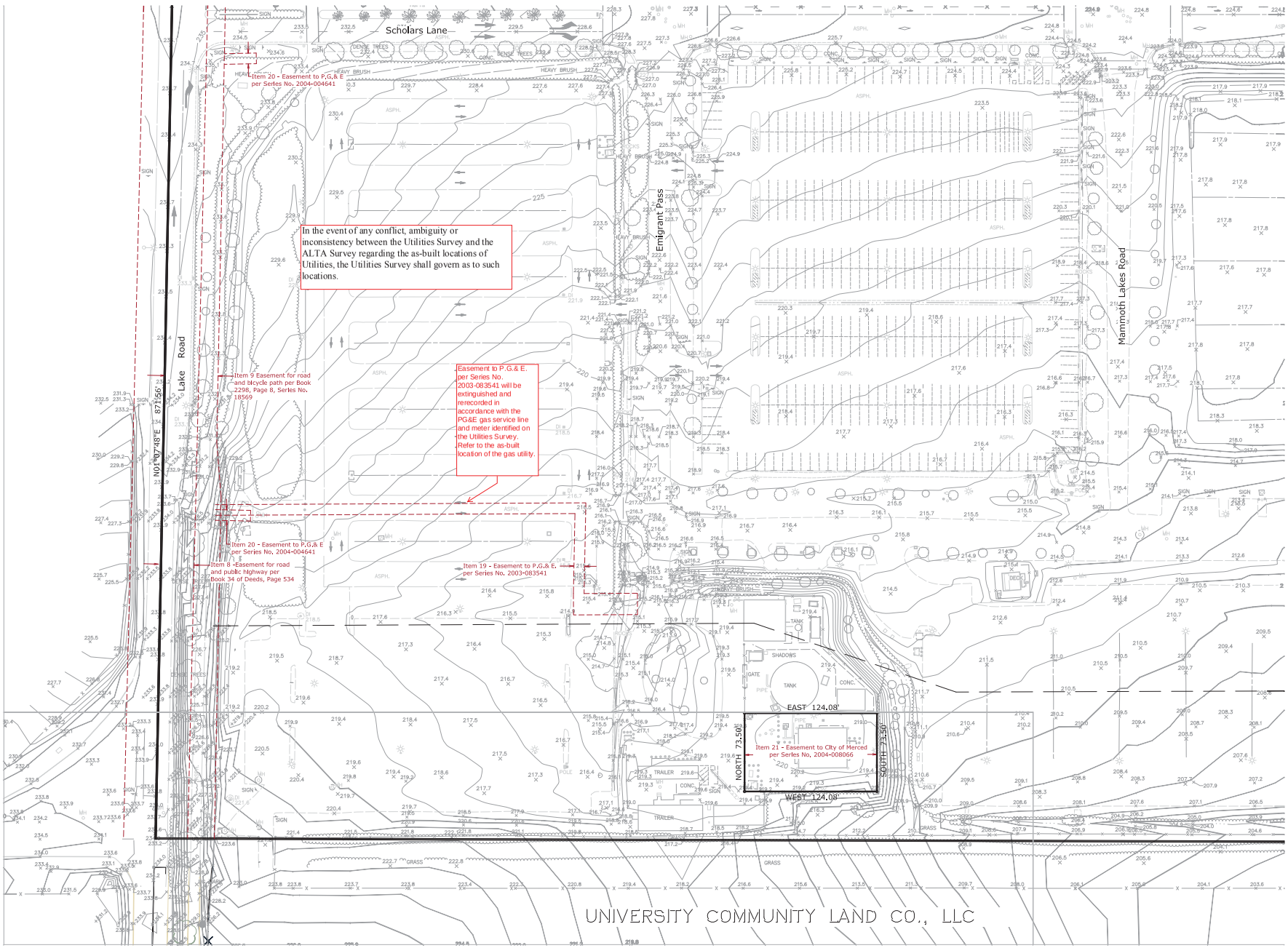
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
(209) 723-4427 • (209) 723-9580 Fax
www.ctaeng.com

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

SHEET 1.3 OF 37



N

W-cta-E

S

40 0 20 40

(IN FEET)
1 Inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey

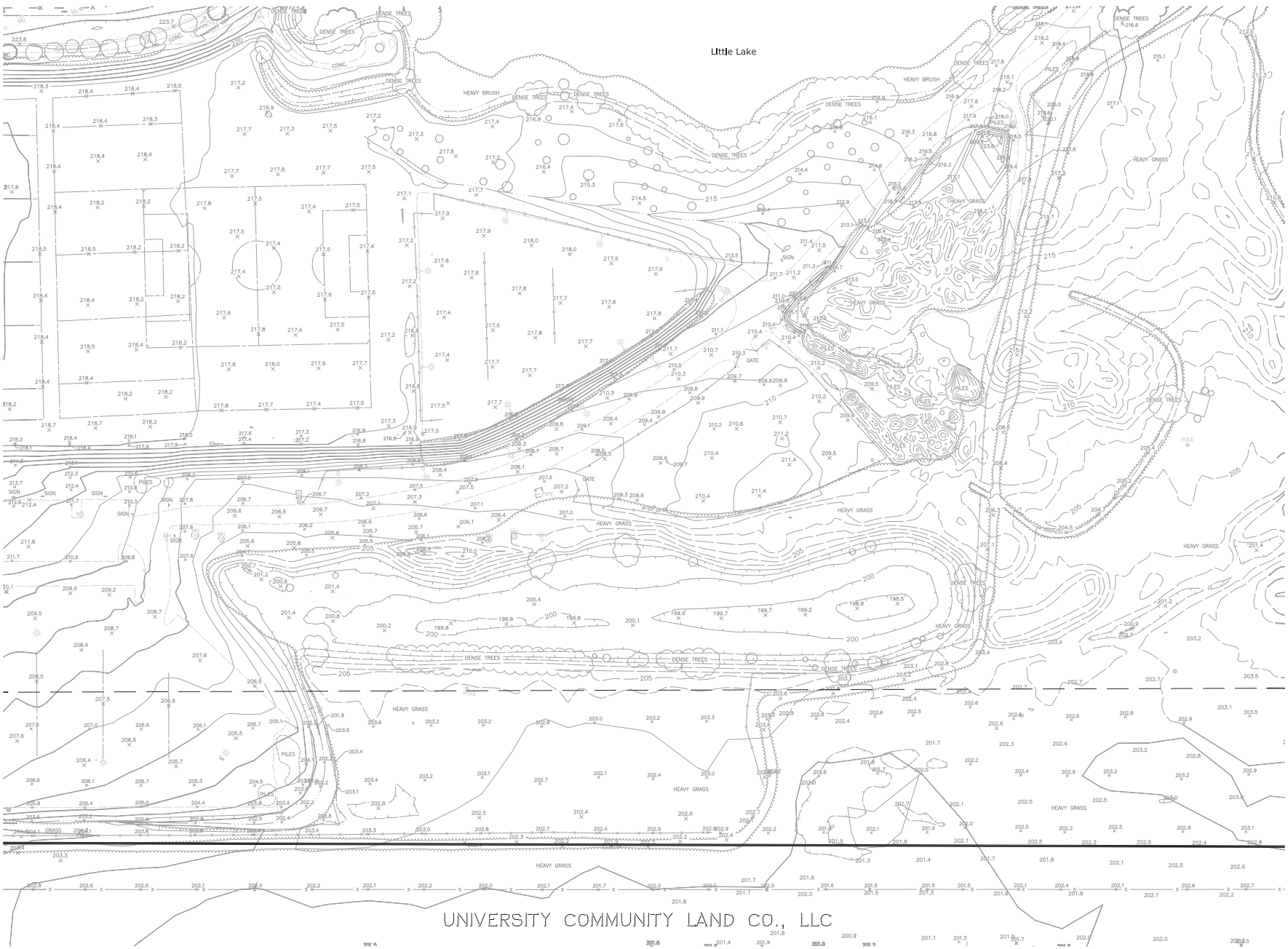
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

SHEET 2 OF 37



N

W-cta-E

S

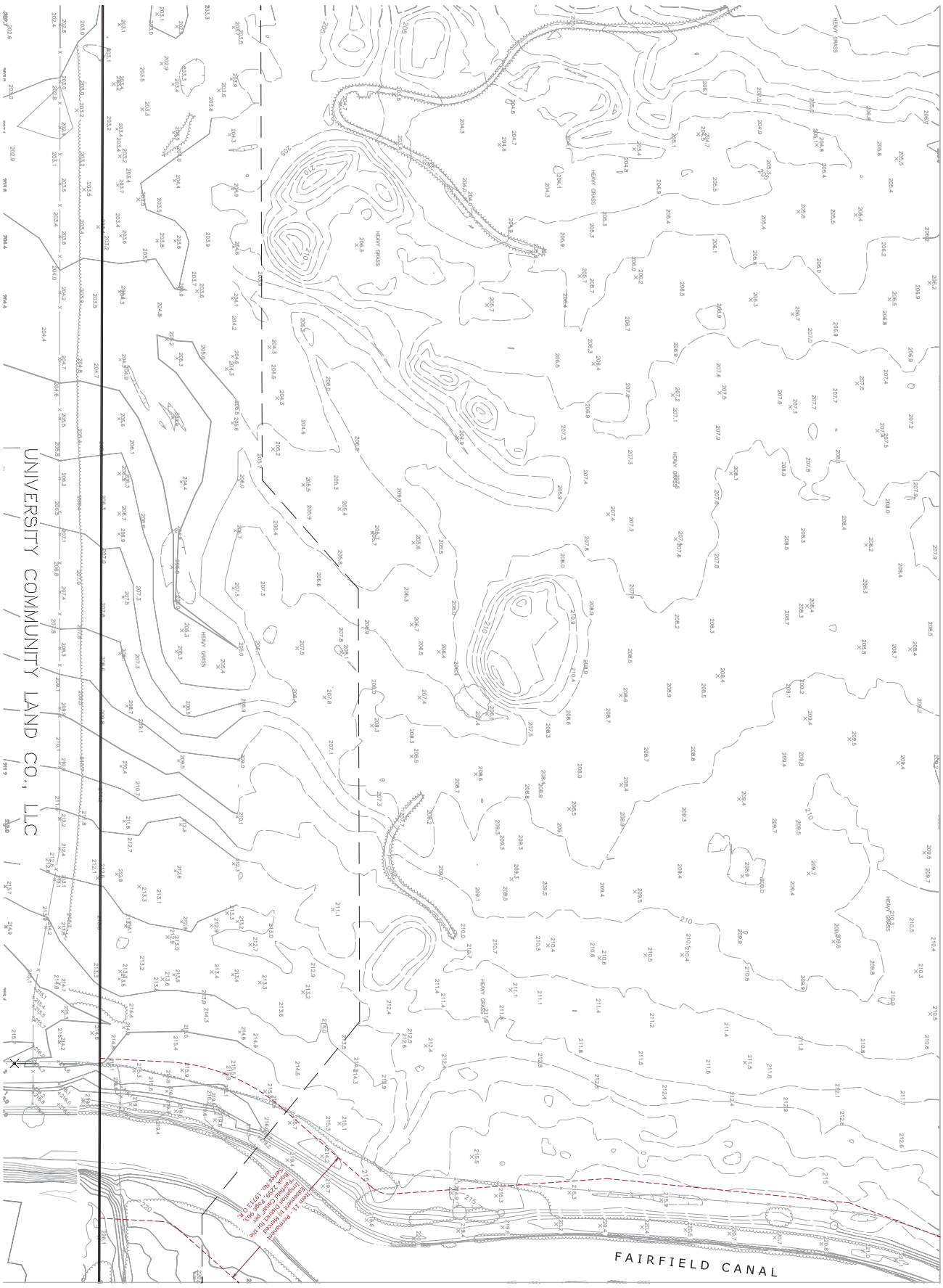
40 0 20 40

(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3205 Wright Circle, Ronald Gordon, CA 95742
T 916.638.6400 • F 916.638.6479 • www.cta-ed.com

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION



SHEET 4 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T (916) 638-2085 • F (916) 638-8479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

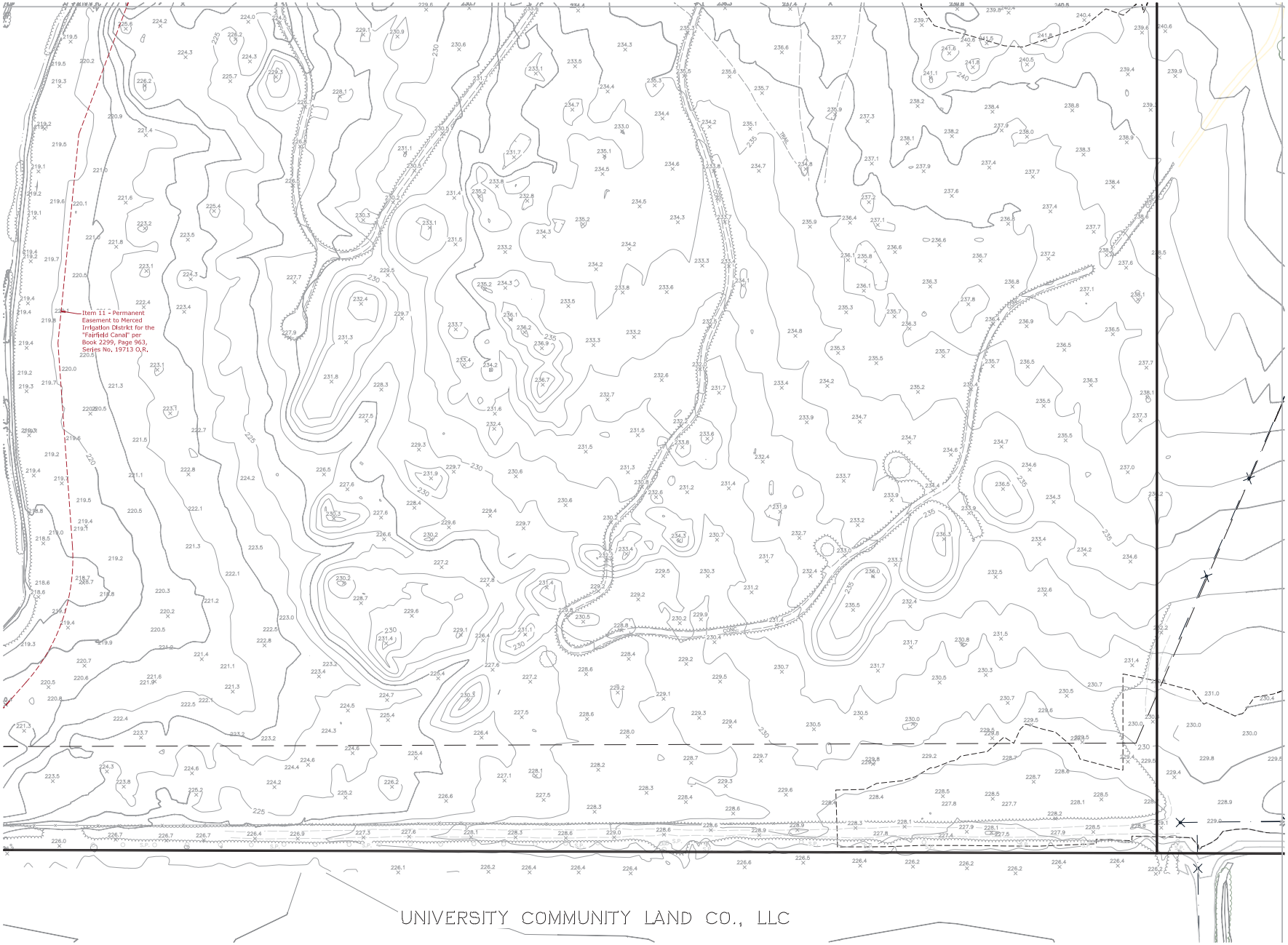
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W E S N



N

W-cta-E

S

40 0 20 40

(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey

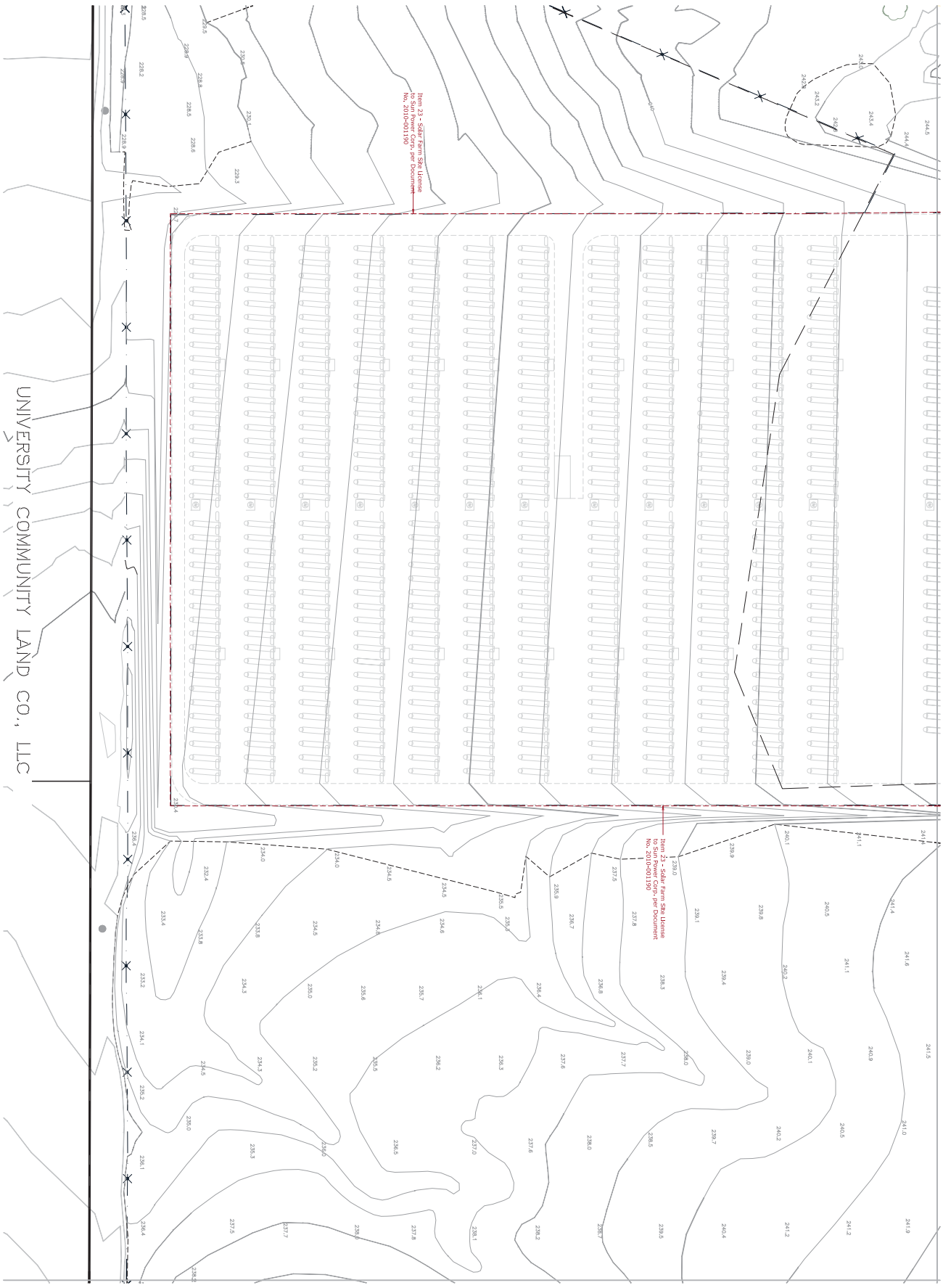
UNIVERSITY OF CALIFORNIA, MERCED

2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3205 Mariposa Street, Riverside, California, CA 92504
T 951.688.0818 • F 951.688.0819 • www.cta-eng.com

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION



SHEET 6 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6979 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

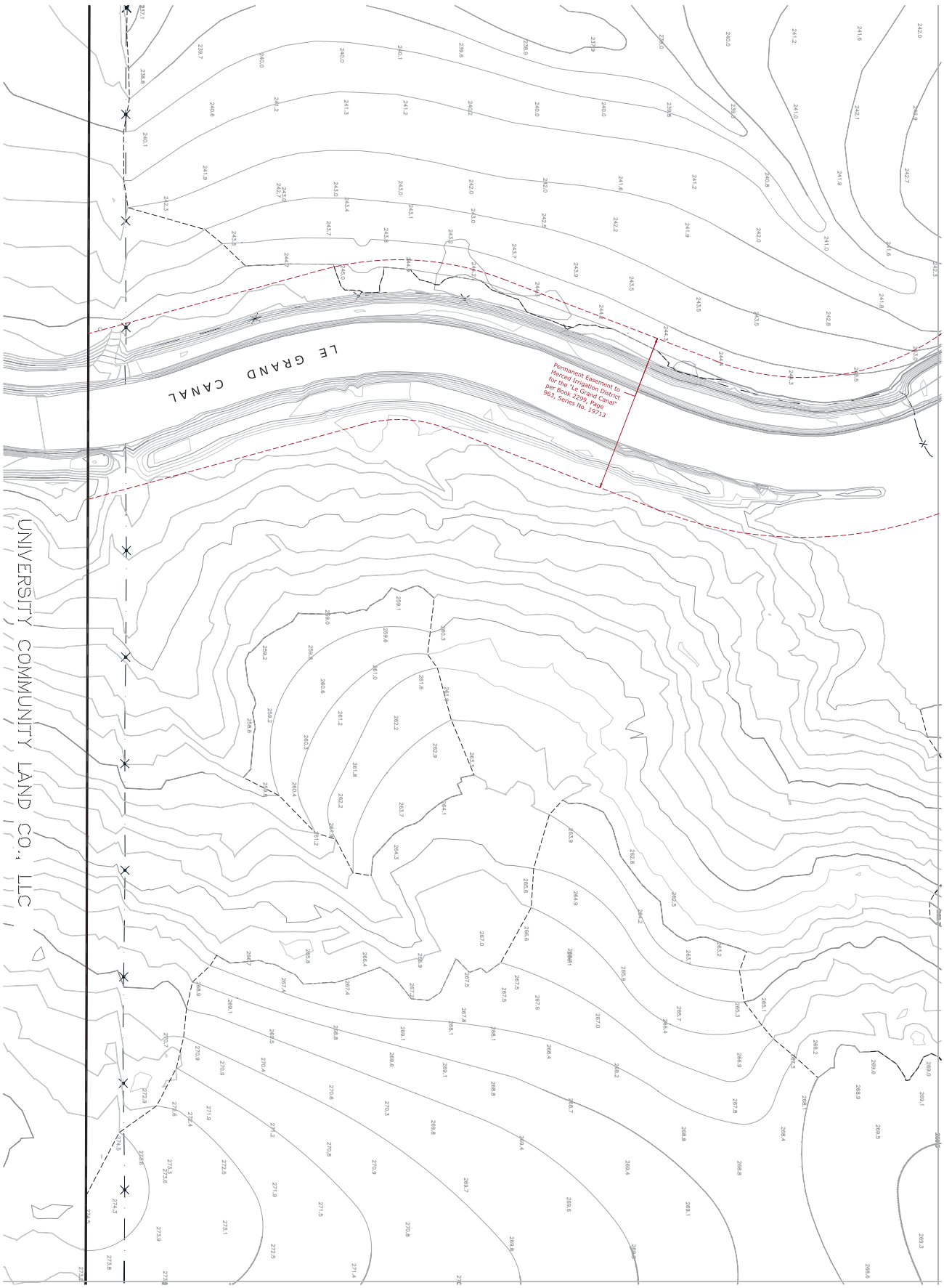
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

N
W-cta-E
S



SHEET 7 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T (916) 638-2919 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

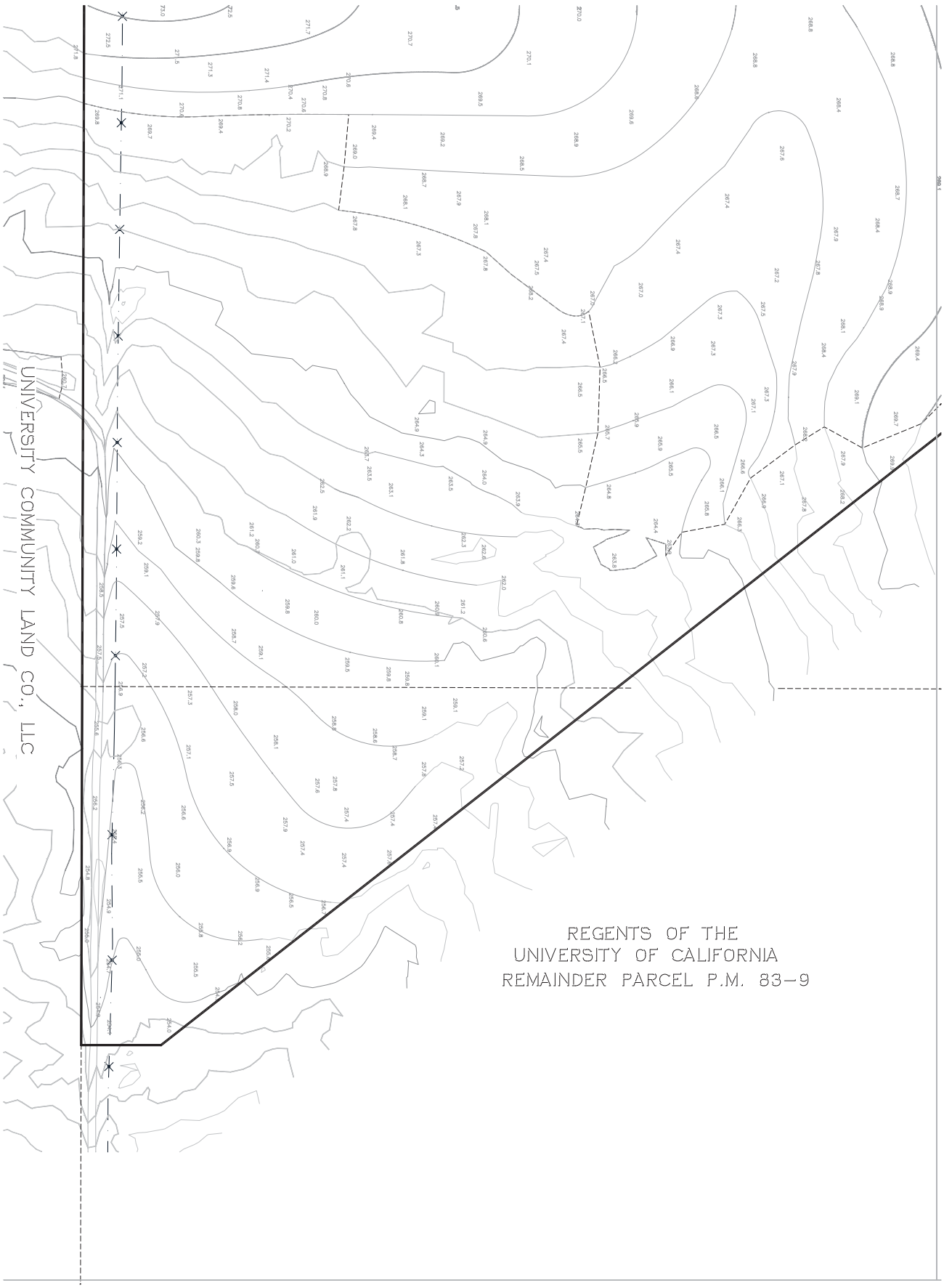
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W E S N



SHEET 8 OF 37

cta Engineering & Surveying
Civil Engineering ▪ Land Surveying ▪ Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

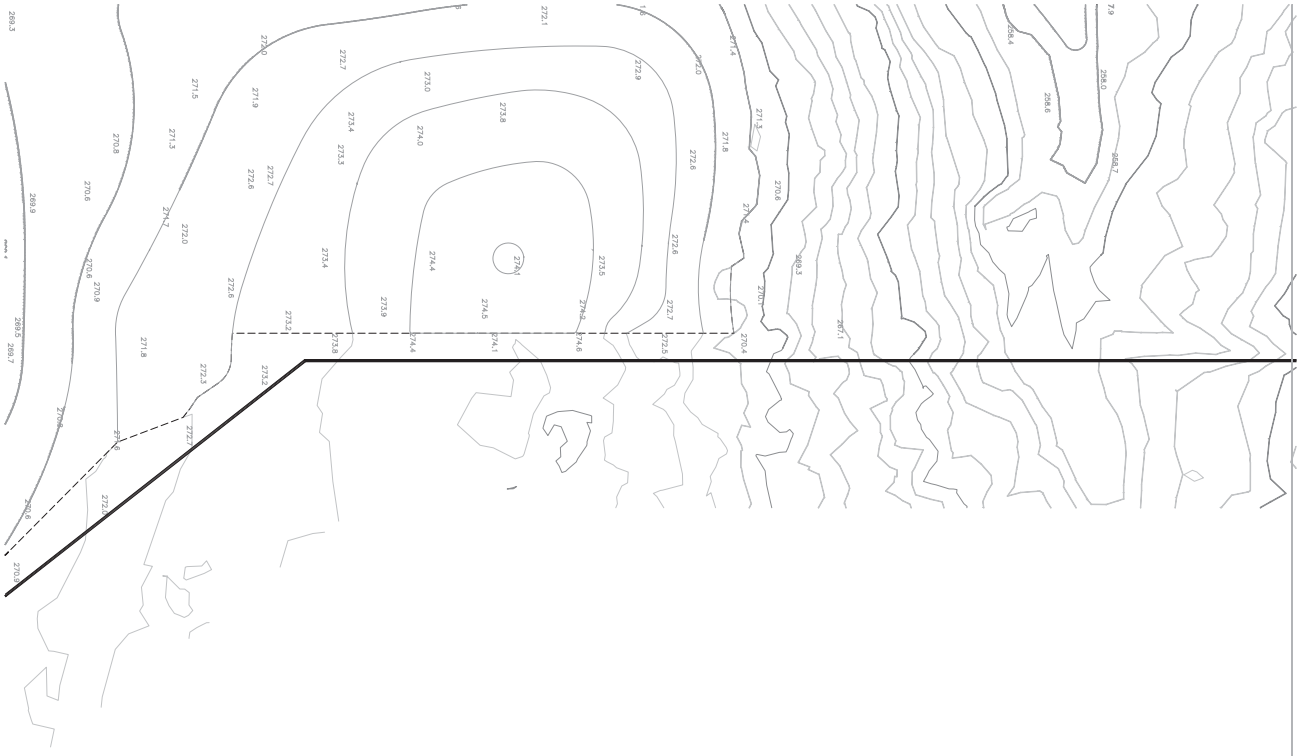
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

N
W E
S



REGENTS OF THE
UNIVERSITY OF CALIFORNIA

PARCEL 3 P.M. 83-9

REMAINDER PARCEL P.M. 83-9

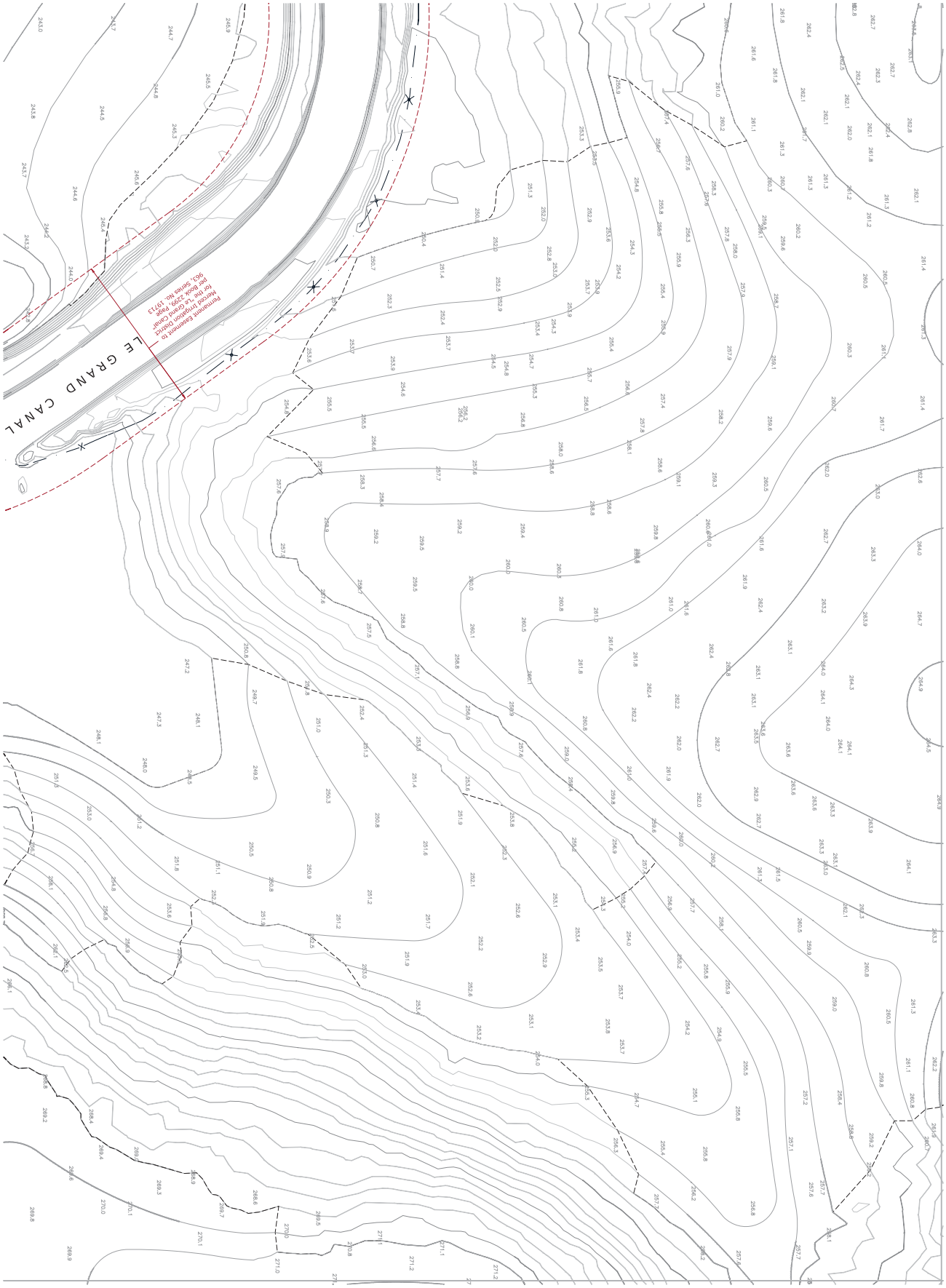
cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeu.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

W-cta-E
S N



SHEET 10 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T (916) 638-2612 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

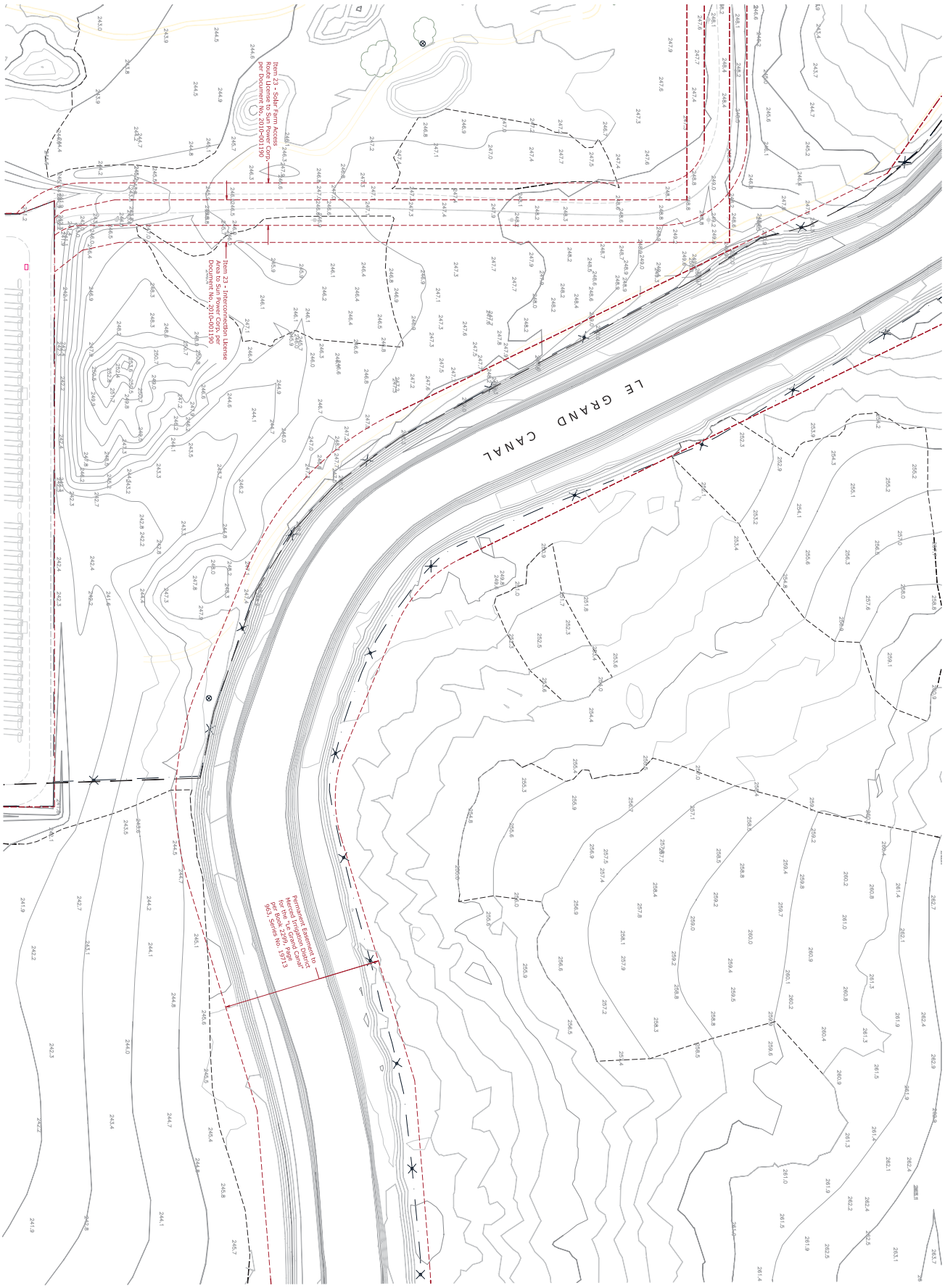
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W-S-E-N



SHEET 11 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-0919 • F (916) 638-0970 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

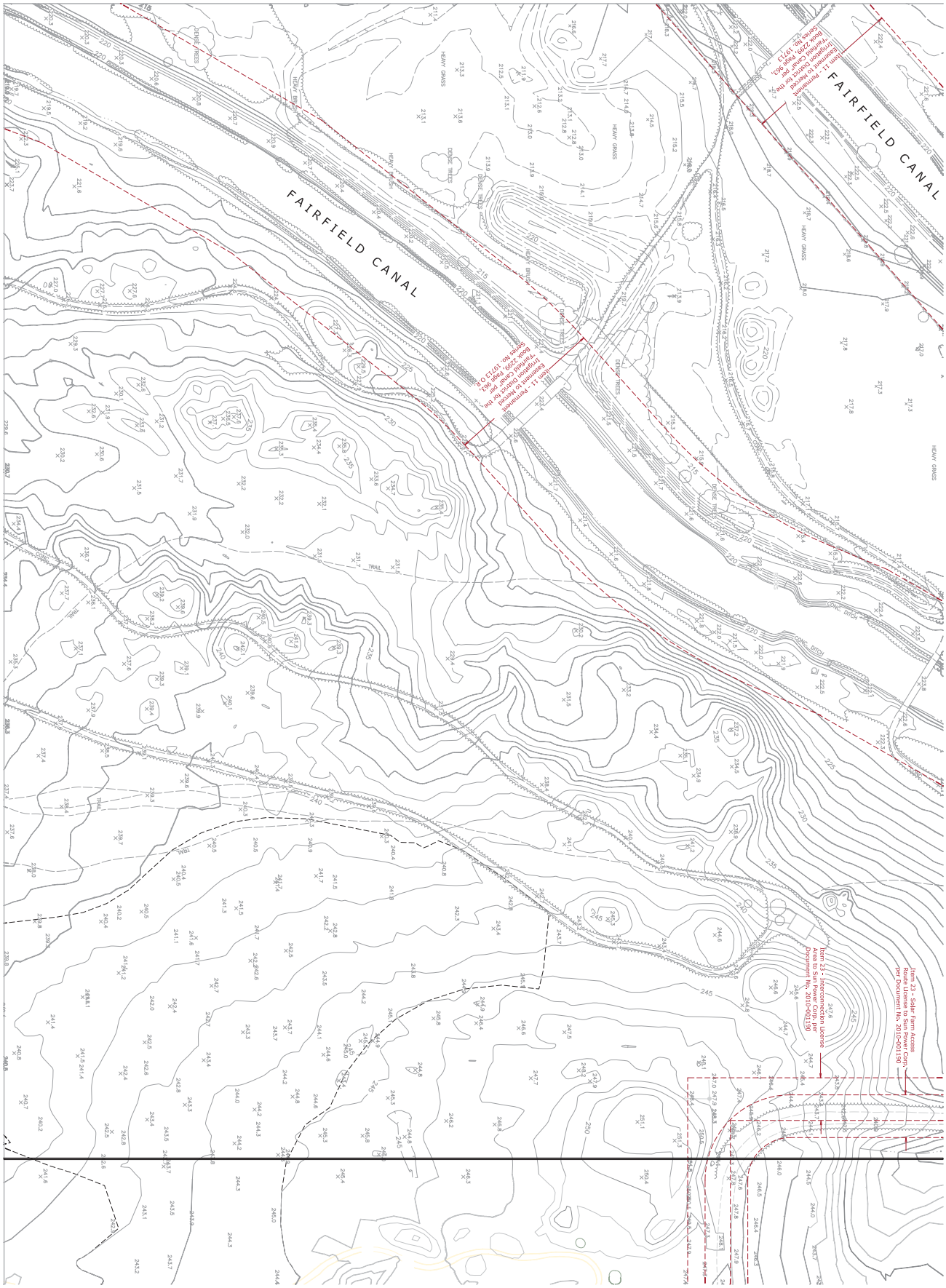
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

N
W cta E
S



SHEET 12 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T: (916) 638-2919 • F: (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

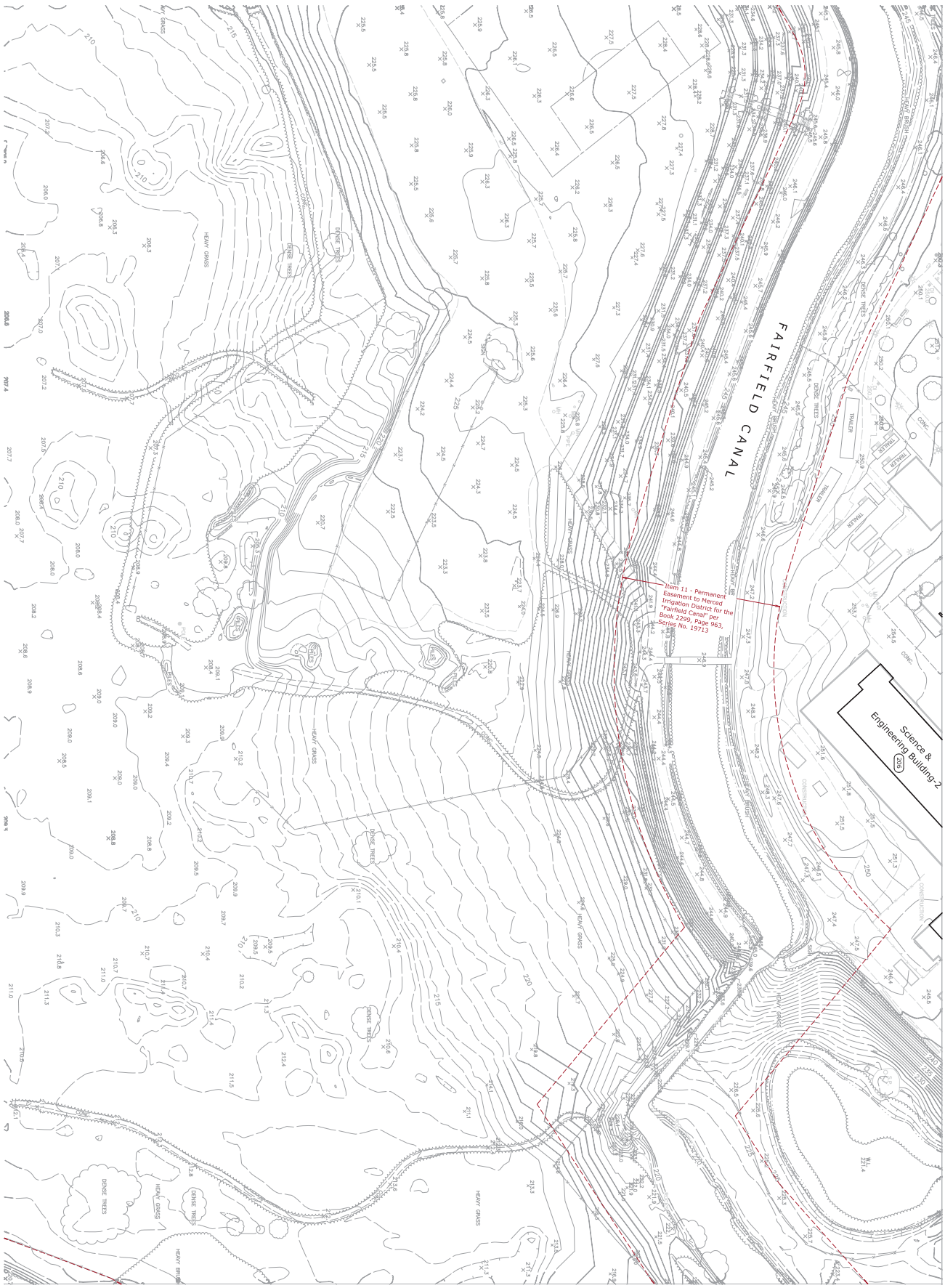
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W E S N



SHEET 13 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mitchell Circle, Rancho Cordova, CA 95742
T (916) 638-0919 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

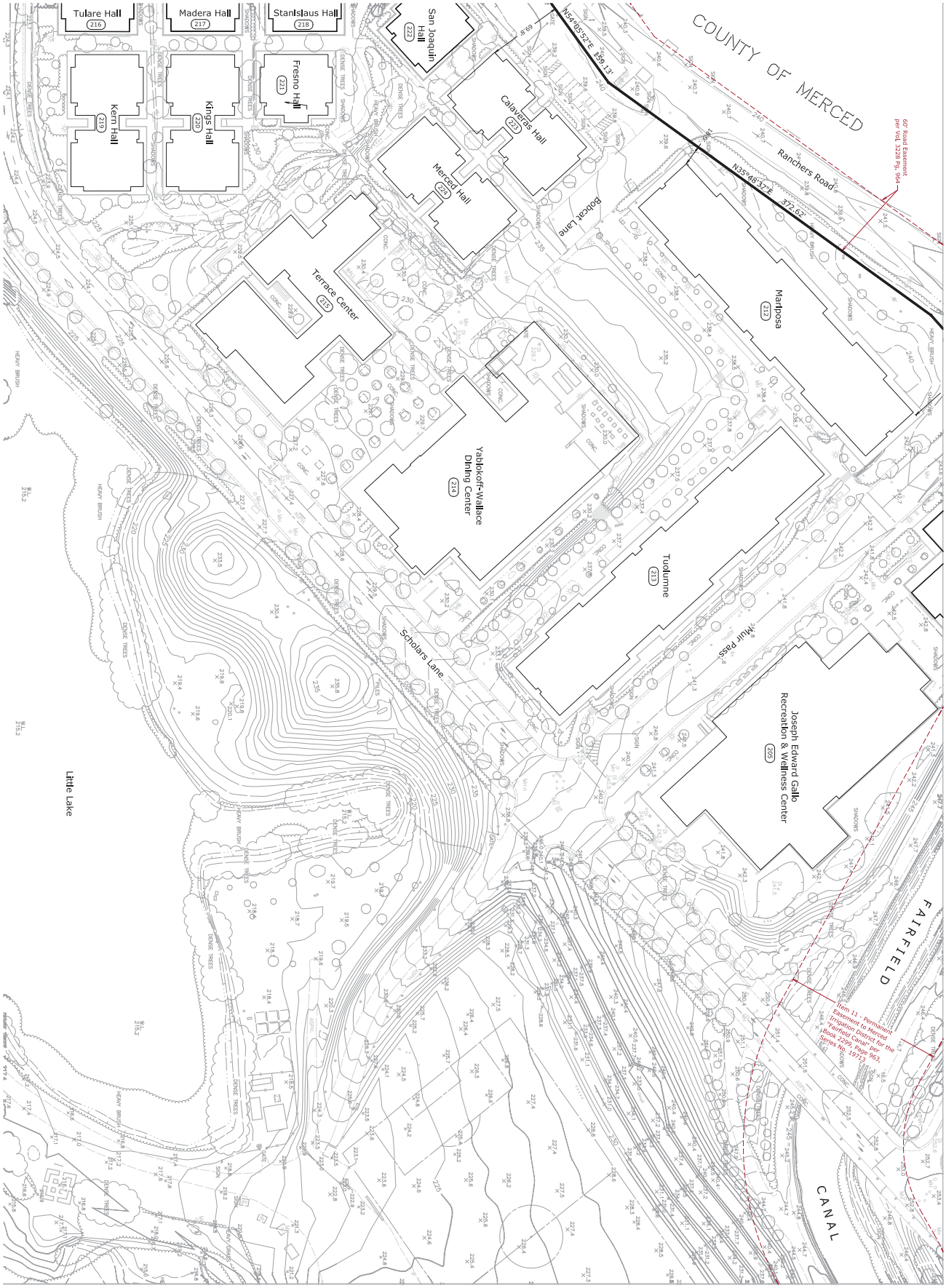
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W E S N



SHEET 14 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mitchell Circle, Rancho Cordova, CA 95742
T (916) 638-0919 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

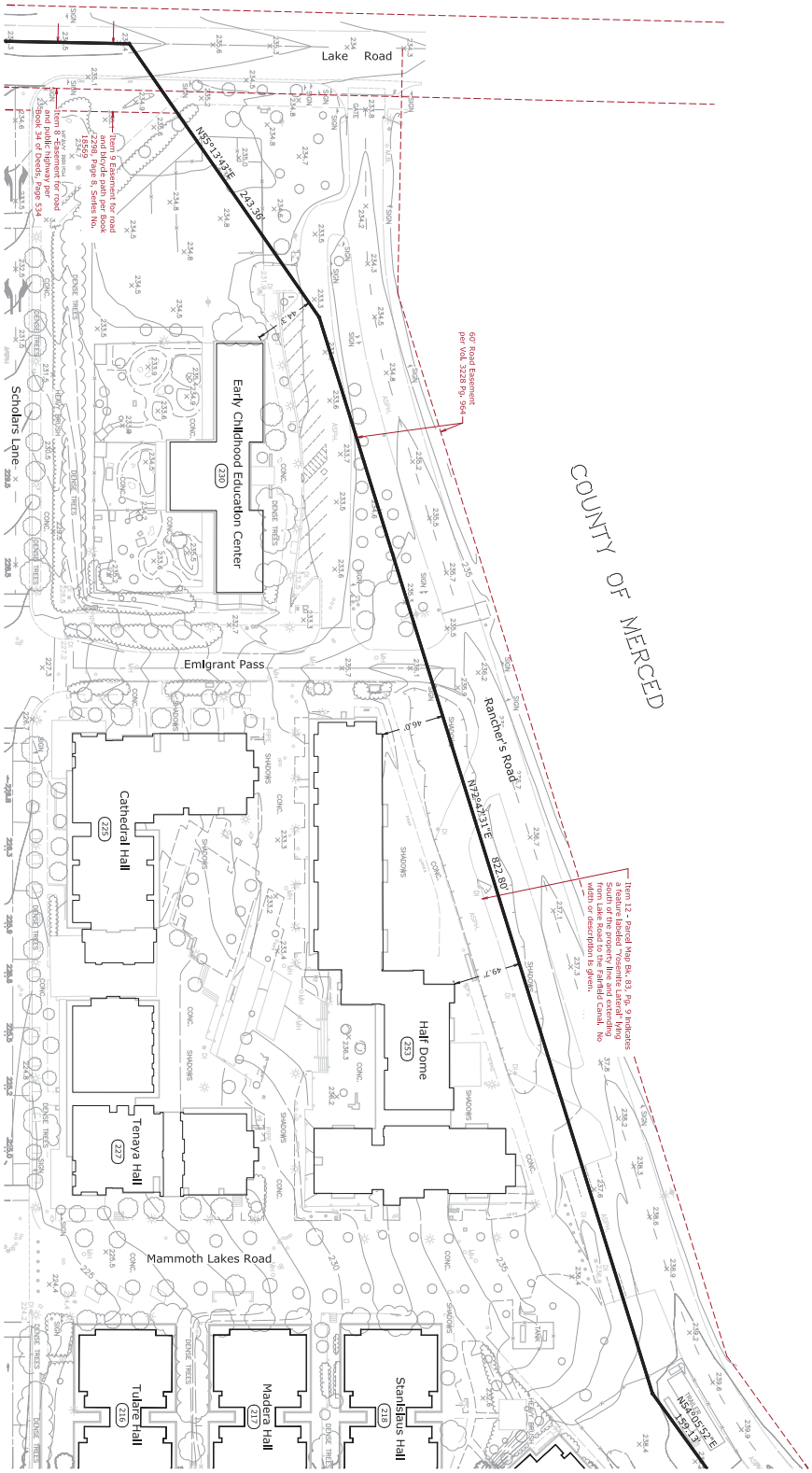
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

N
W E
S



SHEET 15 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T (916) 638-0919 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

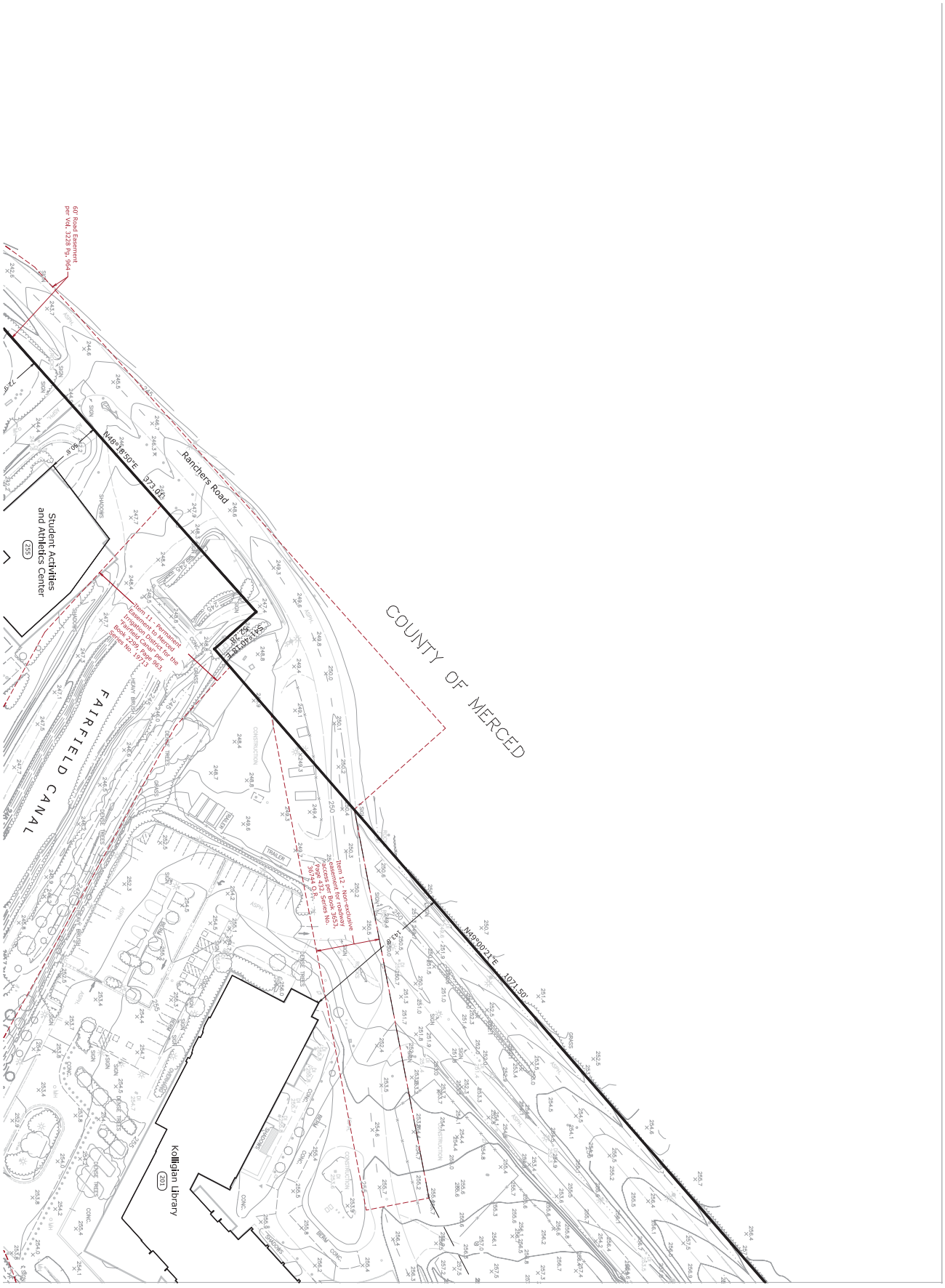
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 inch = 40 ft.
(IN FEET)
40 0 20 40

W E S N



SHEET 16 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T (916) 638-2919 • F (916) 638-8479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

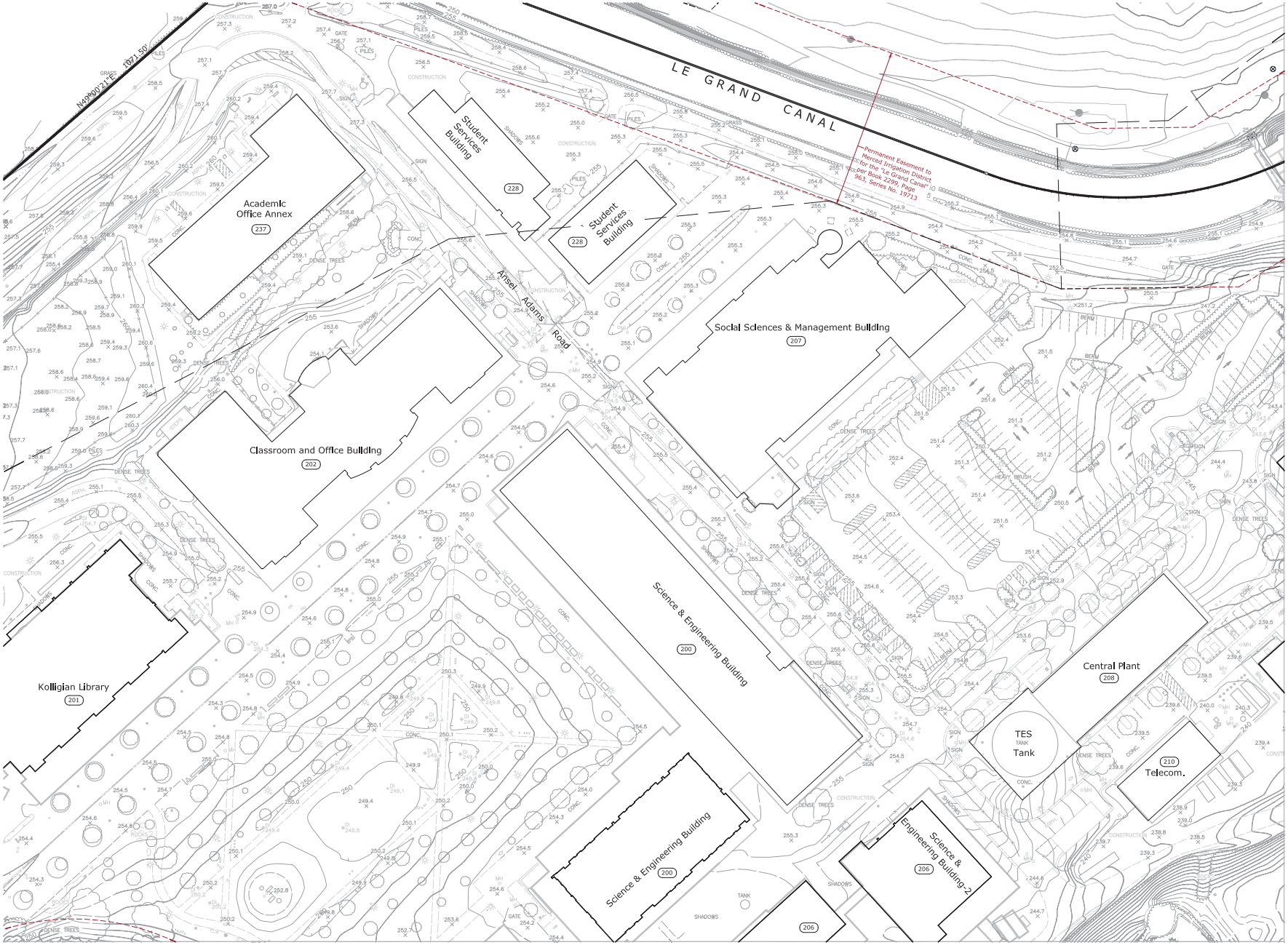
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W E S N



N

W-cta-E

S

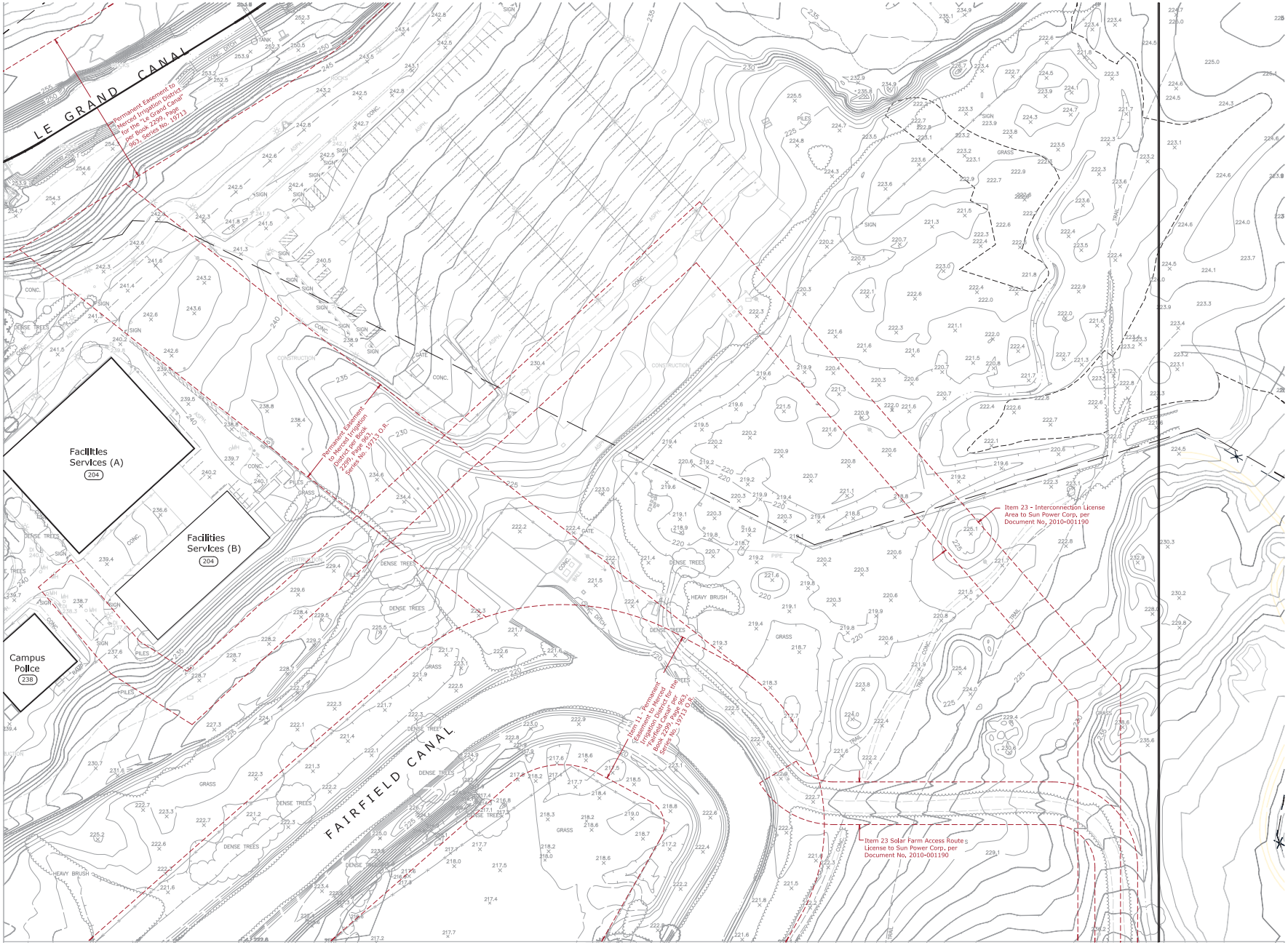
40 0 20 40

(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
2020 Merced Street, Rancho Cordova, CA 95742
T: 916.638.0400 • F: 916.638.0479 • www.cta-ae.com

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION



N

W-cta-E

S

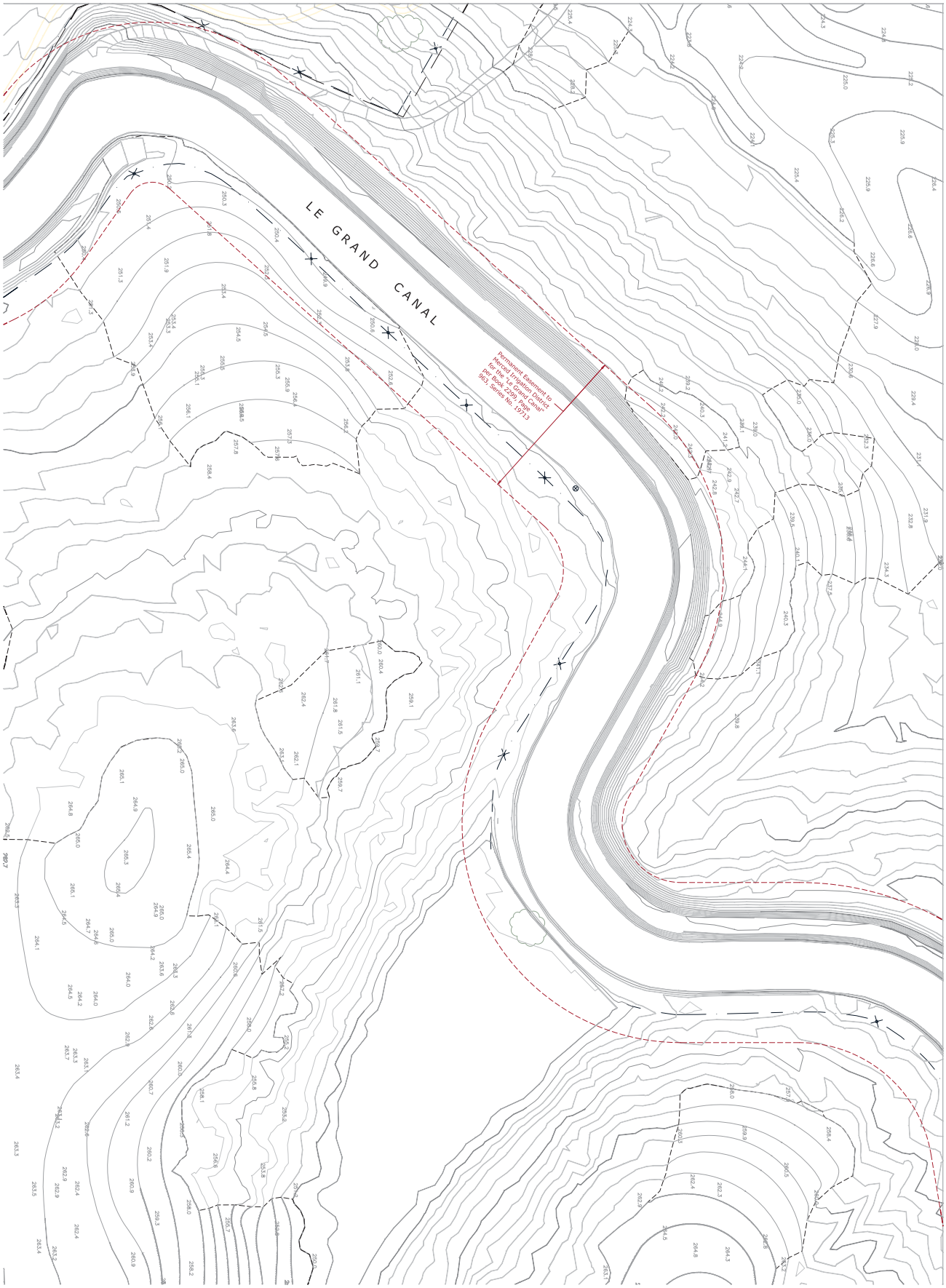
40 0 20 40

(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
2020 Market Street, Ronoke Corona, CA 92742
T 951.638.0400 • F 951.638.0470 • www.cta-e.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION



SHEET 19 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Circle, Rancho Cordova, CA 95742
T (916) 638-0919 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

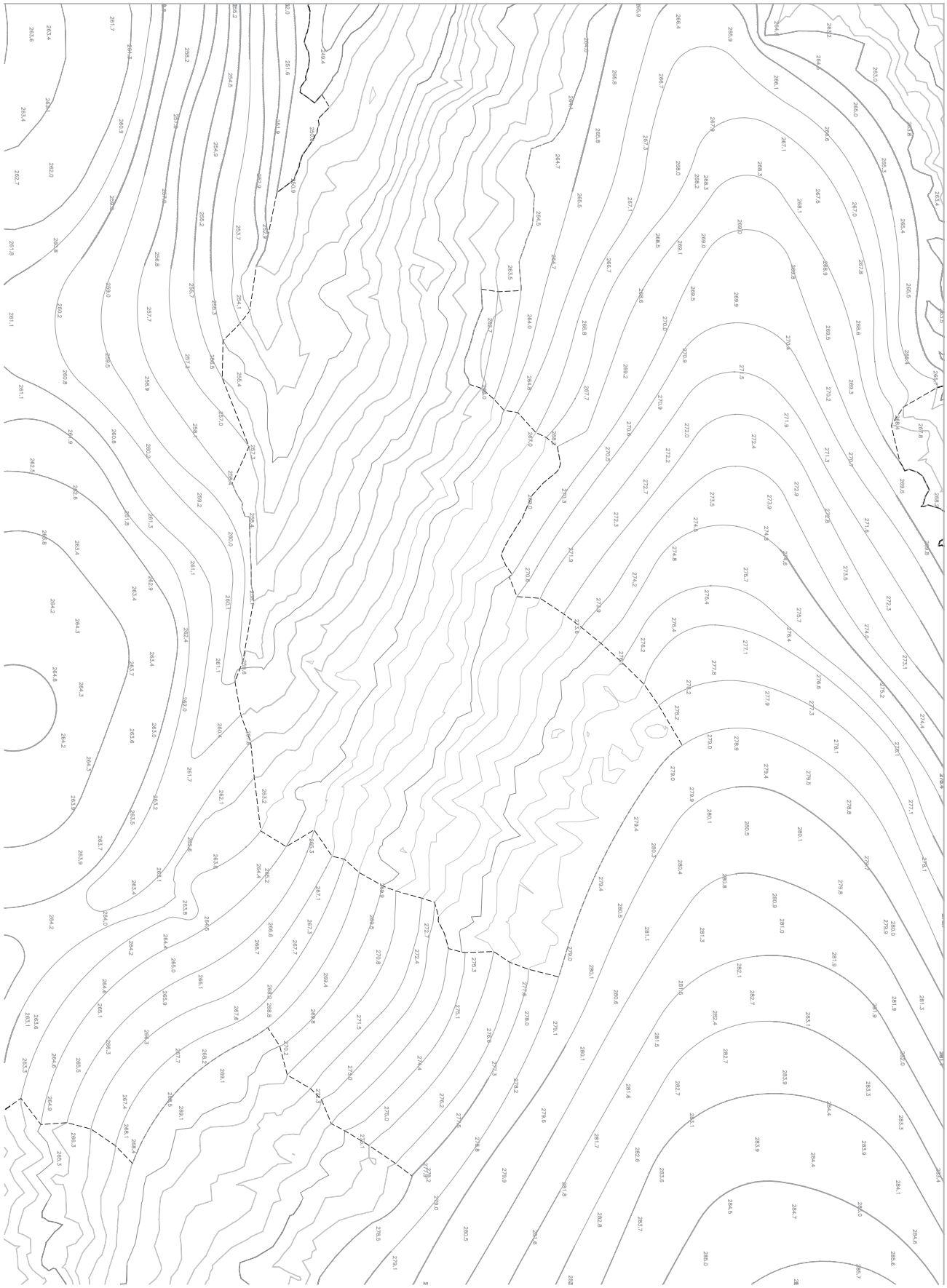
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W-S-E-N



SHEET 20 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T: (916) 638-2085 • F: (916) 638-8479 • www.ctaeng.com

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

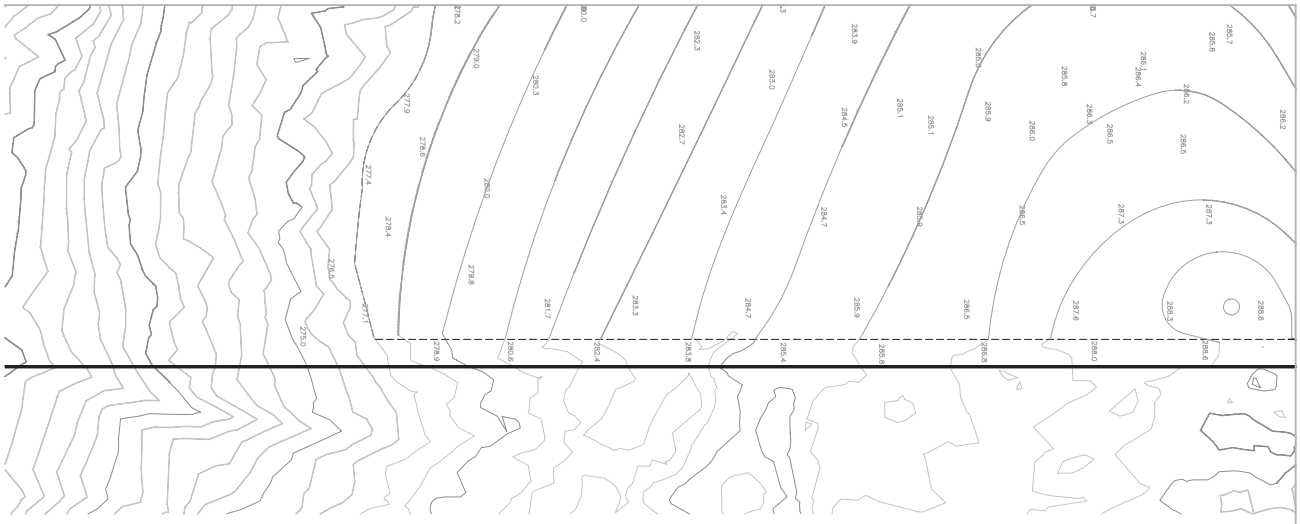
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

N
W E
S



REGENTS OF THE
UNIVERSITY OF CALIFORNIA

PARCEL 3 P.M. 83-9

REMAINDER PARCEL P.M. 83-9

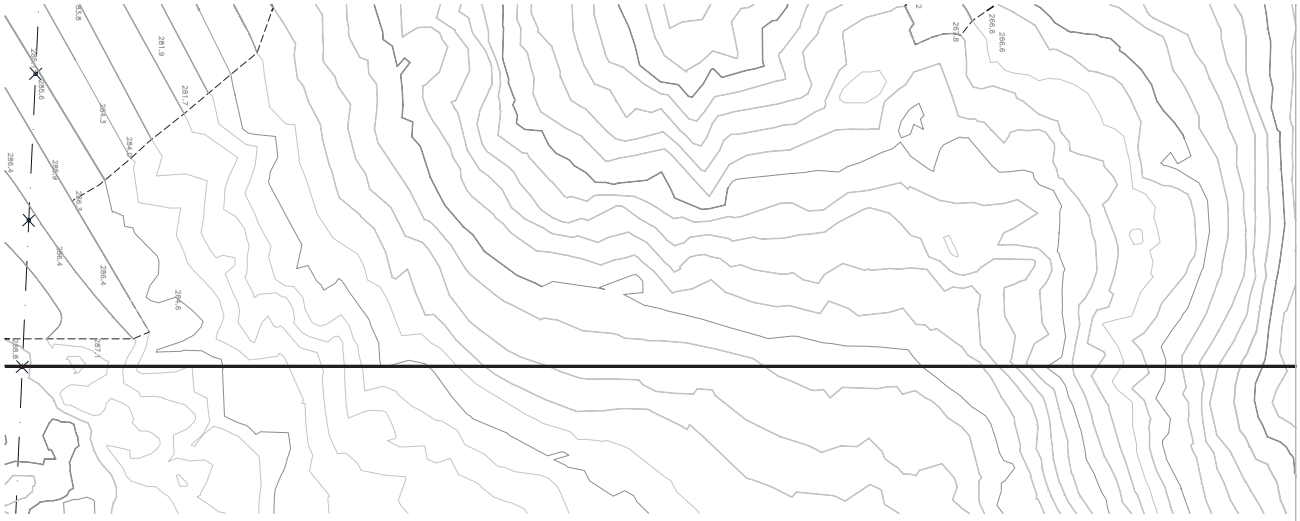
cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeu.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

W-cta-E
S
N



REGENTS OF THE
UNIVERSITY OF CALIFORNIA

PARCEL 3 P.M. 83-9

REMAINDER PARCEL P.M. 83-9

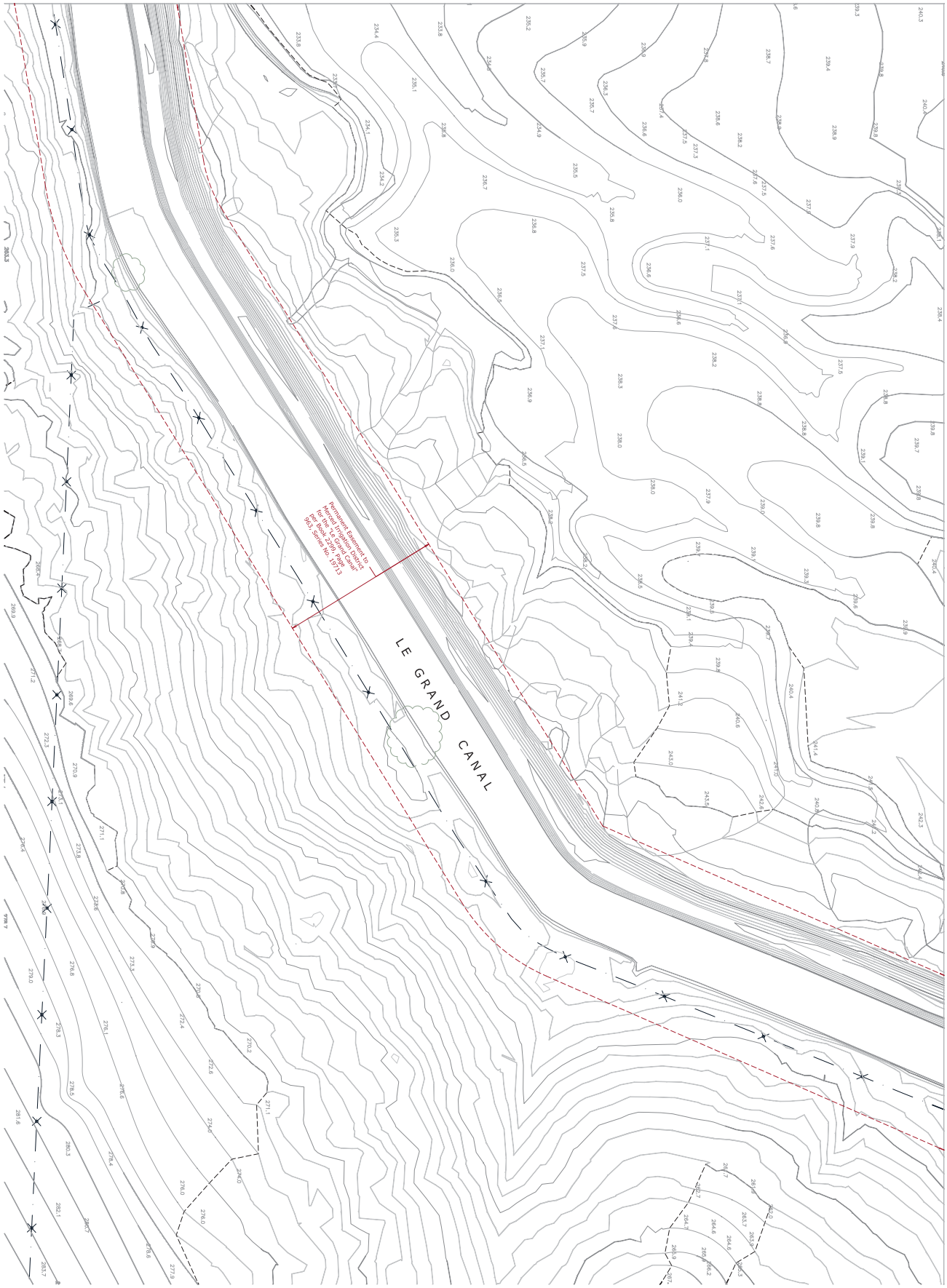
cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

W-cta-E
S N



SHEET 23 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

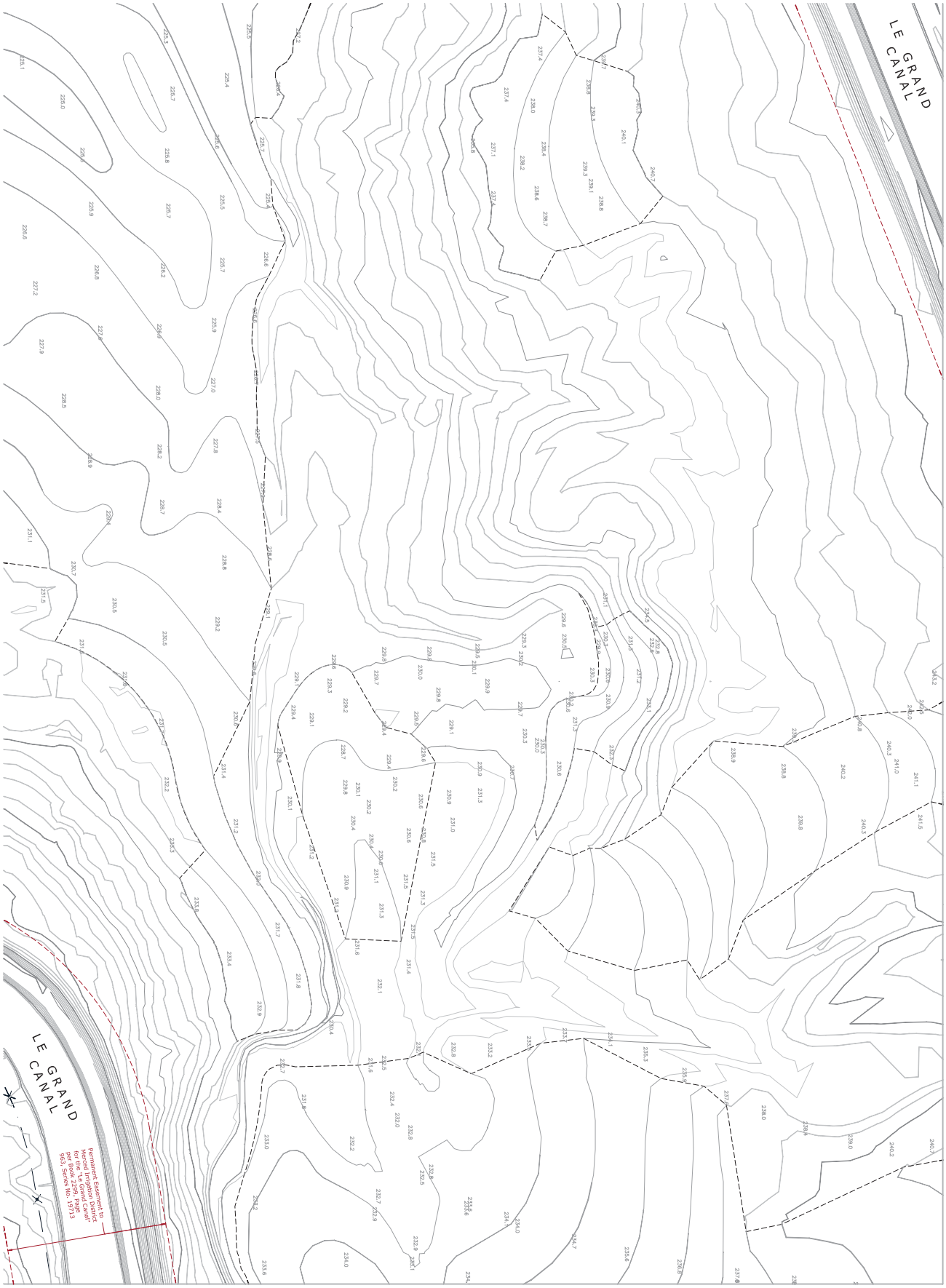
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

N
W E
S



SHEET 24 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T: (916) 638-2612 • F: (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

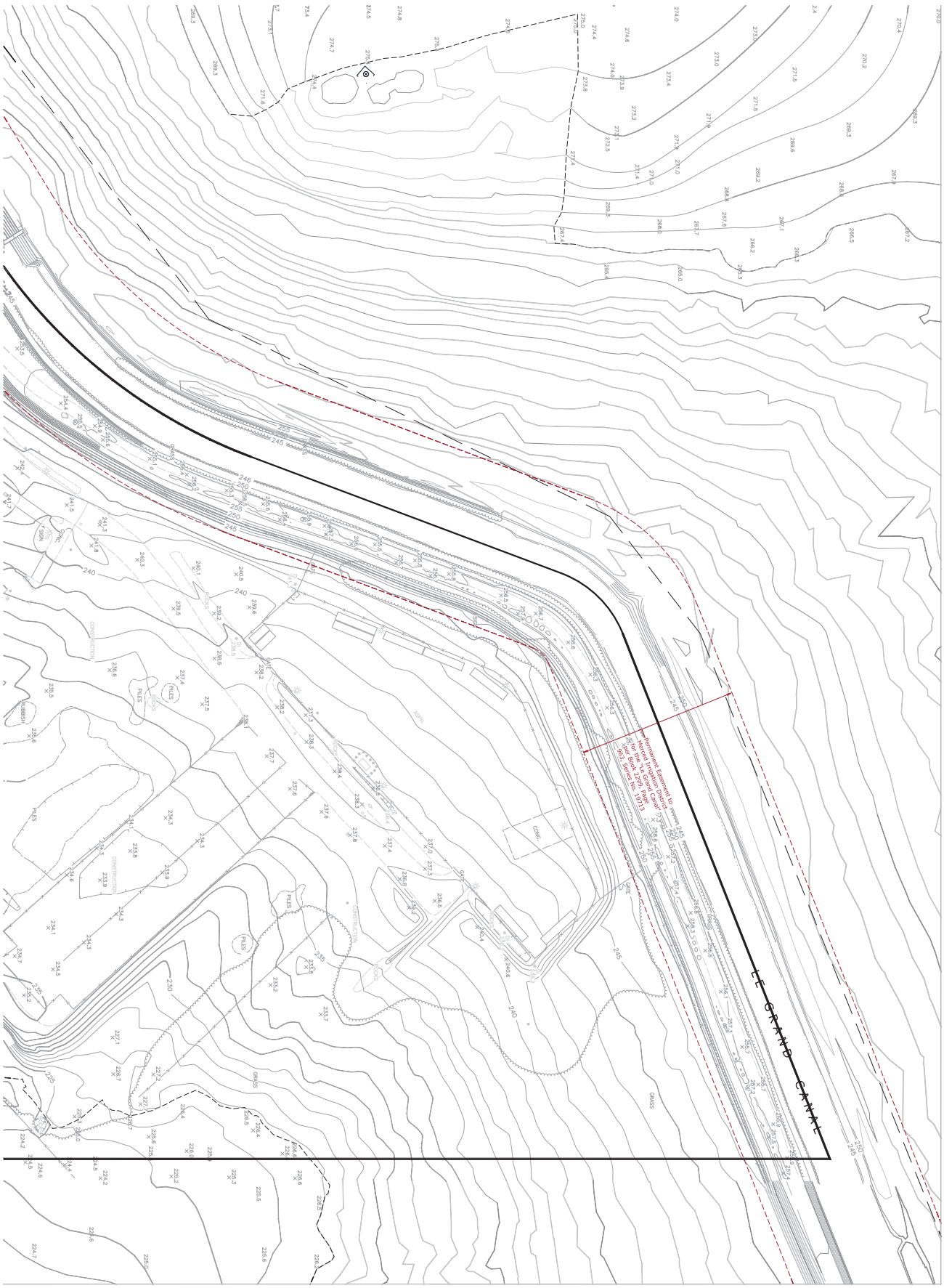
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

W S E N



SHEET 25 OF 37

cta Engineering & Surveying
Civil Engineering ▪ Land Surveying ▪ Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-9919 • F (916) 638-9479 • www.ctaeng.net

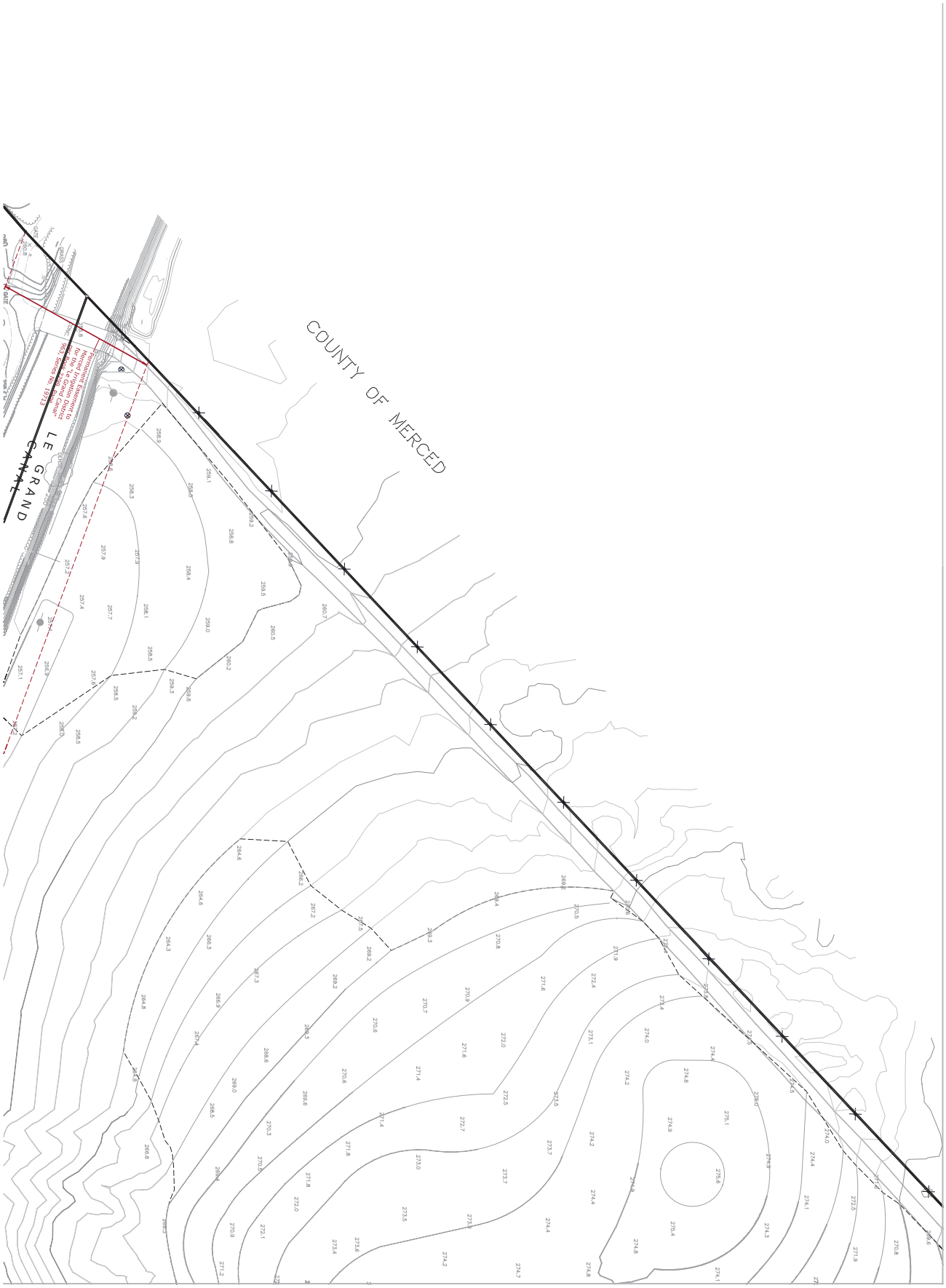
SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California



SHEET 26 OF 37

cta Engineering & Surveying
Civil Engineering ▪ Land Surveying ▪ Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-9919 • F (916) 638-9479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

N
W-cta-E
S



SHEET 27 OF 37

cta Engineering & Surveying
Civil Engineering ▪ Land Surveying ▪ Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-2919 ▪ F (916) 638-9479 ▪ www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

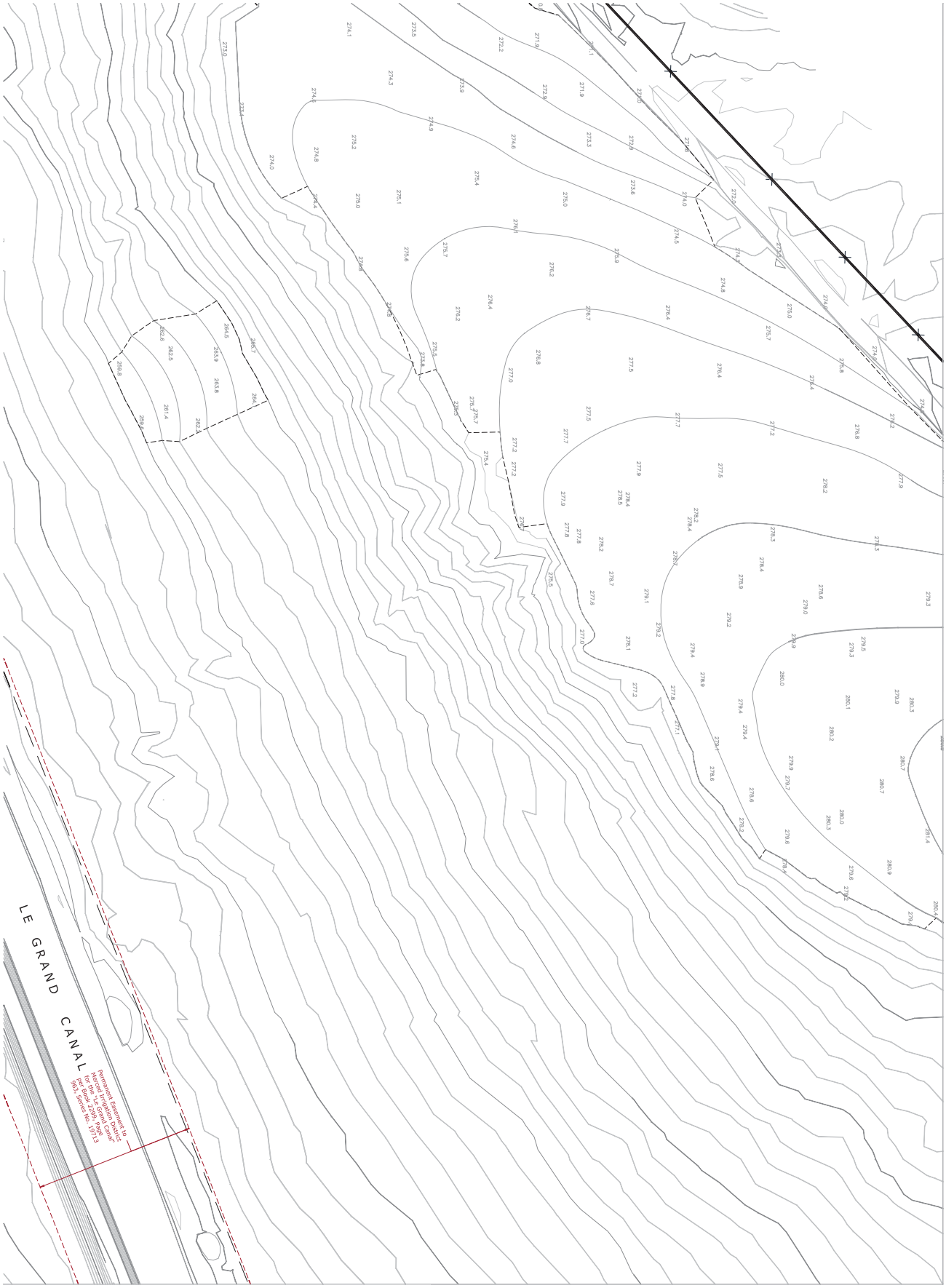
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

N
W E
S



SHEET 28 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3239 Melker Circle, Rancho Cordova, CA 95742
T: (916) 638-2612 • F: (916) 638-2479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

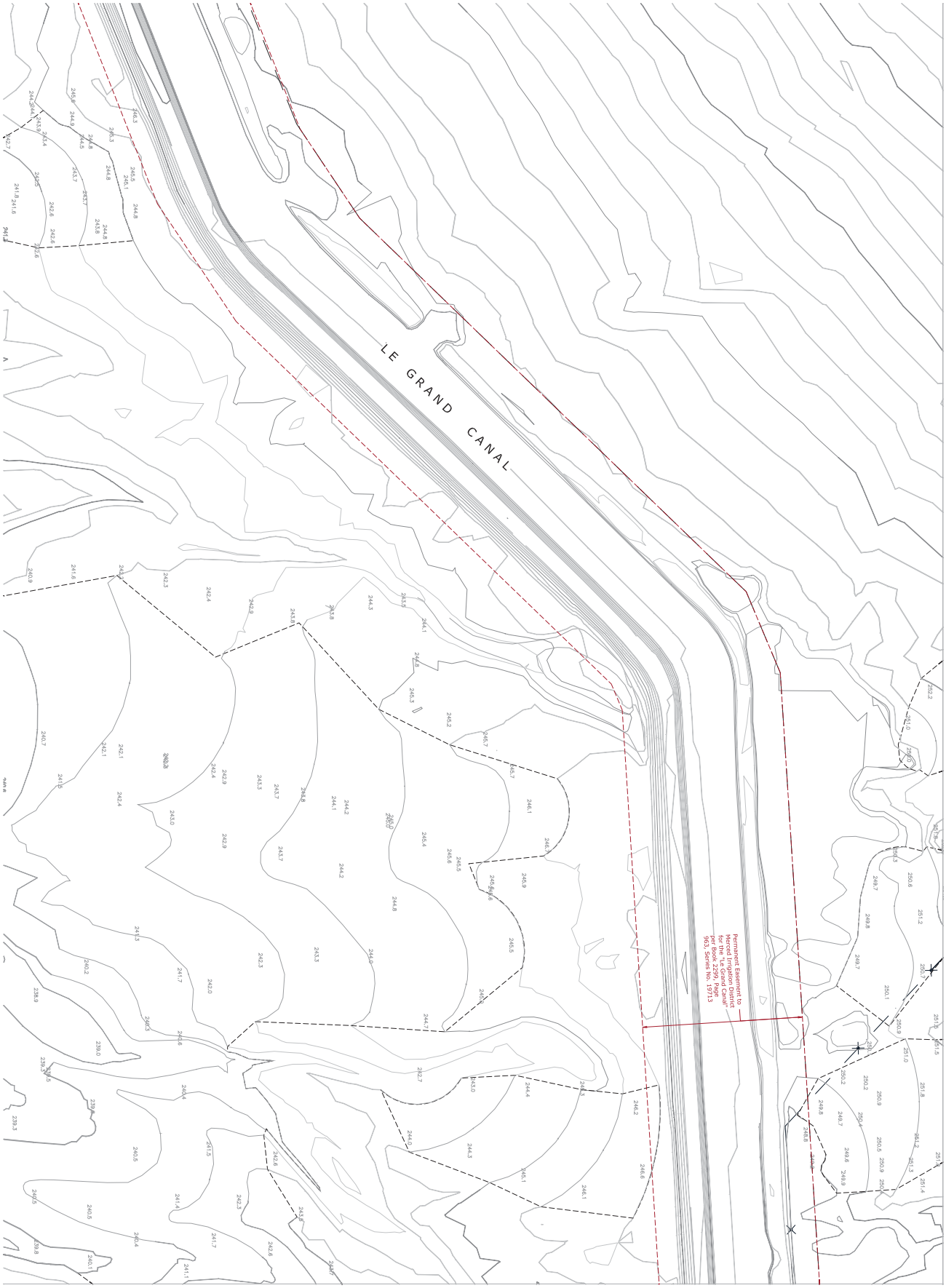
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FT.
40 0 20 40

N



SHEET 29 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T: (916) 638-2612 • F: (916) 638-2479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

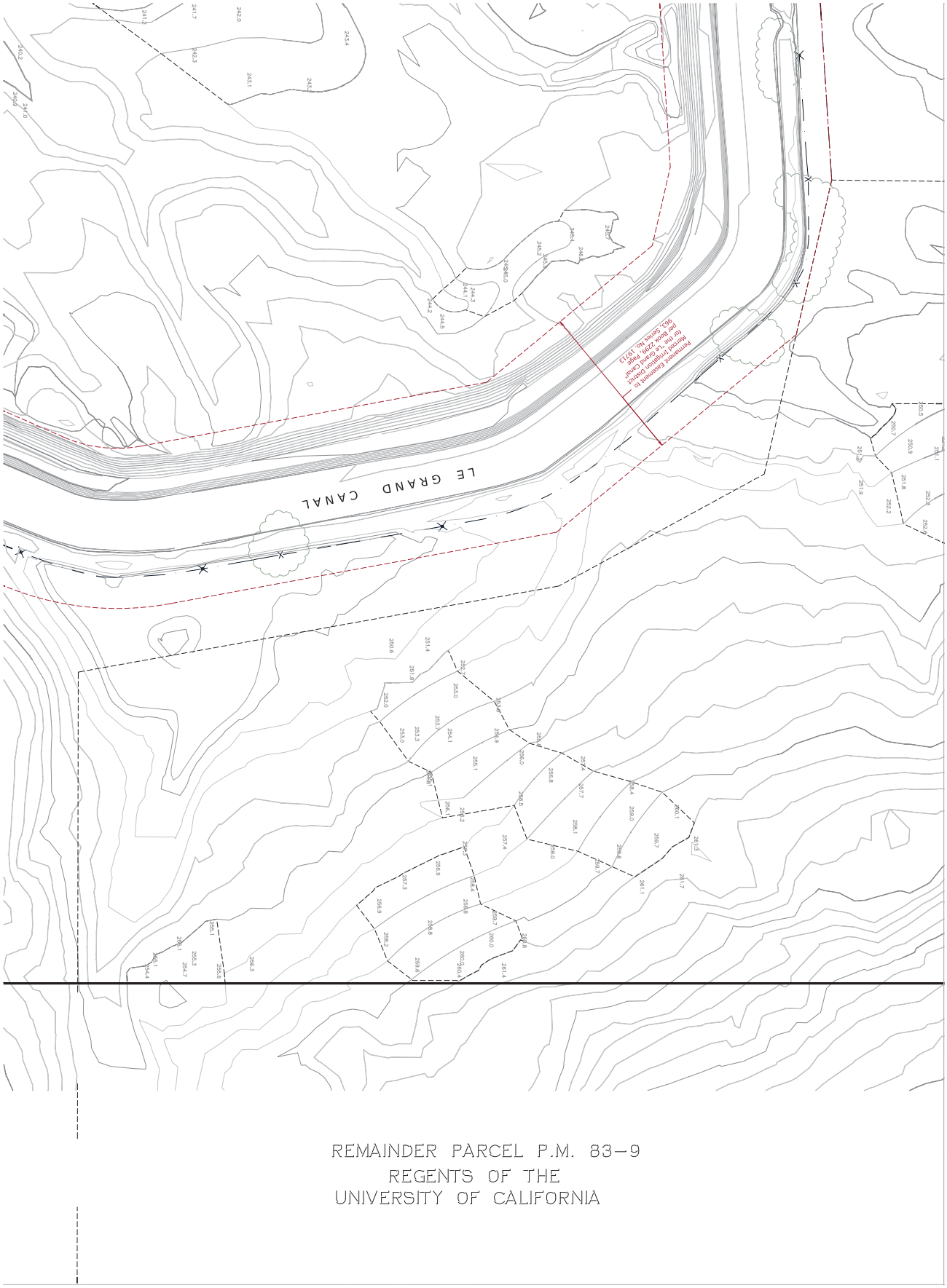
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FT.
(IN FEET)
40 0 20 40

W-S-E-N



SHEET 30 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.cta-ae.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

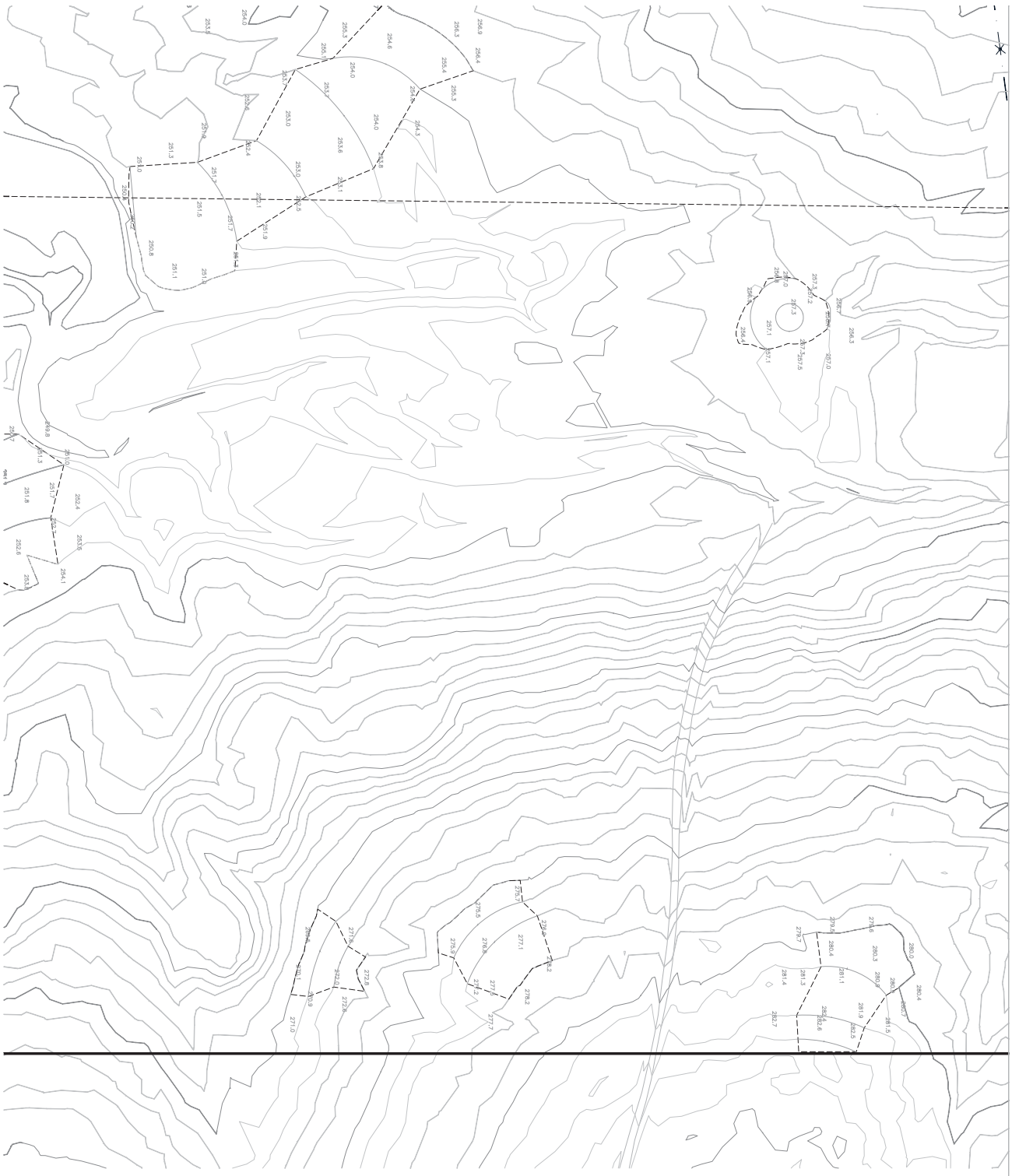
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

W-cta-E
S N



REMAINDER PARCEL P.M. 83-9
REGENTS OF THE
UNIVERSITY OF CALIFORNIA

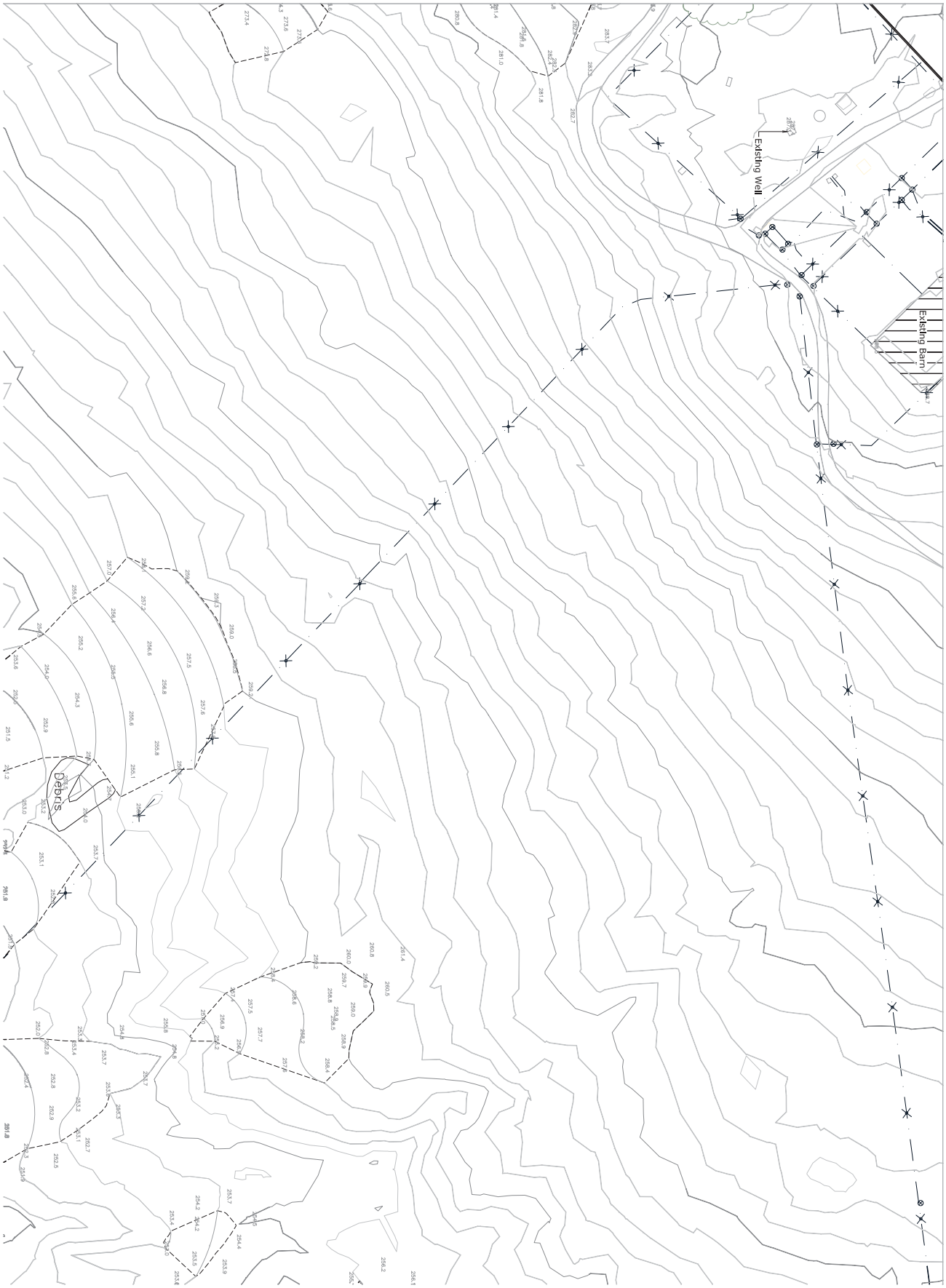
SHEET 31 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mallard Circle, Rancho Cordova, CA 95742
T (916) 638-0919 • F (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 inch = 40 ft.
40 0 20 40
W E S N



SHEET 32 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Mission Oaks Blvd., Rancho Cordova, CA 95742
T: (916) 638-0919 • F: (916) 638-4479 • www.ctaeng.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

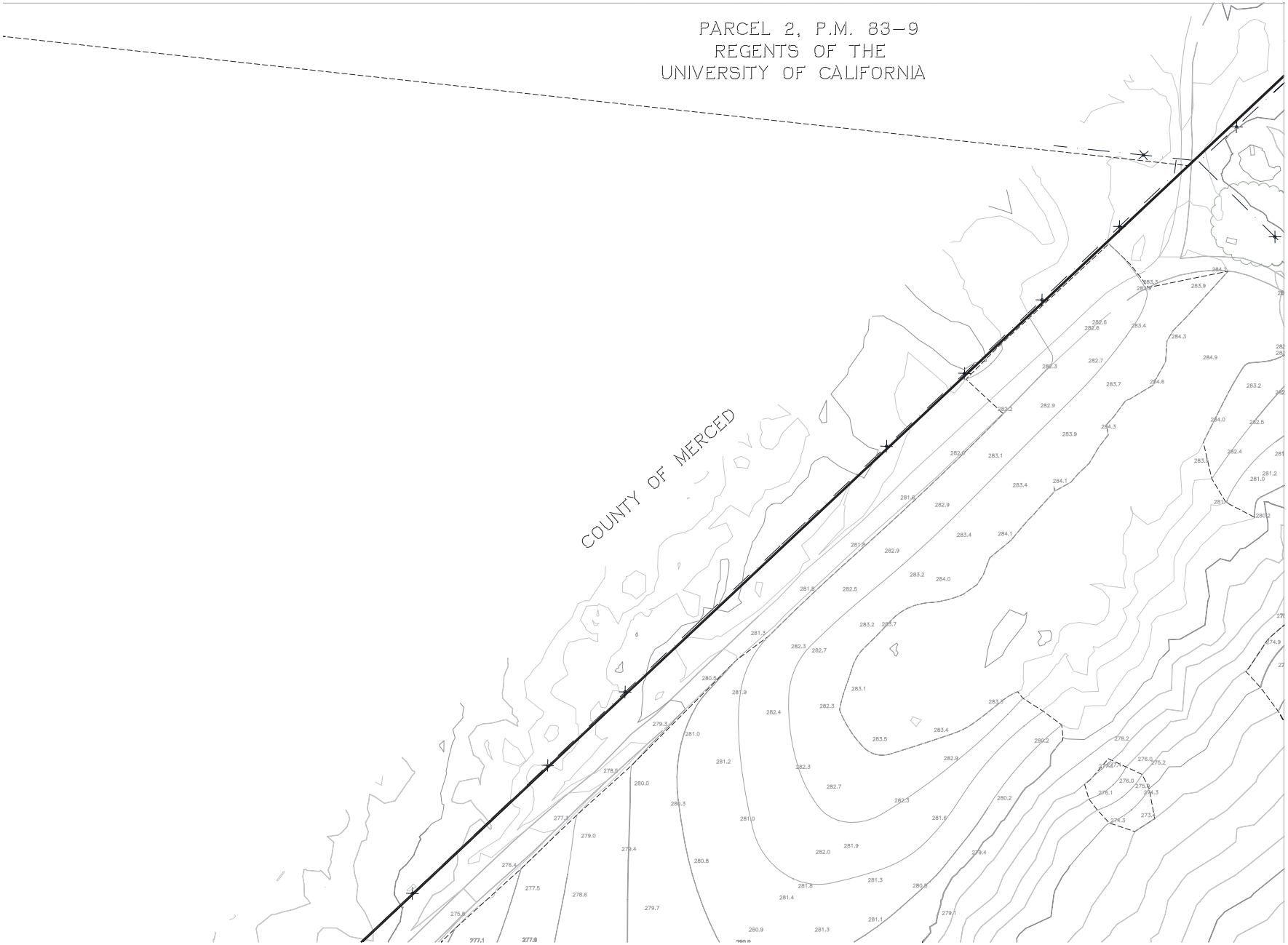
A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

GRAPHIC SCALE
1 INCH = 40 FEET
40 0 20 40

N



N

W-cta-E

S

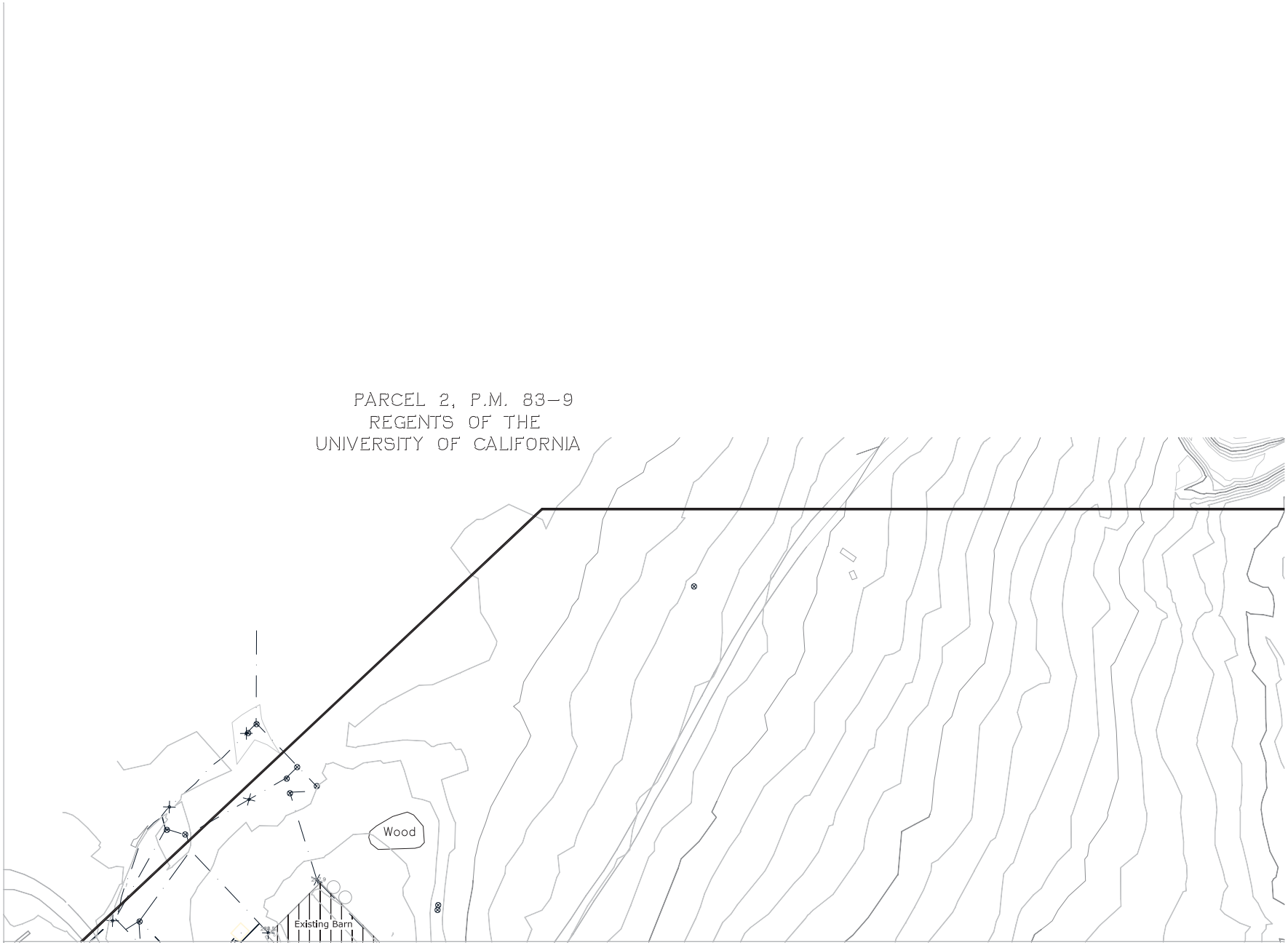
40 0 20 40

(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3205 Mariposa Street, Ramona Gardens, CA 95742
T: 916.638.0400 • F: 916.638.0479 • www.cta.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

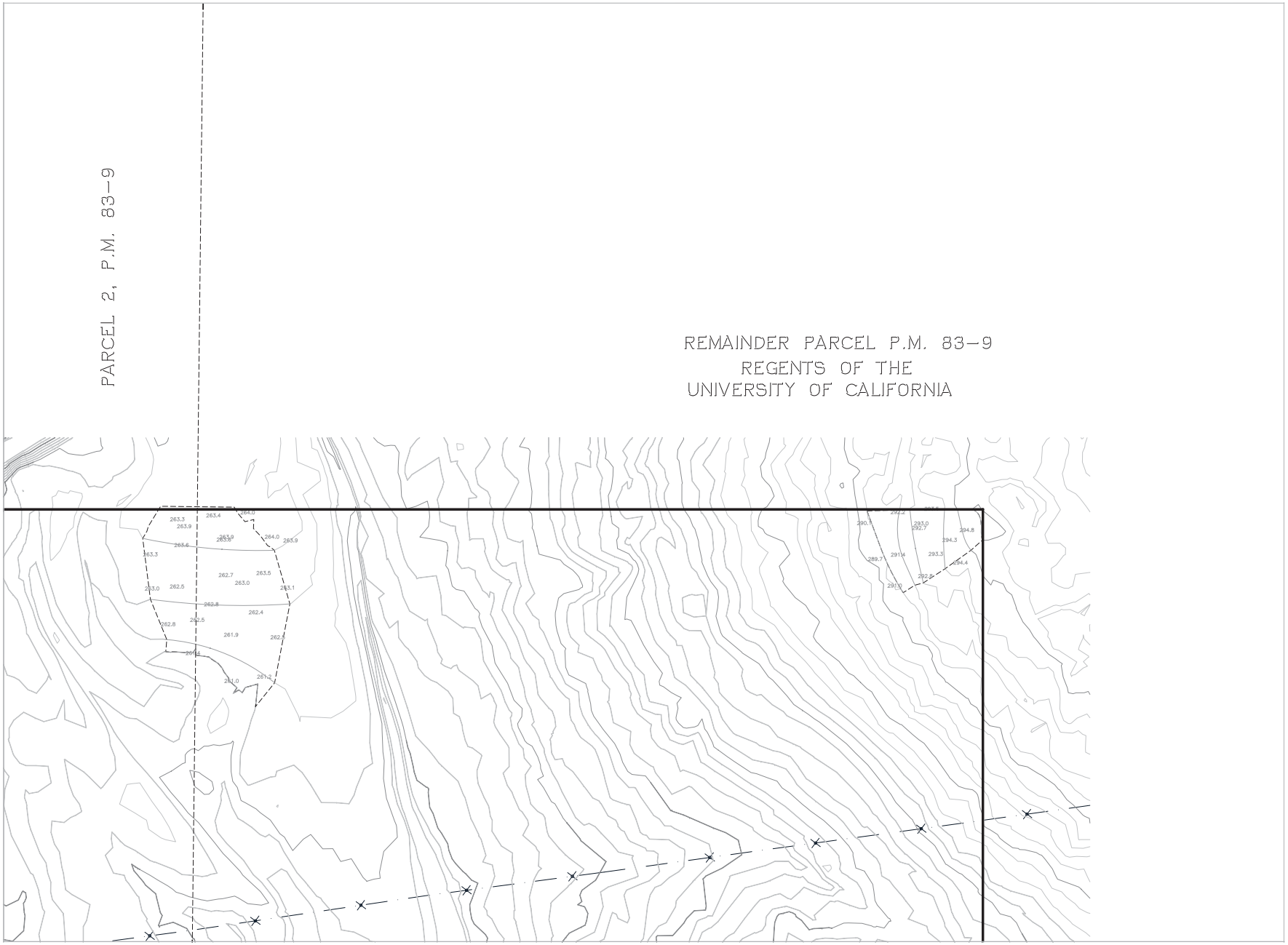


N
W-cta-E
S
40 0 20 40
(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3205 Mariner Circle, Rancho Cordova, CA 95742
T: 916.638.6100 • F: 916.638.6179 • www.cta-ae.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

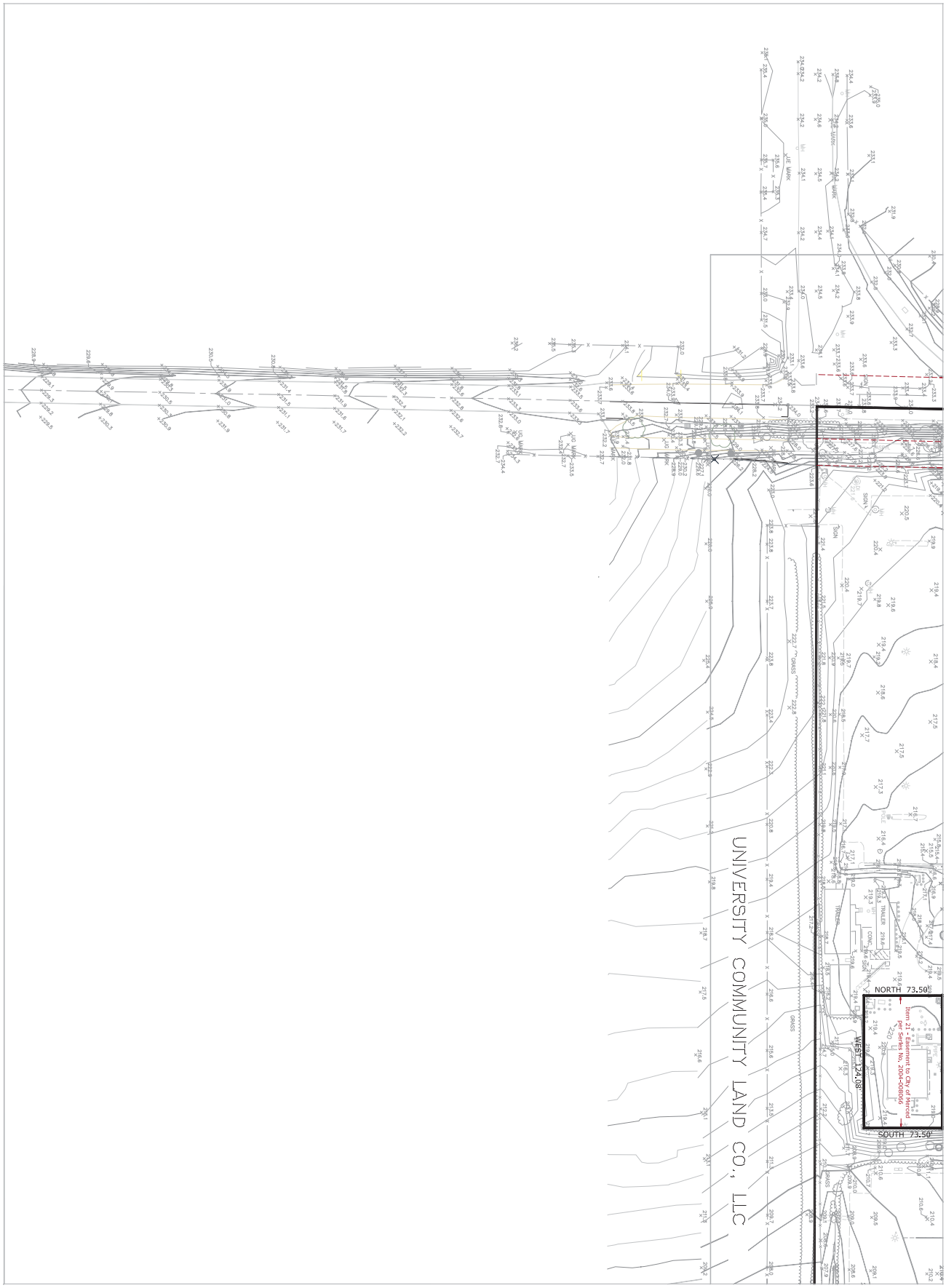


N
W-cta-E
S
40 0 20 40
(IN FEET)
1 inch = 40 ft.
GRAPHIC SCALE

A.L.T.A./A.C.S.M. Land Title Survey
UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY
A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12
County of Merced, State of California

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3205 Mariner Circle, Rancho Cordova, CA 95742
T 916.638.6100 • F 916.638.6119 • www.cta-ae.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION



SHEET 36 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeng.net

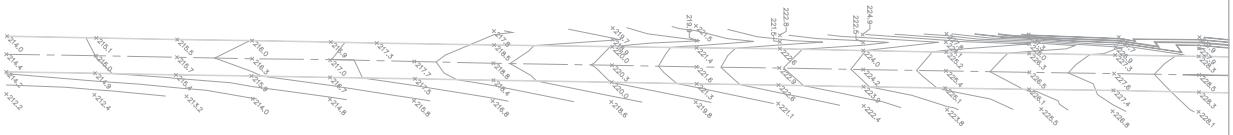
SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California



SHEET 37 OF 37

cta Engineering & Surveying
Civil Engineering • Land Surveying • Land Planning
3233 Monier Circle, Rancho Cordova, CA 95742
T (916) 638-6919 • F (916) 638-6479 • www.ctaeu.net

SEE SHEET 1 OF 37 FOR LEGEND, NOTES, LEGAL DESCRIPTION, BASIS OF BEARINGS AND SURVEYOR'S CERTIFICATION

A.L.T.A./A.C.S.M. Land Title Survey

UNIVERSITY OF CALIFORNIA, MERCED

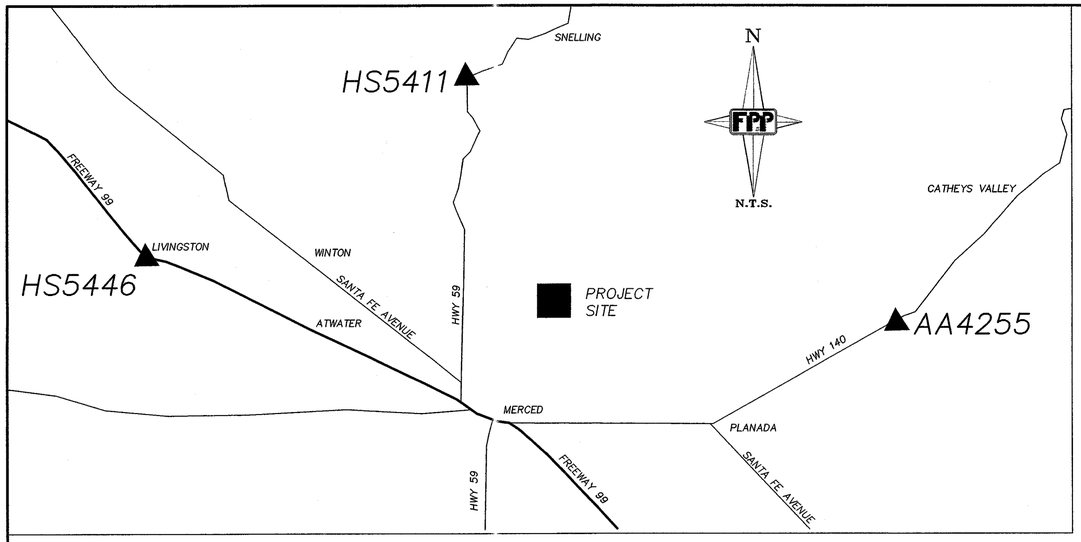
2015 REGENTS CAMPUS AREA SURVEY

A Portion of Sections 26, 34 & 35, Township 6 South, Range 14 East, M.D.M., being a portion of Parcels 1, 2, 3 & the Remainder of Book 83, Parcel Maps, Pages 9-12

County of Merced, State of California

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
40 0 20 40

W-cta-E
S
N



CONTROL DIAGRAM

CONTROL POINTS COORDINATES & ELEVATIONS

POINT #	NORTHING		EASTING		ELEVATION	COMBINED SCALING FACTOR	CONVERGENCE ANGLE
6	1953975.87	(1953975.892 B)	6587560.22	(6587560.184 B)	252.06'(252.145'B)	0.99994509	+0 03 16.4
7	1953977.84	(1953977.830 B)	6586882.56	(6586882.505 B)	236.30'(236.374'B)	0.99994584	+0 03 11.2
12	1954042.59	(1954042.630 B)	6581418.13	(6581418.141 B)	221.48'(221.484'B)	0.99994653	+0 02 29.8
13	1954395.84	(1954395.840 B)	6581425.21	(6581425.256 B)	230.96'(231.045'B)	0.99994596	+0 02 29.8
14	1955055.06	(1955055.078 B)	6581436.51	(6581436.537 B)	232.31'(232.375'B)	0.99994568	+0 02 29.9
15	1955144.72	(1955144.729 B)	6581826.85	(6581826.881 B)	233.95'(234.012'B)	0.99994558	+0 02 32.9
16	1955449.33	(1955449.370 B)	6582487.77	(6582487.768 B)	238.38'(238.451'B)	0.99994527	+0 02 37.9
17	1955914.58	(1955914.598 B)	6582913.15	(6582913.147 B)	247.46'(247.566'B)	0.99994468	+0 02 41.1
18	1956554.77	(1956554.791 B)	6583864.79	(6583864.799 B)	259.37'(258.505'B)	0.99994390	+0 02 48.4
19	1954722.08	(1954722.094 B)	6581857.27	(6581857.297 B)	226.04'(226.073'B)	0.99994609	+0 02 33.1
20	1954784.79	(1954784.800 B)	6582583.63	(6582583.641 B)	223.37'(223.417'B)	0.99994620	+0 02 38.6
21	1955195.35	(1955191.786 B)	6582721.18	(6582723.005 B)	230.03'(229.034'B)	0.99994574	+0 02 39.7
22	1955303.55	(1955303.576 B)	6583210.96	(6583210.987 B)	240.56'(240.556'B)	0.99994521	+0 02 43.4
23	1955443.69	(1955443.666 B)	6583525.36	(6583525.327 B)	239.68'(239.784'B)	0.99994520	+0 02 45.8
24	1955668.79	(1955668.808 B)	6583508.46	(6583508.425 B)	252.86'(252.995'B)	0.99994449	+0 02 45.6
25A	1956195.16		6584148.92		254.90'	0.99994423	+0 02 50.5
26	1955853.17	(1955853.189 B)	6583262.81	(6583262.782 B)	254.75'(254.858'B)	0.99994435	+0 02 43.8
27	1956315.97	(1956316.018 B)	6583558.69	(6583558.678 B)	255.59'(255.737'B)	0.99994416	+0 02 46.0
28	1954176.21	(1954176.218 B)	6581971.24	(6581971.280 B)	218.74'(218.738'B)	0.99994662	+0 02 34.0
29	1955016.11	(1955016.090 B)	6583553.16	(6583553.144 B)	220.23'(220.389'B)	0.99994627	+0 02 46.0
30	1955393.29	(1955393.296 B)	6584224.59	(6584224.569 B)	244.84'(244.942'B)	0.99994497	+0 02 51.1
31	1955798.83	(1955798.856 B)	6583975.90	(6583975.904 B)	249.27'(249.390'B)	0.99994463	+0 02 49.2
31A	1955840.69		6584473.19		254.06'	0.99994439	+0 02 53.0
32	1955840.37	(1955840.402 B)	6584507.17	(6584507.142 B)	253.55'(253.672'B)	0.99994441	+0 02 53.2
33	1956354.67	(1956354.697 B)	6584824.50	(6584824.479 B)	253.52'(253.653'B)	0.99994425	+0 02 55.6
34	1955988.81	(1955988.848 B)	6585343.21	(6585343.173 B)	221.21'(221.320'B)	0.99994591	+0 02 59.6
35	1956672.32	(1956672.301 B)	6585870.18	(6585870.148 B)	225.35'(225.507'B)	0.99994549	+0 03 03.6
36	1957569.38	(1957569.394 B)	6586871.80	(6586871.782 B)	242.92'(243.161'B)	0.99994437	+0 03 11.2
37	1953984.25	(1953984.238 B)	6584641.71	(6584641.722 B)	218.49'(218.575'B)	0.99994669	+0 02 54.2
38	1957191.87		6584511.70		272.63'	0.99994307	+0 02 53.3
39	1956859.85		6584881.02		274.97'	0.99994306	+0 02 56.1
40	1955054.06		6585209.08		235.03'	0.99994555	+0 02 58.5
41	1954822.83		6586076.17		246.75'	0.99994507	+0 03 05.1
AA4255	1947143.823 &(A)		6642878.603 &(A)		367.63' &(A)	0.99994182	+0 10 15.7
HS5446	1963365.798 &(A)		6497437.201 &(A)		134.89' &(A)	0.99994785	−0 08 07.3
HS5411	2002196.304 &(A)		6561364.797 &(A)		206.45' &(A)	0.99993422	−0 00 02.3

NOTE: ALL COORDINATES SHOWN ON THIS MAP ARE CALIFORNIA STATE PLANE COORDINATES, ZONE 3. THE AVERAGE COMBINED SCALING FACTOR FOR POINTS 6 – 41 AS SHOWN, IS 0.99994511966. TO OBTAIN GROUND DISTANCE, DIVIDE THE GRID DISTANCE BY THE AVERAGE COMBINED SCALING FACTOR.

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM ZONE 3 (NAD 83) ZONE 3(A) AS CONSTRAINED BY N.G.S. STATIONS P.I.D. AA4255, HS5446 AND HS5411 SHOWN BELOW FROM (A):

PID	DESIGNATION	NORTHING	EASTING
AA4255	1 JD 365	1947143.823	6642878.603
HS5446	LIVINGSTON RESET	1963365.798	6497437.201
HS5411	HPGN CA 10 03	2002196.340	6561364.797

LEGEND

- ● MONUMENT FOUND AS DESCRIBED(B)
- ○ MONUMENT SET AS DESCRIBED.
- (A) REFERENCE DATA
- M. C. R. MERCED COUNTY RECORDS

PURPOSE OF SURVEY

THE PURPOSE OF THE AMENDED SURVEY IS TO REVISE THE "RECORD OF SURVEY" 54 R.S. 15, M.C.R. SHOWING A PORTION OF THE EXISTING SURVEY CONTROL ON CAMPUS, TO THE SAME EPOCH AS "RECORD OF SURVEY"(A) AND ADD 6 CONTROL POINTS IN NEW CONSTRUCTION AREAS AND TO CONFIRM ACCURACY OF EXISTING CONTROL.

SURVEY PROCEDURES

HORIZONTAL POSITIONS WERE ESTABLISHED BY GLOBAL POSITIONING SYSTEM (GPS) FAST STATIC METHODS. THE SURVEY WAS CONSTRAINED BY HOLDING THE POSITIONS OF NATIONAL GEODETIC SURVEY MONUMENTS, "1 JD 365"(AA4255), "LIVINGSTON RESET"(HS5446) AND "HPGN CA 10 03"(HS5411). DIGITAL LEVELING METHODS WERE USED FOR ALL VERTICAL POSITIONS OF CONTROL POINTS ON CAMPUS.

BENCHMARK

THE ELEVATIONS SHOWN ON THIS MAP ARE BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988. THE BENCHMARK USED FOR THIS SURVEY IS:

NATIONAL GEODETIC SURVEY (NGS) BENCHMARK WITH THE DESIGNATION OF S–941 AND PERMANENT IDENTIFICATION DESIGNATION (PID) OF HS1234 WITH AN NAVD88 ELEVATION (ORTHOMETIC HEIGHT) = 232.20'
BRASS DISK ON CONCRETE MONUMENT NEAR THE NORTHWEST INTERSECTION OF BELLEVUE ROAD AND LAKE ROAD.

MONUMENTS FOUND AS SHOWN ON (B)

POINT 29 IS A 3 1/4" BRASS DISK AS SHOWN BELOW SET IN CONCRETE AND EPOXY CEMENTED IN PLACE. ALL OTHER EXISTING MONUMENTS ARE 3/4" X 30" LONG IRON PIPE WITH A 3 1/4" BRASS DISK AS SHOWN BELOW IN A 6" CONCRETE CASING AND ALLOY CASE AND COVER SET IN CONCRETE.

UNIVERSITY OF CALIFORNIA SURVEY CONTROL 2011
△ ##
LS 8225
MERCED

MONUMENTS SET

POINT 25A IS A 3 1/4" BRASS DISK AS SHOWN BELOW SET IN CONCRETE AND EPOXY CEMENTED IN PLACE FLUSH WITH THE SURFACE. ALL OTHER SET MONUMENTS ARE 2" INSIDE DIAMETER X 30" LONG GALVANIZED IRON PIPE WITH A 3 1/4" BRASS DISK AS SHOWN BELOW SET IN CONCRETE AND COVERED WITH AN ALUMINUM CASE AND COVER SET IN CONCRETE.

UNIVERSITY OF CALIFORNIA SURVEY CONTROL
2014
△ ##
LS 7621
MERCED

REFERENCES

(A) RECORD OF SURVEY, 37 R.S. 23, M.C.R.
(B) RECORD OF SURVEY, 49 R.S. 30, M.C.R.

SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE LAND SURVEYOR'S ACT AT THE REQUEST OF THE UNIVERSITY OF CALIFORNIA, MERCED CAMPUS. IN SEPTEMBER 2014.

DAVID D. HEINRICHS, L.S. 7621
DATE 7/7/2015

LICENSED LAND SURVEYOR
DAVID D. HEINRICHS
No. 7621
STATE OF CALIFORNIA

COUNTY SURVEYOR'S STATEMENT

THIS MAP HAS BEEN EXAMINED IN ACCORDANCE WITH SECTION 8766 OF THE LAND SURVEYOR'S ACT THIS ____ DAY OF _____, 20__.

BY_____
J. STEVEN REICHMUTH L.S. 4895
COUNTY SURVEYOR

LICENSED LAND SURVEYOR
J. STEVEN REICHMUTH
No. 4895
STATE OF CALIFORNIA

RECORDER'S STATEMENT

FILED THIS _____ DAY OF _____, 20____, AT _____.M.

IN BOOK _____ OF RECORD OF SURVEYS AT PAGE _____,

AT THE REQUEST OF UNIVERSITY OF CALIFORNIA, MERCED CAMPUS.

INSTRUMENT # _____

FEE _____

BARBARA J. LEVEY
COUNTY RECORDER

BY:_____
DEPUTY

AMENDED

RECORD OF SURVEY FOR UNIVERSITY OF CALIFORNIA MERCED CAMPUS

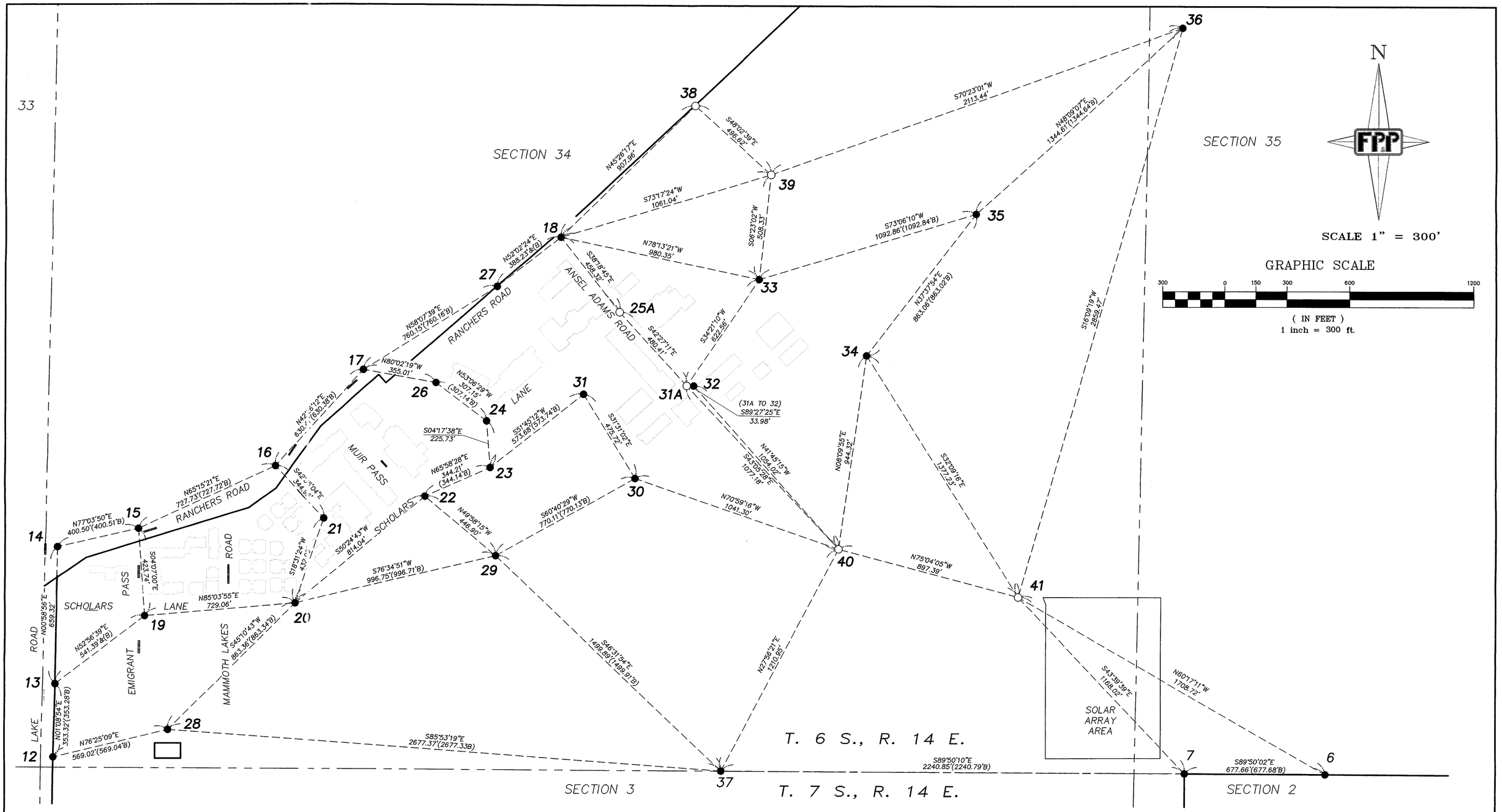
BEING AN AMENDED SURVEY TO ADJUST COORDINATES FROM "RECORD OF SURVEY" RECORDED IN BOOK 54 OF RECORD OF SURVEYS PAGES 15 AND 16 TO MATCH THE HPGN CONTROL AS SHOWN ON "RECORD OF SURVEY" RECORDED IN BOOK 49 OF RECORD OF SURVEYS PAGES 30 & 31, MERCED COUNTY RECORDS AND ADD 6 CONTROL POINTS TO THE ALREADY ESTABLISHED CONTROL

SECTIONS 34 & 35 T.6 S., R. 14 E., M.D.B.& M.
MERCED COUNTY, CALIFORNIA

FPP & Est. 1950
A Quad Knopf Company Est. 1972
2816 Park Avenue
Merced, CA 95348–3375
Tel: (209) 723–2066
Fax: (209) 723–0957
Engineering · Planning
Biology · Surveying
Landscape Architecture
Small Business Enterprise

BOOK
PAGE

140256–A



AMENDED

RECORD OF SURVEY
FOR
UNIVERSITY OF CALIFORNIA MERCED CAMPUS

BEING AN AMENDED SURVEY TO ADJUST COORDINATES FROM "RECORD OF SURVEY" RECORDED IN BOOK 54 OF RECORD OF SURVEYS PAGES 15 AND 16 TO MATCH THE HPGN CONTROL AS SHOWN ON "RECORD OF SURVEY" RECORDED IN BOOK 49 OF RECORD OF SURVEYS PAGES 30 & 31, MERCED COUNTY RECORDS AND ADD 6 CONTROL POINTS TO THE ALREADY ESTABLISHED CONTROL

SECTIONS 34 & 35 T.6 S., R. 14 E., M.D.B.& M.

MERCED COUNTY, CALIFORNIA

FPP Est. 1950
A Quad Knopf Company Est. 1972

2816 Park Avenue
Merced, CA 95348-3375
Tel: (209) 723-2066
Fax: (209) 723-0957

Engineering · Planning
Biology · Surveying
Landscape Architecture
Small Business Enterprise

BOOK

PAGE

SHEET 2 OF 2

140256

Recorded at the Request of
and Return To:

Engineering Department
Merced Irrigation District
744 West 20th Street
P.O. Box 2288
Merced, CA 95344

CONSTRUCTION AND EASEMENT AGREEMENT

This CONSTRUCTION AND EASEMENT AGREEMENT (herein "AGREEMENT") is made this day of _____ , 2016, by and between the MERCED IRRIGATION DISTRICT an irrigation district existing by virtue of the laws of the State of California, whose address is 744 W. 20th Street, Merced, California 95340 hereinafter called the "MID" or "District", and the REGENTS OF THE UNIVERSITY OF CALIFORNIA, on behalf of the Merced campus (hereinafter designated and called "Owner").

RECITALS

WHEREAS, the UC Merced campus was built between two existing MID canals, the Fairfield Canal ("Fairfield") and the LeGrand Canal ("LeGrand"). The canals originate from Lake Yosemite north of UC Merced and are used primarily for irrigation water conveyance as well as for flood control operation. The canals are constructed within earthen embankments. The Fairfield runs east out of Lake Yosemite, then southeast through the campus before turning south. The LeGrand currently borders on the northeast edge of the campus.

WHEREAS, MID possesses a 150 foot right-of-way easement, being 75 feet on each side of the existing centerline of both the Fairfield and LeGrand canals, each of which is described in more detail as follows:

LEGRAND CANAL

An earthen channel within a 150-foot wide easement, being 75-feet on each side of the existing centerline of said canal, as described in that certain "Memorandum of Agreement to Exchange Easements and for the Delivery of Water" filed for record October 7, 1981 in Volume 2299 of Official Records, at Page 963, Merced County Records; lying in a portion of Section 34 and Section 35, Township 6 South, Range 14 East, M.D.B. & M.

FAIRFIELD CANAL

An earthen channel within a 150-foot wide easement, being 75-feet on each side of the existing centerline of said canal, as described in that certain "Memorandum of Agreement to Exchange Easements and for the Delivery of Water" filed for record October 7, 1981 in Volume 2299 of Official Records, at Page 963, Merced County Records, lying in a portion of Section 34, Township 6 South, Range 14 East, M.D.B. & M.

WHEREAS, MID possesses a 110 foot right-of-way easement and penstock which is described in the

more detail as follows:

PAPAZIAN POWER PLANT PENSTOCK

An 8-foot 6 inch underground pipeline assembly within a 110-foot wide easement and approximately 750-feet long, as described in that certain "Memorandum of Agreement to Exchange Easements and for the Delivery of Water" filed for record October 7, 1981 in Volume 2299 of Official Records, at Page 963, Merced County Records, lying in a portion of Section 34, Township 6 South, Range 14 East, M.D.B. & M.

WHEREAS, Owner plans to expand the UC Merced campus capacity to accommodate 10,000 students as part of the "UC Merced 2020 Project" ("2020 Project") in accordance with its UC Merced Long Range Development Plan. The 2020 Project will build along LeGrand without crossing it or encroaching into the District's right-of-way.

WHEREAS, Owner anticipates entering into an agreement with a Developer ("Developer") to design and construct the 2020 Project. As part of the construction of the 2020 Project, the Owner and Developer may desire to modify MID facilities by either constructing an underground pipe assembly(ies) to underground and/or re-route portions of the Fairfield, or alternatively, abandon portions of the Fairfield Canal and expand the LeGrand Canal's conveyance capacity and construct a new pipeline assembly to serve the same purposes as the abandoned portions of the Fairfield. These options for MID facility modifications would provide the Owner greater flexibility regarding their development plans associated with the 2020 Project.

WHEREAS, in order to accommodate the possible MID facility modifications, MID is willing to quitclaim to the Owner its existing easements for that portion of the existing Fairfield that is shown in the Exhibits attached to Section III herein for the option constructed and accepted by MID, and in exchange Owner is willing to convey to MID an easement in the new location for the reconfigured alignment. The final width/location of the easement required by MID will depend on which infrastructure option Owner chooses (see section III.A).

WHEREAS, Owner and MID agree that Owner may choose any one of the options described in Section III herein and that once Owner chooses a particular option, Owner will implement that option consistent with the terms of this Agreement assuming Owner proceeds with development of the 2020 Project.

WHEREAS, MID consents to the Owner's development of its 2020 Project consistent with the description of the 2020 Project in this agreement, said consent being conditioned upon the Owner's agreement to the terms and conditions set forth herein such as installation of the underground pipe assemblies, including control structures and other appurtenances and conveyance of easements consistent with replacement Option selected by Owner.

WHEREAS, the MID and Owner agree that the time periods set forth herein to review, comment and approve proposed construction plans are appropriate and essential to timely construction of improvements associated with 2020 Project.

WHEREAS, the MID and Owner agree that if Owner selects Option 1, the No Change Option, improvements must be constructed to mitigate safety issues related to the energy dissipater (commonly known as the "chute") on the Fairfield Canal. Owner agrees to grant MID any required easements associated with the above described safety improvements to the Fairfield Canal.

WHEREAS, Owner and MID acknowledge that Owner's Developer may propose bridges/culverts/ driveways/ crossings ("driveway crossings") that cross either the Fairfield or LeGrand canals, and that

timely submission of proposed plans for driveway crossings by Owner or its Developer and timely review of any such proposed driveway crossings is essential to development of the 2020 Project. Any proposed driveway crossings approved as described herein will be included as supplements to this Agreement, as discussed below.

NOW, THEREFORE, in consideration of the mutual promises and agreements herein after set forth, the Owner and the MID do hereby mutually agree as follows:

AGREEMENT

The recitals hereto are true and correct and are incorporated into the body of this Agreement as though set forth in full.

I. AGREEMENT BINDING ON SUCCESSORS IN INTEREST

This Agreement is an instrument affecting the title or possession of the real property described herein. All the terms, covenants and conditions herein imposed shall be an interest of the Owner and MID, and upon the subsequent sale or division of the property described herein the terms of this Agreement shall apply and the owner or owners of said property or parcel or any part thereof shall succeed and be bound by the obligations imposed on the parties by this Agreement.

II. STORM DRAINAGE AND FLOOD CONTROL USE OF SUBJECT LATERAL

Owner specifically agrees and represents to MID that Owner acknowledges and understands that the Fairfield and LeGrand Canals subject to this Agreement serve a vital and important function as a storm drainage and flood control facility for the runoff of natural and artificial waters. Use of the waterway as such is therefore continuous and year round and particularly important during the non-irrigation season when rains are heaviest.

Owner therefore agrees to conduct all work hereunder in a manner so as not to interfere with the use of said canals as a drainage and flood control channel and agrees to indemnify and save the MID harmless as set forth in Section VIII, hereunder, for all such liability to which the MID might become liable by virtue of the work of Owner as set forth herein.

III. MID IMPROVEMENTS

A. Owner agrees to select one of the options below and as shown in attached Exhibits for development of its 2020 Project, and if any of Options 2 through 5 are selected, following approval of the construction plans by MID, and issuance of a Notice to Proceed by Owner, Owner agrees to construct the option selected on the property described herein, and as shown on Exhibit "A", attached hereto and made a part hereof, in the manner set forth in this Agreement. Note that pipeline assemblies include necessary structures, controls and other appurtenances:

1. (Option 1) Leave the Fairfield Canal as-is. No change to the Fairfield Canal or its route through the campus will be made. Improvements must be constructed to mitigate safety issues related to the energy dissipater (commonly known as the "chute") on the Fairfield Canal. Owner will provide MID with any required easements associated with the above described safety improvements to the Fairfield Canal.

2. (Option 2) Underground and Reroute Portions of the Fairfield Canal on UC Property.

Owner will construct a 96 inch concrete pipeline assembly constructed between campus entry point along Ranchers Road, to an energy dissipater downstream of the current hydro plant outflow. The energy dissipater shall be capable of reducing exit velocities to the Fairfield to 1 foot-per-second (fps) at 700 cubic feet per second (cfs) flow rate. The pipeline assembly(ies) shall include transition structures with automated trash racks and appropriate safety appurtenances. MID will quitclaim to Owner its interest in the existing 150 foot ROW easement applicable to the portion of the Fairfield Canal that is abandoned and Owner will grant MID a fifty (50) foot easement and an additional 16-feet on either side of pipeline structures for the new pipeline assembly. If the depth from top of ground to top of pipe is greater than 5-feet, than an extra 1.5 feet shall be added to the easement width for every foot of cover over 5-feet. Owner will also grant to MID an additional 30 foot easement (along the left bank) for the entire portion of the Le Grand on UC property.

3. (Option 3) Underground and Re-Route Portions of the Fairfield Canal on UC Property. Owner will design and construct a 96 inch concrete pipeline assembly between campus entry point along Ranchers Road, to an energy dissipater downstream of the current hydro plant outflow. The energy dissipater shall be capable of reducing exit velocities to the Fairfield to 1 foot-per-second (fps) at 700 cubic feet per second (cfs) flow rate. Owner will also construct a pipeline assembly (size and configuration to be determined) from the discharge of the hydro plant to the new energy dissipater. The pipeline assembly(ies) shall include transition structures with automated trash racks and appropriate safety appurtenances. MID will quitclaim to Owner its interest in the existing 150 foot Fairfield Canal easement applicable to the portion of the Fairfield Canal that is abandoned. For the new Fairfield Canal pipeline assembly, Owner will grant MID a fifty (50) foot easement and an additional 16-feet on either side of pipeline structures for the new pipeline assembly. If the depth from top of ground to top of pipe is greater than 5-feet, than an extra 1.5 feet shall be added to the easement width for every foot of cover over 5-feet. Owner will also grant an additional 30 foot easement along the left bank of the Le Grand Canal through Owner's property.

4. (Option 4) Quitclaim Portion of Fairfield Canal and deepen/widen portion of Le Grand. The portion of Fairfield Canal between campus entry point and the Papazian hydroelectric plant will be quitclaimed to Owner by MID. Owner will design and construct a 50 foot widening of the LeGrand Canal from the campus entry point to a newly constructed pipeline between Le Grand Canal and Fairfield Canal. Owner will design and construct an appropriately sized pipeline assembly that will connect and discharge up to 700 cfs back into the Fairfield, including a new energy dissipater capable of reducing exit velocities to the Fairfield to 1 foot-per-second (fps) at 700 cubic feet per second (cfs) flow rate, as shown on Option 4. The pipeline assembly(ies) shall include transition structures with automated trash racks and appropriate safety appurtenances. Owner will modify the headworks of the LeGrand Canal by lowering the head structure to be at the same elevation as the Fairfield Canal headworks structure (approximately 4-feet lowering). MID will quitclaim the area encompassed by the abandoned Fairfield Canal. Owner will grant MID an additional 50 foot easement on the left bank of the LeGrand Canal from the campus entry point to newly constructed pipeline between Le Grand Canal and Fairfield Canal and an additional 30 foot easement (along the left bank) for remaining segments of existing Le Grand Canal on UC property. Owner will grant a fifty (50) foot easement and an additional 16-feet on either side of pipeline structures for the

new pipeline assembly. If the depth from top of ground to top of pipe is greater than 5-feet, than an extra 1.5 feet shall be added to the easement width for every foot of cover over 5-feet for the pipeline between Le Grand Canal and Fairfield Canal.

5. (Reconfiguration Option 5) Quitclaim Portion of Fairfield Canal, widen portion of LeGrand, and Construct a New Pipeline Assembly from the LeGrand Canal to the Fairfield Canal. Owner will widen the portion of the LeGrand between the campus entry point to a newly constructed pipeline between Le Grand Canal and Fairfield Canal. Owner will design and construct an appropriately sized pipeline assembly that will connect and discharge up to 700 cfs back into the Fairfield, including a new energy dissipater capable of reducing exit velocities to the Fairfield to 1 foot-per-second (fps) at 700 cubic feet per second (cfs) flow rate. Owner will modify the headworks of the Le Grand Canal by lowering the head structure to be at the same elevation as the Fairfield Canal headworks structure (approximately 4-feet lowering). The canal flow line shall be lowered and sloped in order for water to flow by gravity southeasterly. The pipeline assembly(ies) shall include transition structures with automated trash racks and appropriate safety appurtenances. Owner will grant MID an additional 50 foot easement on the left bank of the Le Grand Canal from the campus entry point to newly constructed pipeline between Le Grand Canal and Fairfield Canal and an additional 30 foot easement (along the left bank) for remaining segments of existing Le Grand Canal on UC property. MID will quitclaim its 150-foot easement associated with the abandoned portion of the Fairfield between the campus entry point and the Penstock. Owner will grant a 35-foot easement for the 72-inch pipeline assembly between the Le Grand Canal and Fairfield Canal.

B. Owner shall provide said improvements at Owner's sole expense prior to any subsequent property divisions, subdivisions or splits of said property, or sale of any parcel of said property or the whole of said property.

C. An on-site pre-construction meeting between MID representatives and the construction manager/contractor, and the Owner if deemed necessary, shall take place not less than 2 working days and not more than 10 working days prior to the commencement of construction. Owner, or construction manager, shall notify MID at least 2 working days prior to said meeting.

D. All construction shall be according to the standards and specifications of the MID, as shown on the attached Exhibit "B". Owner and its Developer shall comply with MID Policy Regarding Urban Encroachments attached hereto as Exhibit "C".

E. MID and Owner will cooperate with each other to obtain any required permits for construction of any improvements.

F. No trees or vines shall be planted or grown, or permanent fences or structures placed on or over any Merced Irrigation District easements without the prior express written consent of the Merced Irrigation District. Owner shall have the right to use the land that overlays the pipeline easements granted herein by Owner for roads, parking lots, moveable temporary structures, and low-lying shrubs. The granted easement shall state that in the event MID performs work within its ROW, the UC is responsible for restoring its own improvements over the pipeline.

IV. PERFORMANCE OF THE IMPROVEMENTS

Owner shall cause, at Owner's expense, design and construction plans and specifications for the canal-related improvements authorized herein to be prepared by competent persons legally qualified and licensed by the State of California to prepare the plans and specifications. Owner shall submit to MID Canal-Related Work plans and specifications, including all submittal information required by MID as set forth in Exhibit "D", a minimum of 90 calendar days prior to commencement of construction and shall pay all review, study, map and inspection fees, including those of MID, and obtain MID's approval prior to commencement of the Canal-Related Work. MID will review and comment on the proposed plans within twenty (20) calendar days of receipt of the complete application and within ten (10) calendar days for any resubmittals. The work shall be done in accordance with MID Standards in effect at the time said improvements are proposed. Canal-Related Work undertaken between March 1 and October 31 of any given year shall not encroach into existing MID embankments, levees, or rights-of-way without the express written approval of the MID Engineer. The preparation of the design and constructions plans and specifications and the construction of the improvements authorized in this Agreement shall together be defined as the "Canal-Related Work".

Owner shall notify the MID at least 2 working days prior to the start of any Canal-Related Work, and 2 working days prior to the re-start of any Canal-Related Work after any work stoppages. MID shall also be notified a minimum of 2 working days prior to all Canal-Related Work scheduled on a holiday or weekend (phone: 209-722-5761). In no event will any Canal-Related Work of said improvements interfere with the delivery or drainage of water by the MID, or be done between February 1st and October 31st.

In the event that Owner or Developer obtains MID approval of plans and specifications for an improvement authorized by this Agreement and commences construction of that improvement, Owner or Developer shall use reasonable efforts to complete construction of that improvement. In the event that Owner or Developer fails to complete construction of the approved improvement within the time period set forth in the approved plans and specifications, MID shall provide written notice to Owner that the improvement has not been completed with the approved time period. Owner shall then have sixty (60) days to resume construction and thereafter complete the improvement. If Owner does not resume construction within the sixty (60) day time period, MID may, at its option, do the Canal-Related Work and collect all the costs from Owner of said real property. Permission to enter onto the property of Owner is granted to MID or its contractors, assigns, and agents as may be necessary to construct such improvements, provided that if the MID retains a contractor or subcontractor to perform any or all of the work necessary to construct or finish Owner improvements, MID shall require said contractor or subcontractor to, at all times during the performance of the work done by MID's contractor or subcontractor and for all periods for which liability insurance for the work hereunder may exist, general liability insurance that will fully protect the Owner against claims of any and all persons for personal injury, death or property damage in the combined single limit of Two Million Five Hundred Thousand Dollars ($2,500,000), Comprehensive Automobile insurance in the sum of Two Million Five Hundred Thousand Dollars ($2,500,000), and Workers' Compensation in the sum of One Million Dollars ($1,000,000). The policy or policies of liability insurance shall be subject to approval by the Owner, which shall not be unreasonably withheld. The insurance policy will not be canceled or reduced without ten (10) days prior written notice to the Owner.

Owner and its Developer may commence construction of the Canal-Related Work upon approval of the construction plans by MID and at any time thereafter consistent within the time periods set forth herein. MID will, within forty-five (45) calendar days accept the Canal-Related Work constructed by Owner or its Developer upon completion of the Canal-Related Work consistent with the approved plans, completion of any punch list items set forth in writing by MID and written approval of such items by MID which approval shall not be unreasonably withheld, and submission of record documents prepared in compliance with MID standard specifications. Upon acceptance of the Canal-Related Work improvements to MID's facilities by MID, MID will assume ownership of and responsibility for maintenance of the Canal-Related Work

improvements and Owner and Developer shall be released from any maintenance or liability obligations associated with the Canal-Related Work improvements.

As Owner is a self-insured agency of the State of California, the necessity for Owner to secure a payment bond and a performance bond is waived. However, Owner shall require its Developer to secure a payment bond and performance bond, said bonds will cover all of the Canal-Related Work authorized herein.

Pursuant to California Civil Code Section 9554, said payment bond must be in a sum not less than one hundred percent (100%) of the total contract price for the completion of the Canal-Related Work authorized herein and to be constructed based on the MID approved construction plans; however, a larger payment bond that applies to more aspects of the entire 2020 Project is acceptable, so long as such larger payment bond specifically includes the Canal-Related Work authorized herein. Owner shall require its Developer to name MID as a beneficiary under said payment bond, but only as to the portion of said bond that covers the Canal-Related Work authorized herein. Further, any payment bond secured by Developer must satisfy all other requirements specified in Civil Code Section 9554.

In addition, Owner shall require its Developer to secure a performance bond in an amount of at least one hundred percent (100%) of total contract price for the completion of the Canal-Related Work authorized herein; however, a larger performance bond that applies to entire 2020 Project is acceptable, so long as such larger performance bond specifically includes the Canal-Related Work authorized herein. Owner shall require its Developer to name MID as a beneficiary under said performance bond, but only as to the portion of said bond that covers the Canal-Related Work authorized herein.

Upon satisfactory completion of the Canal-Related Work authorized herein and acceptance of the Canal-Related Work by MID, MID will release the Developer from any bonding obligations that it holds and shall sign any documents necessary to effectuate the release of those obligations. Owner and MID understand and agree that MID's release of any bonding obligations pursuant to the terms of this Agreement shall have no effect on the payment and performance bonds applicable to the other portions of the 2020 Project and that MID's authority to release bonding obligations is expressly limited to those portions of the payment and performance bonds that apply to the Canal-Related Work authorized herein.

All bonds will be executed by an admitted surety insurer in accordance with applicable law and acceptable to the Owner and MID.

V. REVIEW OF REQUIREMENTS

If Owner disagrees with the requirements set forth in any notice to commence installation of Canal-Related Work improvements, Owner shall, within ten (10) days of the date the notice was mailed, request a review of the requirements by the Merced Irrigation District Board of Directors. The review will occur no later than the next regular meeting of the Board of Directors occurring a minimum of five (5) days after Owner request the review. The decision of the Merced Irrigation District Board of Directors shall be final, but subject to review pursuant to California CCP Section 1085 or 1094.5.

VI. EASEMENTS

Upon selection of an Option set forth in Section III above by Owner and prior to commencement of

construction, Owner will prepare and submit to MID draft easement conveyance documents which shall be subject to approval as to form by the General Counsel of MID, which approval shall not be unreasonably withheld or delayed. The easement conveyance and quitclaim documents and the escrow instructions shall be in substantial compliance with the form documents included in Exhibit "E", attached hereto. The parties shall establish an escrow to process and record the easement documents. The costs of the escrow shall be shared by the parties with the exception of title insurance which shall be paid for by the party seeking title insurance. The easements and quitclaim deeds shall be executed and submitted into escrow prior to acceptance of the improvements by MID.

VII. INSURANCE

Owner shall, or shall cause Developer to, procure and maintain, at all times during the performance of the Canal-Related Work called for herein, insurance policies that meet the following minimum requirements:

Minimum Scope of Insurance, or an equivalent program of self-insurance:

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001 04 02 or equivalent.)
2. Insurance Services Office Business Automobile Policy or equivalent.
3. Employer's Liability insurance and Workers' Compensation insurance as required by the State of California.
4. Builders All Risk, Completed Value Form.

Minimum Limits of Insurance, or an equivalent program of self-insurance:

Owner shall, or shall cause Developer to, maintain limits no less than:

1. General Liability: **$2,000,000** per occurrence for bodily injury, personal injury, and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit. The limits of liability may be satisfied by a combination of primary and excess policies.
2. Automobile Liability: **$2,500,000** per accident for bodily injury and property damage.
3. Employer's Liability: **$1,000,000** per accident for bodily injury or disease.

Other Insurance Provisions:

The general liability and automobile policies shall contain, or shall be endorsed to contain, the following provisions:

1. The MID, its officers, officials, employees, agents and volunteers are to be covered as additional insured as respects: liability arising out of activities performed by or on behalf of the Owner, products and completed operations of the Owner; premises owned, occupied or used by the Owner; or automobiles owned, leased, hired or borrowed by the Owner, but only in proportion to and to the extent that such liability is caused by or results from the negligent or intentional acts or omissions of Owner, its officers, employees or agents.
2. For any claims related to this project, the Owner insurance shall be primary insurance as respects the MID, its officers, officials, employees, agents or volunteers, but only in proportion to

and to the extent that such liability is caused by or results from negligent or intentional acts or omissions of Owner, its officers, employees or agents.

3. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the MID, its officers, officials, employees, agents or volunteers.

4. The Owner's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

Builders All Risk policy shall contain the following provision: The insurer shall waive all rights of subrogation against the MID.

Verification of Coverage:

Owner shall furnish the MID with certificates of coverage and endorsements effecting coverage required by this clause. All documents are to be received and approved by the MID prior to the commencement of work. The MID reserves the right to request original policies.

Subcontractors:

A. Owner shall include all contractors or subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each contractor or subcontractor involved in the project.

B. No cancellation provision in any insurance policy shall be construed in degradation of the continuous duty of Owner to furnish insurance during the term of this Agreement. At least thirty (30) days prior to the expiration of any such policy, a signed complete certificate of insurance, with all endorsements required by Section VI. Insurance, of this Agreement, showing that such coverage has been renewed or extended shall be filed by Owner with the MID.

C. Owner or its contractors shall be solely liable for and shall pay all deductible amounts provided for in said policies of insurance and for any self-insured amounts of such policies as maintained by Owner.

VIII. INDEMNITY

The Owner shall assume the defense and indemnity and save harmless the MID, its officers, agents and employees, from every expense, liability, claim, demand or payment by reason of injury, including death, to persons or damage to property suffered through any act or omission, including passive negligence or acts of negligence, or both, or willful misconduct of the Owner, its officers, or employees, or anyone directly or indirectly employed by them, or arising in any way from the Canal-Related Work or bridges/culverts/driveways/crossings authorized by this Agreement, on any part of the premises, or the performance or nonperformance of the work, but only in proportion to and to the extent such liability, loss, expense, attorney's fees or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of Owner's officers, employees, or agents . The Owner shall also include in its contract with any Developer retained by Owner that the Developer and its contractors assume the defense and indemnity and save harmless the MID, its officers, agents and employees, from every expense, liability, claim, demand or payment by reason of injury, including death, to persons or damage to property suffered through any act or omission, including passive negligence or acts of negligence, or both, or willful misconduct of the Developer or contractor, or their officers, or employees, or anyone directly or indirectly employed by them, or arising in any way from the Canal-Related Work or bridges/culverts/driveways/crossings authorized by this Agreement, on any part of the premises, or the performance or nonperformance of the work, but only in proportion to and to the extent such liability, loss, expense, attorney's fees or claims for injury or damages are caused by or result from the negligent or

intentional acts or omissions of Developer or its contractor's officers, employees, or agents. This indemnity shall not apply to damages from the sole negligence or willful misconduct of the MID or its agents, servants or independent contractors who are directly responsible to the MID.

MID shall indemnify, hold harmless and defend Owner and its officers, directors, agents, assignees and employees from every expense, liability, claim, demand or payment by reason of injury, including death, to persons or damage to property suffered arising from the willful misconduct or negligence of MID or its agents, officers, servants or employees, in the performance of this Agreement, but only in proportion to and to the extent such liability, loss, expense, attorney's fees or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of MID's officers, employees, contractors or agents.

IX. ATTORNEY'S FEES

In the event of any action, legal or equitable, by either party hereto to enforce the within Agreement or any of its provisions, the prevailing party shall be allowed a reasonable attorney's fee to be fixed by the Court and their costs in said action.

X. NOTICES

Except as otherwise expressly provided by law, any and all notices or other communications required or permitted by this agreement or by law to be served on or given to any party hereto by any other party hereto shall be in writing and shall be deemed duly served and given when personally delivered to the party to whom they are directed, or in lieu of such personal service, when deposited in United States mail, first class postage prepaid, addressed as follows:

Merced Irrigation District
Name/Title
744 West 20th Street
P. O. Box 2288
Merced, CA 95344-0288

University of California, Merced
Attn: Vice Chancellor for Administration
5200 North Lake Road
P.O. Box 2039
Merced, CA 95344

X. BRIDGE/CULVERTS/DRIVEWAY/ CROSSING OF CANAL

Owner or its Developer may propose bridges/culverts /driveway/ crossings (hereinafter referred to as driveway crossing) that cross either the Fairfield or LeGrand canals by submitting a "supplement" request to this agreement. The supplement shall include a figure and written description that describes in general terms what type of driveway crossing is being proposed and shows the precise location of said bridge. Upon approval of the driveway crossing design drawings by MID, the supplement will be included and amended to this Agreement.

Owner agrees to and does hereby assume any and all liability for any damage that may be sustained or suffered by the MID, Owner, and others as a direct result of the installation and/or operation by Owner of the driveway crossing herein above mentioned.

Owner agrees to indemnify the MID and will save the MID free, clear and harmless from any and all

damages, claims, demands, liability, costs and expenses, including legal fees and costs, regardless of nature, that may be sustained, caused or suffered by the MID as a result of the construction, maintenance, use or operation of the said driveway crossing, but only in proportion to and to the extent such liability, loss, expense, attorney's fees or claims for injury or damages are caused by or result from the negligent or intentional acts or omissions of Owner's officers, employees, or agents including but not limited to the Developer. This indemnity shall not apply to damages from the sole negligence or willful misconduct of the MID or its agents, servants or independent contractors who are directly responsible to the MID.

Owner further agrees that he/she will, at his/her own expense and without any expense to the MID, install, keep, and properly maintain at all times said driveway crossing. Whenever performing any maintenance within MID's Right of Way the Owner must contact MID Water Resources Engineering Department staff at least 2 working days prior to the start of any work for approval.

The design load capacity for the bridge shall be permanently fixed to the bridge where it will be visible for vehicles/equipment which may be traveling across. The bottom of the bridge deck shall not encroach within 1 Foot of the high water mark.

Said improvements, works, construction and installation will conform to the terms of this Agreement, and to the Standard Details 501, 251, and 551 of the MID, as shown in Exhibit "B", attached hereto and made a part hereof, and will be inspected and approved in the field by MID. Owner shall contact the MID Engineering Department staff at least 2 working days prior to commencement of the installation of said driveway crossing.

Construction between March 1 and October 31, of any given year shall not encroach into existing MID embankments, levees, or rights-of-way without the express written approval of the MID Engineer.

The permission herein given by the MID creates in Owner no interest of any nature in the real property subject hereto, the property of the MID or otherwise. If at any time the purpose and needs of the MID so dictate, the MID may relocate the improvements of Owner as herein set forth at no cost to UC.

The application and approval process for bridge crossings shall be the same as the process for construction of Canal-Related Work improvements as set forth in Section IV herein. Provided that the proposed bridge(s) comply with the applicable MID Standards for bridge crossings, MID will approve the proposed bridge(s) subject to all terms and conditions of this Agreement.

XI. AMENDMENTS

The provisions of this Agreement may be waived, altered, amended, or repealed, in whole or in part, only on the written consent of all parties to this Agreement.

XII. APPLICABLE LAW

This Agreement and all matters relating to it shall be governed by the laws of the State of California and any action brought relating to this Agreement shall be held exclusively in a state court in the County of Merced.

XII. AUTHORITY TO SIGN

Each person signing this Agreement warrants and represents that, to the extent he or she is executing

this Agreement for and on behalf of an entity, he or she has been fully empowered and properly authorized to execute this Agreement for and on behalf of said entity and instructed by those having the requisite authority to cause said entity to make and enter into this Agreement.

IN WITNESS WHEREOF, Owner has executed this Agreement as of: _____

OWNER:

By: _____

Janet Napolitano, President

Regents of the University of California

IN WITNESS WHEREOF, the MID has executed this Agreement as of: _____

MERCED IRRIGATION DISTRICT

By: _____
Bryan Kelly, Deputy General Manager, Water Resources

Exhibit "A"

Options

Exhibit "B"

MID Standards and Specifications

The following Merced Irrigation District standard details are by reference made a part of this Agreement and are on file at the office of the Merced Irrigation District Engineering Department (MID Job No. 15-____)

Exhibit "C"

MID Policy Regarding Urban Encroachments

Exhibit "D"

MID Plan Submittal Requirements

Exhibit "E"

Quitclaim and Form Easements

RECORDING REQUESTED BY
AND WHEN RECORDED RETURN TO:

Engineering Department
Merced Irrigation District
744 West 20th Street
P.O. Box 2288
Merced, California 95344-0288

Recorded in Official Records, Merced County
KENT B. CHRISTENSEN
Merced County Recorder

2/18/2011
12:53 PM
RE04

MID MERCED IRRIGATION DIST G

Doc#: 2011-005962

Titles: 1 Pages: 8

Fees	0.00
Taxes	0.00
Other	0.00
PAID	$0.00

NON-EXCLUSIVE CROSSING AGREEMENT

This NON-EXCLUSIVE CROSSING AGREEMENT, (herein "Agreement"), made and entered into this 18 day of February, 2011, by and between The Regents of the University of California, on behalf of its Merced campus, whose address is 5200 North Lake Road, Merced, CA 95343 (hereinafter designated and called "University"), and MERCED IRRIGATION DISTRICT, an irrigation district existing by virtue of the laws of the State of California, whose address is 744 West 20th Street, Merced, California, 95344, (hereinafter "District").

WITNESSETH:

WHEREAS, University desires to obtain permission of the District to install and maintain one crossing over the District's Papazian Powerplant easement, for the purpose of a roadway over the improvements of the MID described as follows and at the location as set forth below and shown on Exhibit "A" attached hereto and incorporated herein, namely a pipeline assembly (penstock) within the following:

PAPAZIAN POWERPLANT

a 110-foot wide easement as delineated in that certain "Memorandum of Agreement to Exchange Easements and for Delivery of Water" filed for record October 7, 1981 in Volume 2299 of Official Records, Page 963, Merced County Records; all lying in the Southeast Quarter of Section 34, Township 6 South, Range 14 East, Mount Diablo Base and Meridian. Said easement contains a 102-inch diameter concrete pipeline assembly (penstock).

The location of said proposed roadway crossing shall cross said existing District penstock approximately 130 foot downstream of the head of the penstock at the Le Grand Canal, lying in a

portion of the Southeast Quarter of Section 34, Township 6 South, Range 14 East, Mount Diablo Base & Meridian (APN 052-300-026 and a portion of 052-300-024).

WHEREAS, the District is willing to grant said permission;

NOW, THEREFORE, IT IS AGREED AS FOLLOWS:

1. The recitals hereto are true and correct and are incorporated into the body of this agreement as though set forth in full.

2. The University shall defend, indemnify and hold District, its officers, employees and agents harmless from and against any and all liability, loss, expense (including reasonable attorney's fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorney's fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omission of the University, its officers, employees, agents or invitees.

3. Should University damage the property of the District during the use of the District's facilities described herein, University shall repair, cause to be repaired, or pay for repairs necessary to remedy the damage, at no cost to MID.

4. University further agrees that it will, at its own expense and without any expense to the District, install, keep and properly maintain said roadway crossing at all times.

5. In consideration of the promises, covenants and agreements herein set forth and required to be kept and performed by the University, the District hereby grants to the University permission and consent to install the following improvements for said crossing:

1. Construct a road and concrete bridging structure and appurtenances as shown on the plans in Exhibit "B" entitled UNIVERSITY OF CALIFORNIA MERCED, NORTH BOWL PARKING LOT PHASE 1.

Said improvements shall be installed as described herein, and as shown on Exhibit "B", attached hereto and made a part hereof. Crossing the District pipeline at approximately 130 feet downstream of the head of the pipeline at the Le Grand Canal, lying in a portion of the Southeast Quarter of Section 34, Township 6 South, Range 14 East, Mount Diablo Base & Meridian (APN 052-300-026 and a portion of 052-300-024).

6. At any time the purposes and needs of the District so require, the District may, without claim of damage or loss by the University, relocate the improvements of University as herein set forth. Said relocations if necessary, will be entirely at the expense of the University. District shall not relocate the improvements more than one time.

7. All improvements, works, construction and installations as herein contemplated shall be completed before **March 1, 2012** or this agreement shall be terminated. No work or maintenance shall encroach into the District embankments, levees, or right-of-ways between March 1 and October 31 without express written approval of the District Engineer. Said improvement works, construction and installation will conform to the terms of this agreement, to the standards of the District, and will be inspected and approved in the field by District. University shall contact the District Engineering Department staff at least 2 working days prior to commencement of the installation of said driveway crossing. All construction shall be completed in a manner such that it will not affect the District operation or maintenance.

8. University agrees to pay to the District the following amount:

(a) $300.00 non-refundable for engineering and administrative costs associated with the preparation and filing of this agreement.

9. It is understood and agreed that this agreement and each and all of the provisions herein shall be binding upon owner, his executors, administrators, heirs and assigns and any person or persons claiming through or under University, and the District.

10. In the event of any action, legal or equitable, by either party hereto to enforce the within agreement or any of its provisions,. the prevailing party shall be allowed reasonable attorney's fees to be fixed by the Court and their costs in said action.

11. Termination. The License shall commence upon execution and shall continue until terminated. This agreement may be terminated by mutual agreement of both parties. Upon termination the University shall restore the property, in so far as possible to the condition in which it existed prior to the installation of said roadway crossing.

****

IN WITNESS WHEREOF, University has executed this agreement as of February 7, 2011.

UNIVERSITY: The Regents of the University of California

By: Mary Miller
Mary Miller
Vice Chancellor for Administration

IN WITNESS WHEREOF, the District has executed this agreement as of 2-18-11

MERCED IRRIGATION DISTRICT

By: John Sweigard
John Sweigard
General Manager

2-7-11
ATTACHED ACKNOWLEDGMENT KM

ACKNOWLEDGMENT

State of California
County of Merced)

On February 7, 2011 before me, Karole Morgan, Notary
(insert name and title of the officer)

personally appeared Mary Miller, VC Admin,
who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/t~~hey~~ executed the same in ~~his~~/her/t~~heir~~ authorized capacity~~(ies)~~, and that by ~~his~~/her/t~~heir~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

KAROLE MORGAN
COMM. #1753198
NOTARY PUBLIC • CALIFORNIA
MERCED COUNTY
Comm. Exp. JUNE 25, 2011

Signature Karole Morgan (Seal)

STATE OF CALIFORNIA }
COUNTY OF MERCED }ss

On February 18, 2011, before me, CRYSTAL M. ALVES, NOTARY PUBLIC, personally appeared JOHN SWEIGARD, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person or entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Crystal M. Alves
Notary Public signature

-OPTIONAL-

The below is not required by law, however it may prove valuable could prevent fraudulent removal and reattachment of this form to another document.

Description of Notarized Document

Title or Type of Document: Non-Exclusive Crossing Agreement

Document Date: February 18, 2011 Number of Pages

Exhibit "A"

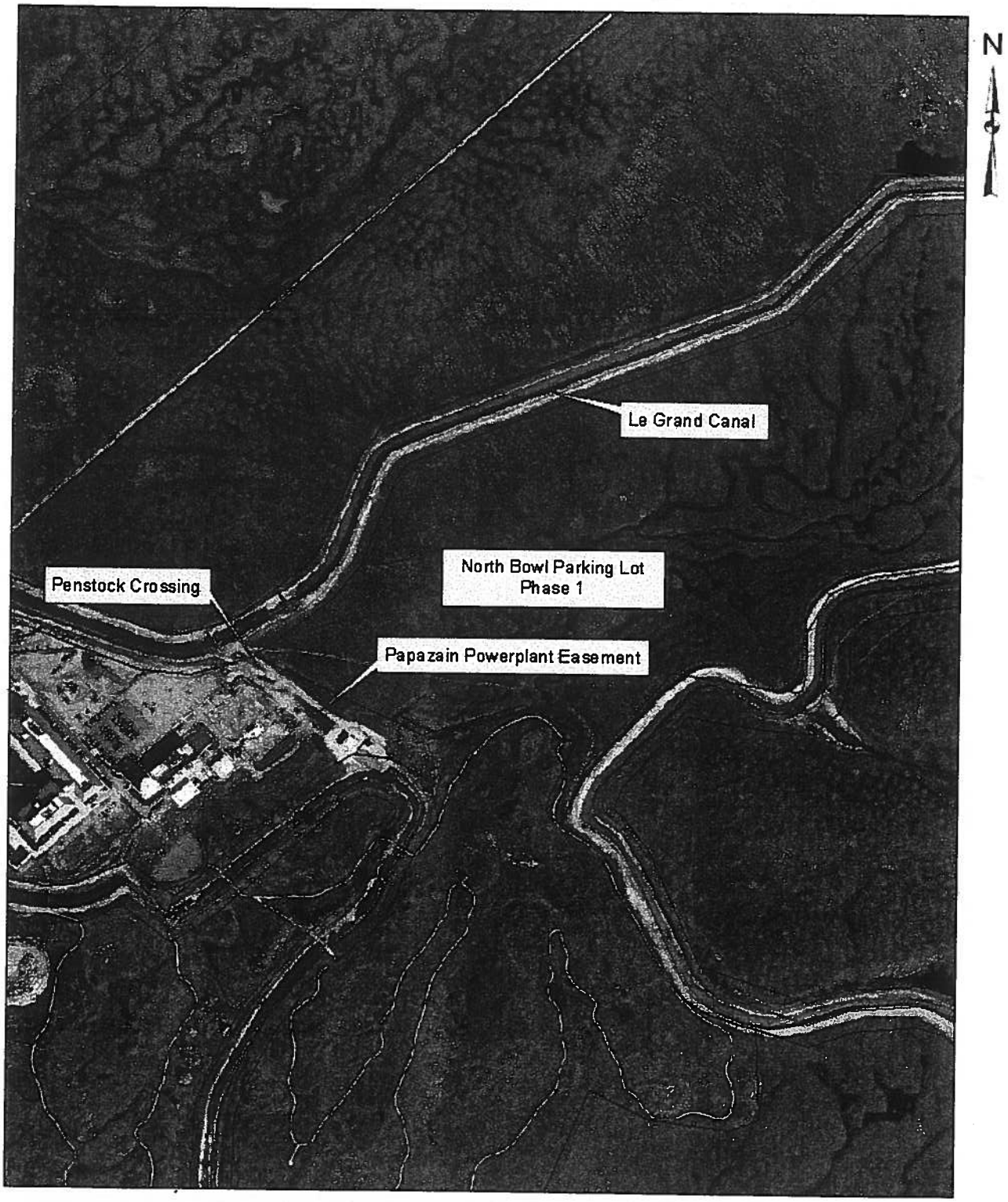

N
Le Grand Canal
North Bowl Parking Lot
Phase 1
Penstock Crossing
Papazain Powerplant Easement

Exhibit "B"

PLANS AND SPECIFICATIONS

The proposed District Engineer approved improvements related to District facilities are shown on the plans and specifications entitled:

UNIVERSITY OF CALIFORNIA, MERCED
NORTH BOWL PARKING LOT
PHASE 1

Dated: **11/3/2010**

Revised:

Prepared by:

SEIGFREID ENGINEERING
3244 BROOKSIDE ROAD, SUITE 100
STOCKTON CALIFORNIA 95219

Including any addendum reviewed and approved by the Merced Irrigation District's Engineer and/or the District's Appointee.

Recorded at the Request of
and Return to:

Engineering Department
Merced Irrigation District
744 West 20th Street
P. O. Box 2288
Merced, California 95344

Recorded In Official Records,
Merced County
Doc#: 2009 – 049425
10/13/2009 10:42 AM

NON-EXCLUSIVE PIPELINE
LICENSE AGREEMENT

This NON-EXCLUSIVE PIPELINE LICENSE AGREEMENT, (herein "Agreement"), made and entered into this 7th day of October, 2009, by and between The Regents of the University of California, on behalf of its Merced campus, whose address is 5200 North Lake Road, Merced, CA 95343 (hereinafter designated and called "University"), and MERCED IRRIGATION DISTRICT, an irrigation district existing by virtue of the laws of the State of California, whose address is 744 West 20th Street, Merced, California, 95344, (hereinafter "District").

RECITAL

WHEREAS, the University desires to obtain permission of the District for University or its contractors to install transmission lines for the purpose of transporting solar generated electricity under the District's Papazian Powerplant penstock.

WHEREAS, there shall be two transmission lines crossing the improvements of the District described as follows, and at the location as set forth on Exhibit "A" attached hereto and incorporated herein, namely:

PAPAZIAN POWERPLANT PENSTOCK

an 8-foot 6-inch underground concrete pipeline assembly within a 110-foot wide easement as delineated in that certain Agreement to Exchange Easements and for Delivery of Water filed for record October 7, 1981 in Volume 2299 of Official Records, Page 963, Merced County Records; all lying in the Southeast One-quarter of Section 34, Township 6 South, Range 14 East, Mount Diablo Base and Meridian.

WHEREAS, said transmission lines shall cross the existing District penstock at approximately Engineer's Station 460+00 (as shown on the MID Fairfield Hydroelectric Project "As Built" drawing) all lying in the Southeast One-quarter of Section 34, Township 6 South, Range 14 East, Mount Diablo Base & Meridian (APN 052-300-022); and

WHEREAS, the District is willing to grant said permission.

NOW, THEREFORE, in consideration of the District's consent to said transmission line crossing upon the University's promises herein after set forth, the University and the District do hereby mutually agree as follows:

AGREEMENT

1. The recitals hereto are true and correct and are incorporated into the body of this Agreement as though set forth in full.

2. The University shall defend, indemnify and hold District, its officers, employees and agents harmless from and against any and all liability, loss, expense (including reasonable attorney's fees), or claims for injury or damages arising out of the performance of this Agreement but only in proportion to and to the extent such liability, loss, expense, attorney's fees, or claims for injury or damages are caused by or result from the negligent or intentional acts or omission of the University, its officers, employees, agents or invitees.

3. Should University damage the property of the District during the use of the District's facilities described herein, University shall repair, cause to be repaired, or pay for repairs necessary to remedy the damage, at no cost to MID.

4. MID has notified University of subterranean water movement in the locality of the project. Such activity may increase the movement with potential detriment to the proposed improvement and/or other University facilities. The University shall bear full monetary and logistic responsibilities towards such.

5. In no event shall the University's use of the District's property under this Agreement in any way unreasonably impact or interfere with the District's use of its own property to carry out the obligations and purposes of the District.

6. In consideration of the promises, covenants and agreements herein set forth and required to be kept and performed by the University, the District hereby grants to the University, on terms herein, a rent-free, non-exclusive license to enter upon and use that portion of District's land as depicted in Exhibit A ("License"), including the District's permission and consent to construct, install, use and maintain the following improvements for the transmission line crossings:

a. Install two 4-inch HDPE conduits, approximately 110 linear feet long.

b. Transmission line crossing shall be installed a minimum of ten feet below the bottom of the existing District's Papazian Powerplant penstock.

c. Two (8-inch by 24-inch) type "A" object markers attached to a standard 6-foot T-post. Object marker shall state: 1.) number, size and pipe material, 2.) type of utility 3.) Owner of utility and, 4.) emergency phone number, all according to the District's Standard Detail 592.

Said improvements shall be installed as described herein, according to the applicable portions of the District's Standard Details 501, 591, and 592 as shown on Exhibit "B" and on Exhibits "C" & "C-1" attached hereto and made a part hereof, all located at approximately Engineer's Station 460+00 of the Papazian Powerplant penstock in the Southeast One-quarter of Section 34, Township 6 South, Range 14 East, Mount Diablo Base & Meridian (APN 052-300-022).

7. The License shall commence upon execution and shall continue until October 31, 2029.

8. Construction between March 1 and October 31, of any given year shall not encroach into existing District embankments, levees, or rights-of-way along the District's Papazian Powerplant penstock without the express written approval of the District Engineer. Said improvement works, construction and installation will conform to the terms of this Agreement, to the standards of the District, and will be inspected and approved in the field by the District. The University shall contact the District's Water Resources Engineering Department staff at least 2 working days prior to commencement of the installation of said transmission line crossing. All construction shall be completed in a manner such that it will not affect the District's operation or maintenance.

9. The University, at its sole cost and expense, shall insure its activities in connection with this Agreement and obtain, keep in force and maintain insurance as follows:

a. General Liability Self-Insurance Program (contractual liability included) with minimum limits as follows:

1. Each Occurrence	$1,000,000
2. Products/Completed Operations Aggregate	$5,000,000
3. Personal and Advertising Injury	$1,000,000
4. General Aggregate	$5,000,000

b. Business Automobile Liability Self-Insurance Program for owned, non-owned, or hired automobiles with a combined single limit of not less than one million dollars ($1,000,000) per occurrence.

c. Workers' Compensation as required by California law.

d. Such other insurance in such amounts which from time to time may reasonably be required by the mutual agreement of the University and the District against other insurable hazards relating to this Agreement.

The coverage's referred to under a. and b. shall include the District as an additional insured. Such a provision shall apply only in proportion to and to the extent of the negligent acts or omissions of the University, its officers, agents, employees and invitees.

The coverage's required herein shall not limit the liability of the University.

10. No cancellation provision in any insurance policy shall be construed in degradation of the continuous duty of the University to furnish insurance during the term of this Agreement. A signed complete certificate of insurance showing the District as an additional insured, and with all endorsements required by this Agreement shall be submitted to the District prior to or concurrently with the execution of this Agreement. At least thirty (30) days prior to the expiration of any such policy, a signed complete certificate of insurance, with all endorsements required by this Agreement, showing that such insurance coverage has been renewed or extended shall be filed by the University with the District.

11. The University shall be solely liable for and shall pay any and all deductible amounts provided for in said policies of insurance and for self-insured amounts of such policies as maintained by University.

12. The University agrees to pay to the District a fee in the amount of $265.00 for a Non-Exclusive Pipeline License Agreement. Said fee is due at the time the Agreement is executed.

13. Should a dispute arise between the parties in the application and/or interpretation of this Agreement, the parties agree to attempt a good faith settlement of such dispute. The representative of the University shall initially be the Vice Chancellor for Administration and for the District, the General Manager. Either party may nominate a replacement representative by written notification to the other party.

14. It is understood and agreed that this Agreement and each and all of the provisions hereof shall be binding upon the University, their executors, administrators, heirs and assigns and any person or persons claiming through or under the University and the District.

15. At any time the purpose and needs of the District so dictate, the District may, without claim of damage or loss by the University, relocate the improvements of the University as herein set forth. Said relocation, if necessary, will be entirely at the expense of the University. District shall not relocate the improvements more than one time.

16. In the event of any action, legal or equitable, by either party hereto to enforce this Agreement or any of its provisions, the prevailing party shall be allowed a reasonable attorney's fees to be fixed by the Court and their costs in said action.

17. Upon termination of this Agreement, the property will be restored, in so far as possible, to the condition in which it existed prior to the installation of said transmission line crossing.

18. This Agreement may be terminated by either party upon the material breach of the other party, provided that the breaching party fails to cure the material breach after written notice of such material breach by a party to the other party setting forth the facts of the breach. The party alleged to have committed such material breach shall have not less than sixty (60) days to cure such breach. If such breach is cured this Agreement shall not terminate.

19. This Agreement may not be assigned by either party without the prior written consent of the other, which consent shall not be unreasonably withheld.

20. The failure of either party to exercise its rights hereunder or to defend such rights shall not constitute a waiver thereof.

21. Notices required hereunder shall be considered given when personally delivered or on the third day after deposit to the U.S. Mail first class postage prepaid to:

University: The University of California, Merced
Attn: Vice Chancellor for Administration
5200 North Lake Road
Merced, Ca. 95343

District: Merced Irrigation District
744 W. 20th Street
P.O. Box 2288
Merced, Ca. 95344

22. This License supersedes any and all prior understandings and agreements, whether written or oral, between the parties with respect to the subject matter of this License. No alteration or variation of this License shall be valid unless made in writing and signed by Licensor and Licensee.

IN WITNESS WHEROF, the Parties have caused these presents to be executed in duplicate by their respective officers previously duly authorized.

IN WITNESS WHEREOF, University has executed this Agreement as of: 10/2/09.

UNIVERSITY: The Regents of the University of California

By: Mary Miller
Mary Miller
Vice Chancellor for Administration

SEE ATTACHED ACKNOWLEDGMENT
Karol Morgan
10-2-09

IN WITNESS WHEREOF, the MID has executed this Agreement as of: 10-7-09.

MERCED IRRIGATION DISTRICT

By: Hicham ElTal
Hicham ElTal
ACTING ~~Interim~~ General Manager

APPROVED AS TO FORM
LLOYD C. LEE
UNIVERSITY COUNSEL OF THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

ACKNOWLEDGMENT

State of California
County of MERCED)

On 10-2-09 before me, KAROLE MORGAN, NOTARY
(insert name and title of the officer)

personally appeared MARY MILLER VC ADMIN,
who proved to me on the basis of satisfactory evidence to be the person~~(s)~~ whose name~~(s)~~ is/~~are~~ subscribed to the within instrument and acknowledged to me that ~~he~~/she/~~they~~ executed the same in ~~his~~/her/~~their~~ authorized capacity~~(ies)~~, and that by ~~his~~/her/~~their~~ signature~~(s)~~ on the instrument the person~~(s)~~, or the entity upon behalf of which the person~~(s)~~ acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

KAROLE MORGAN
COMM. #1753198
NOTARY PUBLIC • CALIFORNIA
MERCED COUNTY
Comm. Exp. JUNE 25, 2011

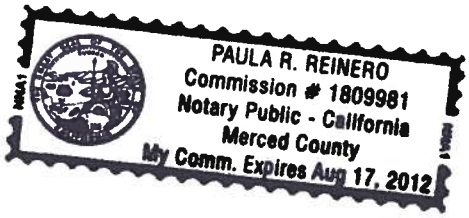
Signature Karole Morgan (Seal)

STATE OF CALIFORNIA }
COUNTY OF MERCED }ss

On October 7, 2009, before me, PAULA R. REINERO, NOTARY PUBLIC, personally appeared HICHAM ELTAL, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument the person or entity upon behalf of which the person acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.



Paula R. Reinero
Notary Public signature

-OPTIONAL-

The below is not required by law, however it may prove valuable could prevent fraudulent removal and reattachment of this form to another document.

Description of Notarized Document

Title or Type of Document: Non-Exclusive Pipeline License Agreement

Document Date: October 7, 2009 Number of Pages

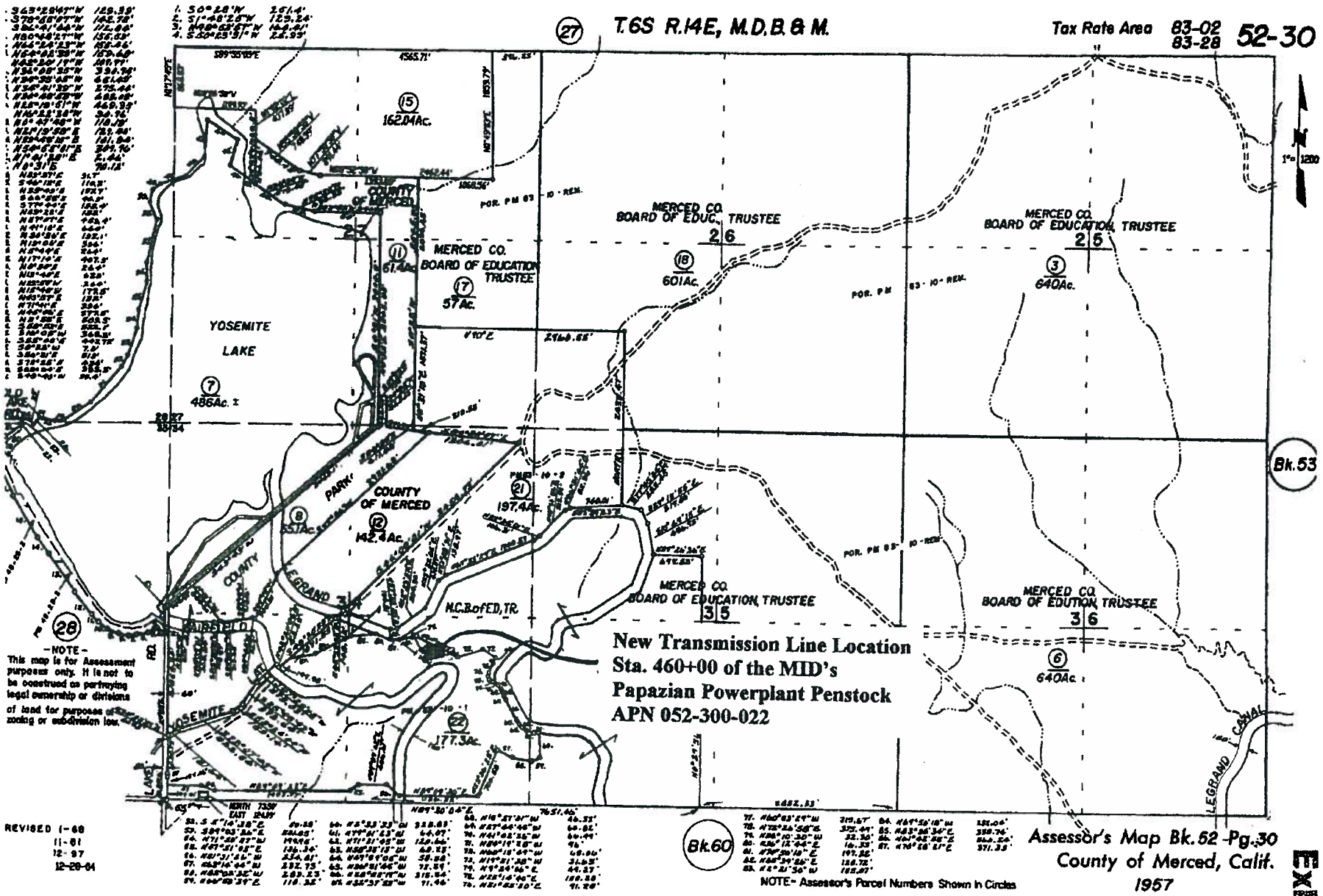

T.6S R.14E, M.D.B.& M.
Tax Rate Area 83-02 83-28
52-30
YOSEMITE LAKE
COUNTY OF MERCED
MERCED CO. BOARD OF EDUCATION TRUSTEE
MERCED CO. BOARD OF EDUC. TRUSTEE
MERCED CO. BOARD OF EDUCATION TRUSTEE
MERCED CO. BOARD OF EDUCATION TRUSTEE
MERCED CO. BOARD OF EDUTION TRUSTEE
162.04Ac.
61.4Ac.
57Ac.
601Ac.
640Ac.
486Ac.
197.4Ac.
142.4Ac.
177.3Ac.
640Ac.
Bk.53
Bk.60
LEGRAND CANAL
N.C.B.of ED.TR.
New Transmission Line Location
Sta. 460+00 of the MID's
Papazian Powerplant Penstock
APN 052-300-022
-NOTE-
This map is for Assessment purposes only. It is not to be construed as portraying legal ownership or divisions of land for purposes of zoning or subdivision law.
REVISED 1-68
11-81
12-97
12-28-04
NOTE- Assessor's Parcel Numbers Shown In Circles
Assessor's Map Bk. 52 -Pg. 30
County of Merced, Calif.
1957

Exhibit A

EXHIBIT "B"

The following Merced Irrigation District standard details are by reference made a part of this Agreement and are on file at the office of the Merced Irrigation District Water Resources Engineering Department (MID Job No. 08-504).

Standard detail numbers:

501 (1 of 1) - "General Notes"
591 (1 of 2) - "Pipeline Trench Detail"
591 (2 of 2) - "Pipeline Trench Detail"
592 (1 of 1) - "Utility Crossing Marker Detail"

MID NOTES:

1. THE SIGNATURE OF THE MERCED IRRIGATION DISTRICT (MID) ON DRAWINGS CONSTITUTES MID'S APPROVAL OF THE SAME AS TO THE ENGINEERING ASPECTS THEREOF ONLY AND DOES NOT AUTHORIZE, EXPRESSLY OR IMPLICITLY THE CONSTRUCTION OF ANY ASPECT HEREOF OR THE INTERFERENCE WITH ANY PROPERTY, EQUIPMENT, OR INTEREST OF THE MID. NO SUCH CONSTRUCTION OR INTERFERENCE SHALL OCCUR UNTIL THE MID HAS OBTAINED, BY SEPARATE AGREEMENT SUCH AGREEMENTS AS MID DEEMS NECESSARY FOR THE PROTECTION OF ITS FACILITIES.

2. ALL CONSTRUCTION WITHIN THE MID RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH THE APPROVED DRAWINGS AND THE CURRENT EDITION OF MID STANDARDS AND CALTRANS STANDARD SPECIFICATIONS, AS APPLICABLE.

3. CONSTRUCTION WITHIN THE MID RIGHT-OF-WAY WILL NOT BE ALLOWED DURING THE IRRIGATION SEASON (MARCH 1 TO OCTOBER 31).

4. CONTRACTOR SHALL PROVIDE AN ALTERNATE STORM WATER REROUTE DURING CONSTRUCTION UNLESS DETERMINED OTHERWISE BY THE MID ENGINEER.

5. WHERE THE PLANS OR SPECIFICATIONS DESCRIBE PORTIONS OF THE WORK IN GENERAL TERMS BUT NOT IN COMPLETE DETAIL, IT IS UNDERSTOOD THAT ONLY THE BEST GENERAL PRACTICE IS TO PREVAIL AND THAT ONLY MATERIALS AND WORKMANSHIP OF THE FIRST QUALITY ARE TO BE USED.

6. MID STANDARD DETAILS MAY REQUIRE MODIFICATIONS BASED ON FOUND FIELD CONDITIONS SUCH MODIFICATIONS SHALL BE REVIEWED AND APPROVED BY THE MID ENGINEER.

7. CONTRACTOR AGREES TO ASSUME SOLE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

8. CAL-OSHA SAFETY REQUIREMENTS SHALL BE IN EFFECT DURING ALL CONSTRUCTION. SPECIAL SAFETY PRECAUTIONS SHALL BE TAKEN WHEN WORKING IN THE VICINITY OF GAS, OIL, OR ELECTRICAL LINES.

9. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH CALIFORNIA GOVERNMENT CODE 4216, AS APPLICABLE. TO OBTAIN A DIG ALERT IDENTIFICATION NUMBER, CALL 800-227-2600 AT LEAST TWO WORKING DAYS BEFORE DIGGING UNDERGROUND.

10. THE MID WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE OBTAINED IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THE PLANS.

11. CONTRACTOR SHALL BE REQUIRED TO HAVE A PRE-CONSTRUCTION CONFERENCE WITH THE MID ENGINEER, PRIOR TO STARTING ANY WORK WITHIN THE MID RIGHT-OF-WAY.

12. EARTHFILL AND SUBGRADES SHALL BE COMPACTED TO A MINIMUM 90% RELATIVE COMPACTION (ASTM D-1557) WITHIN THE MID RIGHT-OF-WAY, UNLESS DETERMINED OTHERWISE BY THE MID ENGINEER.

13. A SET OF APPROVED PLANS SHALL BE ON THE JOB SITE AT ALL TIMES DURING CONSTRUCTION.

14. ANY DAMAGES TO MID FACILITIES DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED IN A MANNER APPROVED BY THE MID ENGINEER AT THE SOLE COST OF THE CONTRACTOR.

15. ANY WORK WITHIN THE MID RIGHT-OF-WAY SHALL NOT BE DEEMED COMPLETE UNTIL THE MID ENGINEERING DEPARTMENT HAS BEEN PROVIDED WITH A SET OF AS-BUILT PLANS IN AUTO CAD R12 AND HARD COPY FORMATS.

16. CONTACT THE MERCED IRRIGATION DISTRICT ENGINEERING DEPARTMENT AT LEAST TWO WORKING DAYS PRIOR TO ANY CONSTRUCTION AND/OR NECESSARY INSPECTIONS. WORK WITHIN THE MID RIGHT-OF-WAY SHALL PROCEED IN A CONTINUOUS MANNER ONCE STARTED. THE MID ENGINEER SHALL BE NOTIFIED OF ANY WORK STOPPAGES. WHENEVER WORK IS TO RESTART, THE MID ENGINEER SHALL REQUIRE AN ADDITIONAL TWO WORKING DAYS NOTICE. THE MID ENGINEER SHALL ALSO BE CONTACTED A MINIMUM OF TWO WORKING DAYS PRIOR TO ALL CONSTRUCTION SCHEDULED ON A HOLIDAY OR WEEKEND. PHONE: 209-722-5761.

STD501.dwg

GENERAL NOTES		MERCED IRRIGATION DISTRICT ENGINEERING DEPARTMENT		
MID	APPROVED MGR OF ENGINEERING, WATER RESOURCES DATE	DESIGNED: HT	SCALE: N.T.S.	STANDARD DETAIL 501
		DRAWN: MRS	DATE: 10/13/03	SHEET 1 OF 1

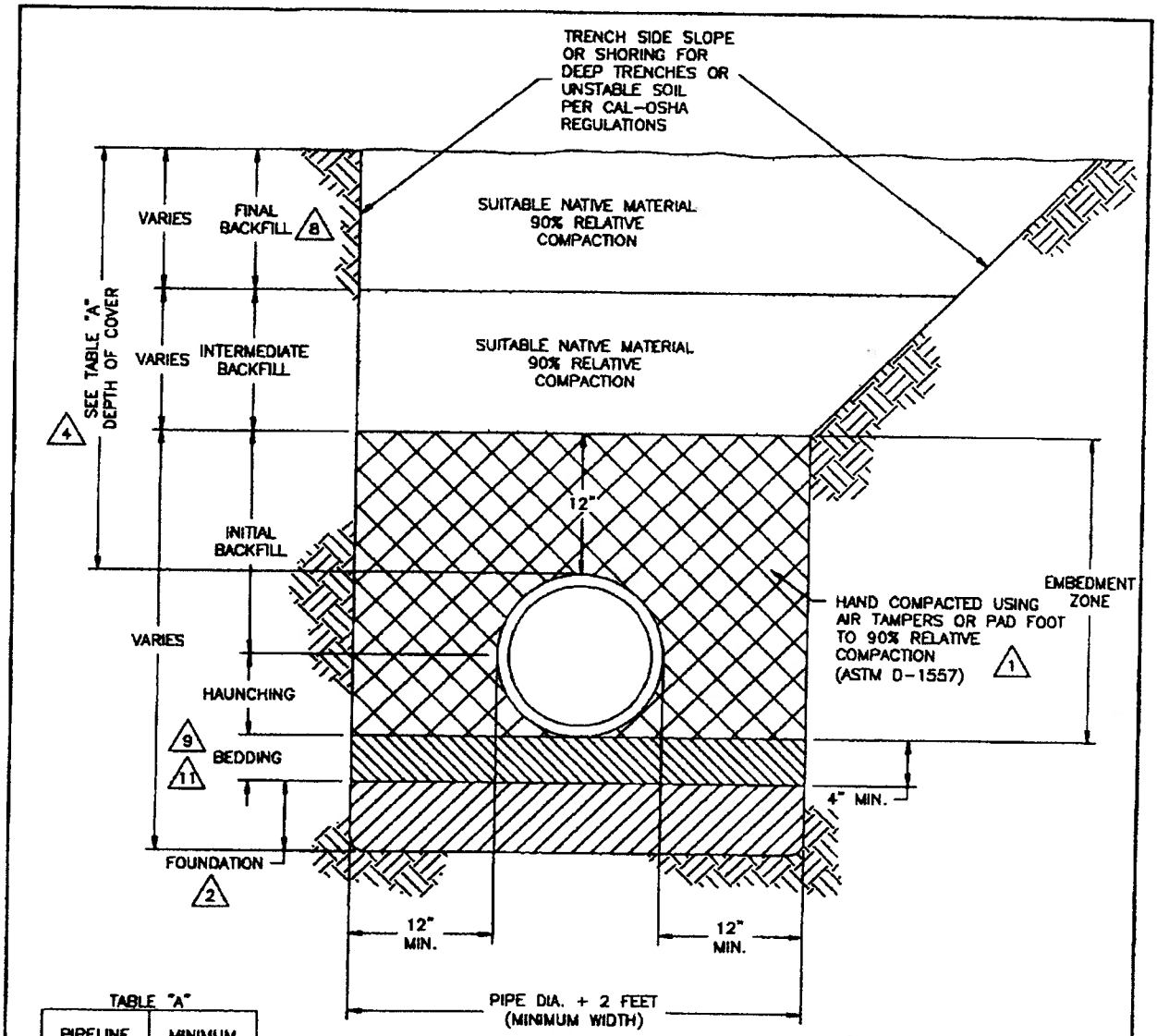


TABLE "A"

PIPELINE TYPE	MINIMUM COVERAGE
CONCRETE	3.0'
PLASTIC	4.0'

NOTE:

SEE SHEET 2 FOR CONSTRUCTION NOTES

STD591.dwg

PIPELINE TRENCH DETAIL

MERCED IRRIGATION DISTRICT
ENGINEERING DEPARTMENT

MID

APPROVED

MGR OF ENGINEERING, WATER RESOURCES DATE

DESIGNED:	SCALE:	STANDARD DETAIL
HT	N.T.S.	591
DRAWN:	DATE:	SHEET 1 OF 2
MRS	10/06/03	

CONSTRUCTION NOTES:

1. COMPACTED EARTHFILL SHALL MEET 90% MAXIMUM DENSITY (ASTM D-1557) AND BE ACCOMPLISHED BY MANUALLY DIRECTED HAND COMPACTORS TO A MINIMUM DEPTH OF 12 INCHES OVER TOP OF PIPE. THE MAXIMUM LAYER THICKNESS SHALL BE 12 INCHES BEFORE COMPACTION.

2. ALL STRUCTURE SUBGRADES TO BE INSPECTED BY THE MID ENGINEER PRIOR TO BACKFILL. SUBGRADES SHALL MEET 90% MAXIMUM DENSITY (ASTM D-1557).

3. EARTHFILL SHALL BE SELECT NATIVE MATERIAL, CONTAIN NO MATERIALS OVER 3 INCHES IN DIAMETER OR LENGTH, AND BE COMPACTED AGAINST UNDISTURBED EARTH. FILL MATERIALS SHALL CONTAIN NO SOD, BRUSH, ROOTS, OR OTHER ORGANIC OR UNSUITABLE MATERIAL.

4. PIPELINE SHALL BE INSTALLED ACCORDING TO MANUFACTURER INSTRUCTIONS AND SPECIFICATIONS. MINIMUM DEPTH OF COVER SHALL BE PER TABLE 'A' EXCEPT IN MID CANAL BANKS WHERE THE MINIMUM DEPTH OF COVER SHALL BE 4 FEET.

5. MID REQUIRED COMPACTION TESTS SHALL BE AT THE LANDOWNER OR DEVELOPER EXPENSE. ANY RETESTS SHALL BE PAID BY THE CONTRACTOR. FREQUENCY AND LOCATION OF THE TESTS TO BE DETERMINED BY THE MID ENGINEER.

6. DEWATERING DUE TO HIGH GROUNDWATER OR CANAL SEEPAGE MAY BE REQUIRED. DEWATERING METHODS SHALL BE APPROVED BY THE MID ENGINEER PRIOR TO COMMENCEMENT OF DEWATERING.

7. TRENCH WIDTHS SHALL BE AS SHOWN UNLESS THE PIPELINE SIZE IS 4 INCHES OR SMALLER, WHERE THE TRENCH SHALL HAVE A 12 INCH MINIMUM WIDTH.

8. FINAL BACKFILL SHALL BE MINIMUM 90% RELATIVE COMPACTION (ASTM D-1557), UNLESS OTHER LOCAL AGENCY STANDARDS DICTATE HIGHER COMPACTION.

9. BEDDING, IF REQUIRED SHALL BE MINIMUM 4 INCHES AS SPECIFIED BY THE MID ENGINEER. BEDDING SHALL CONFORM TO THE SPECIFICATIONS BELOW. SOIL TYPES SHALL BE AS DETERMINED BY THE MID ENGINEER.

A) ON SANDY SOIL (BEDDING & HAUNCHING):

NATIVE MATERIAL, IF SUITABLE, OR SAND AS APPROVED BY THE MID ENGINEER

B) ON CLAY SOIL (BEDDING & HAUNCHING):

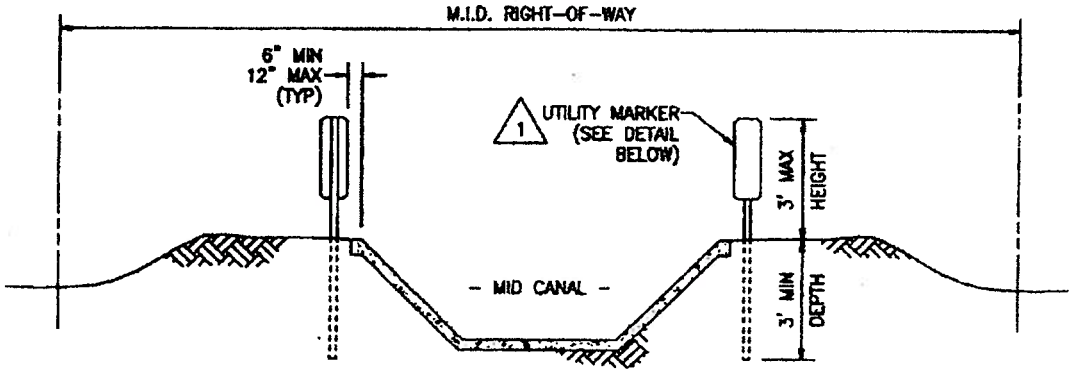
SAND OR MID APPROVED NATIVE MATERIAL ONLY SHALL BE PLACED IN 12 INCH LIFTS

10. WATER PACKING OR JETTING SHALL ONLY BE USED ON SOILS APPROVED BY THE MID ENGINEER. WHEN WATER PACKING OR JETTING IS USED, THE AMOUNT OF WATER SHALL BE CONTROLLED TO INSURE THAT POOLING OF EXCESS WATER DOES NOT OCCUR. THE WETTED FILL MUST BE ALLOWED TO REACH OPTIMUM MOISTURE AND THEN MECHANICALLY COMPACTED TO MEET 90% RELATIVE COMPACTION (ASTM D-1557) BEFORE ADDITIONAL BACKFILLING IS DONE. CARE MUST BE EXERCISED TO PREVENT PIPE FLOTATION DURING WATER PACKING OR JETTING, MEASURES MUST BE APPROVED BY THE MID ENGINEER. THIS ITEM DOES NOT APPLY TO PVC OR HDPE PIPELINES.

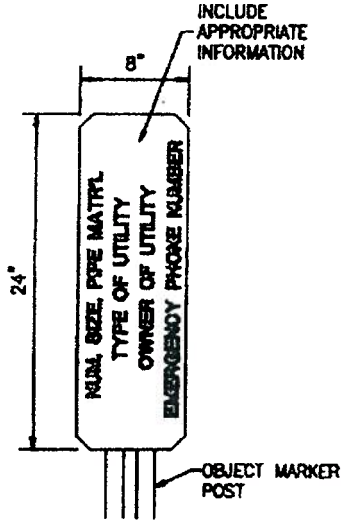
11. A CLAY PLUG MAY BE REQUIRED UPSTREAM OF EACH MANHOLE, OR AT 400 FOOT INTERVALS. CLAY PLUG SHALL BE A MINIMUM OF 12 INCHES IN WIDTH AND EXTEND A MINIMUM OF 12 INCHES INTO UNDISTURBED TRENCH WALLS, TRENCH BOTTOM AND ABOVE THE TOP OF PIPE.

STD591.dwg

PIPELINE TRENCH DETAIL		MERCED IRRIGATION DISTRICT ENGINEERING DEPARTMENT		
MID	APPROVED MGR OF ENGINEERING, WATER RESOURCES DATE	DESIGNED: HT	SCALE: N.T.S.	STANDARD DETAIL 591
		DRAWN: MRS	DATE: 10/06/03	SHEET 2 OF 2



UTILITY MARKER LOCATION



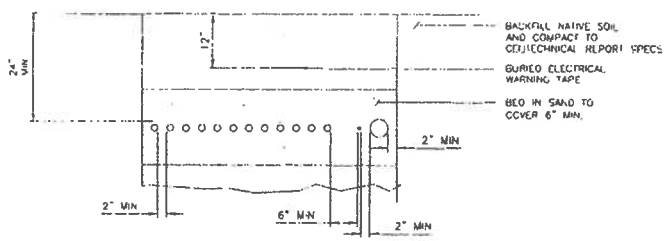
MARKER INFORMATION

CONSTRUCTION NOTES:

1. IRRIGATION UTILITY MARKER AND POST SHALL BE PLACED NOT MORE THAN 12 INCHES FROM TOP OF BANK CROWN ON EACH SIDE OF CANAL.
2. UTILITY MARKER POSTS SHALL BE STANDARD 6' OBJECT MARKER POSTS WITH 8" x 24" TYPE "A" OBJECT MARKER BOLTED TO OBJECT MARKER POST IN A MINIMUM OF 2 LOCATIONS.
3. UTILITY MARKER SHALL SHOW THE FOLLOWING INFORMATION: NUMBER OF PIPES, PIPE SIZES, PIPE MATERIAL, TYPE OF UTILITY, OWNER OF UTILITY, EMERGENCY PHONE NUMBER. INFORMATION SHALL BE PERMANENTLY ATTACHED TO THE MARKER BY SILKSCREENING OR ENGRAVING, OR OTHER MID ENGINEER APPROVED SUITABLE METHOD.

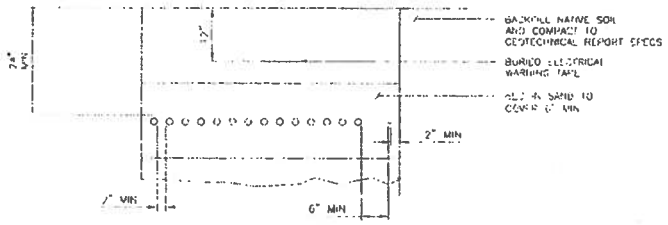
ST0592.dwg

UTILITY CROSSING MARKER DETAIL		MERCED IRRIGATION DISTRICT ENGINEERING DEPARTMENT		
MID	APPROVED: -DRAFT- DISTRICT ENGINEER DATE	DESIGNED: EAA	SCALE: N.T.S.	STANDARD DETAIL 592
		DRAWN: JWK/BRB	DATE: 06-05-95	SHEET 1 OF 1



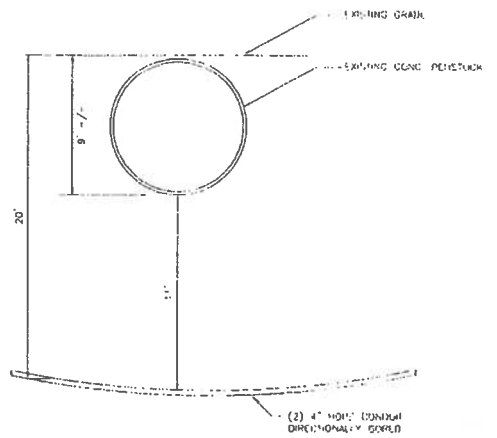
N-M TRENCH CONTAINS (2) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS) (1) 4" C-PVC AC TO TIE-IN	M-L TRENCH CONTAINS (4) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS) (1) 4" C-PVC AC TO TIE-IN	L-K TRENCH CONTAINS (6) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS) (1) 4" C-PVC AC TO TIE-IN
K-J TRENCH CONTAINS (8) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS) (1) 4" C-PVC AC TO TIE-IN	J-I TRENCH CONTAINS (10) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS) (1) 4" C-PVC AC TO TIE-IN	I-H TRENCH CONTAINS (12) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS) (1) 4" C-PVC AC TO TIE-IN

1 DC & AC MOTOR & AC TO TIE-IN TRENCH DETAIL
E-4.0 SCALE 1"=1'-0"

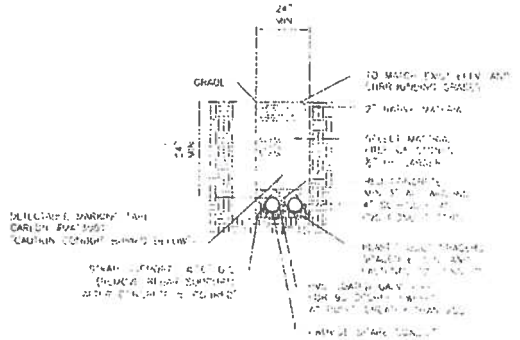


A-B TRENCH CONTAINS (2) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)	B-C TRENCH CONTAINS (4) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)	C-D TRENCH CONTAINS (6) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)
D-E TRENCH CONTAINS (8) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)	E-F TRENCH CONTAINS (10) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)	F-G TRENCH CONTAINS (12) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)
G-H TRENCH CONTAINS (14) 1½" C-PVC DC FEEDERS (1) ¾" C-PVC AC POWER (TRACKER MOTORS)		

2 DC & AC MOTOR TRENCH DETAIL
E-4.0 SCALE



DIRECTIONALLY DRILLED UNDER GROUND
3 COUNDUIT WITHIN MID RIGHT OF WAY BELOW PENSTOCK
E-3.1 SCALE NTS



UNDER GROUND CONDUIT OUT OF
4 MID RIGHT OF WAY CONCRETE ENCASED
SCALE NTS

CAUTION TO CONTRACTOR

SUNPOWER

ENGINEER'S STAMP

UC MERCED
SOLAR ELECTRIC FACILITY

TRENCH DETAILS

REVISIONS
DESCRIPTION

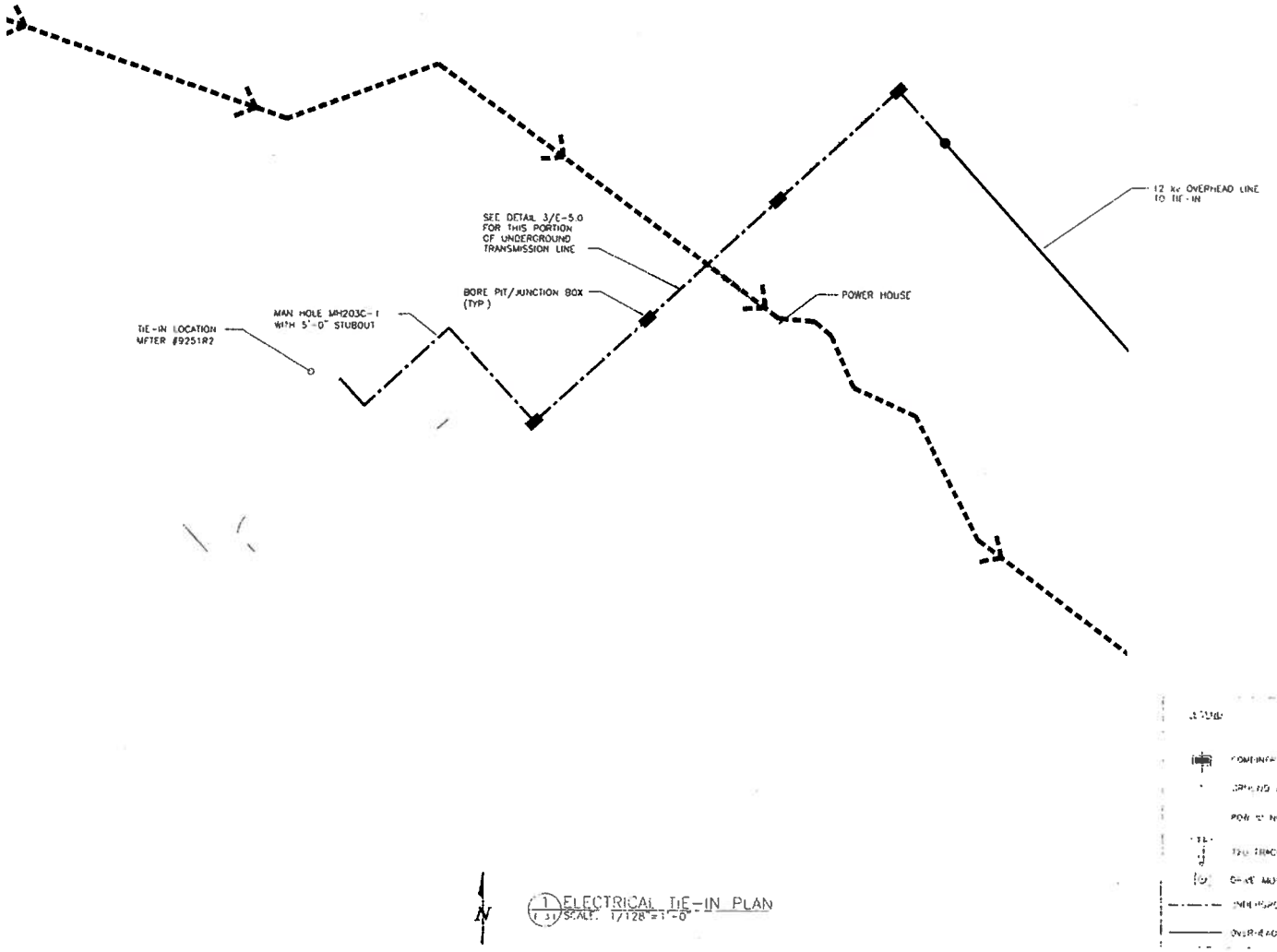
OPPORTUNITY 022889

PROJECT

DATE DRAWN

DRAWN BY

E-5.0



1 ELECTRICAL TIE-IN PLAN
1/31 SCALE: 1/128"=1'-0"

LEGEND

COMBINER BOX

GROUND ROD

POWER NUMBER

TRACKER UNIT

DRIVE MOTOR PAD

UNDERGROUND LINE

OVERHEAD LINE

SUNPOWER

ENGINEER'S STAMP

UC MERCED
SOLAR ELECTRIC FACILITY
5200 NORTH LAKE ROAD
MERCED, CA 95343

ELECTRICAL TIE IN PLAN

REVISIONS

REV	QUOTE #	DESCRIPTION	DATE	DR	CK
1		ISSUE FOR CUSTOMER REVIEW/PERMIT	09 04 09	SN	MS
2		PERMIT NC SUBMITTAL	11/21/09	PN	MS
3		PERMIT AS-SUBMITTAL-2	07 21 09	PN	MS

OPPORTUNITY	002989
PROJECT	-
DATE DRAWN	01/07/09
DRAWN BY	ACEVEDO

SHEET

E-3.1

Recorded at the request of
and return to:

MERCED IRRIGATION DISTRICT
c/o Flanagan & Corman
P. O. Box 2067
Merced, Ca. 95340

19713

RECORDED BY
Western Title Ins. Co.
OCT - 7 1981 at 10:00am

VOL 2299 PAGE 963
OFF'L RECORDS OF
MERCED COUNTY
CALIFORNIA
LeROY G. GILSDORF
Recorder

Elsie Kotsmore
Assistant

MEMORANDUM OF AGREEMENT TO
EXCHANGE EASEMENTS AND FOR DELIVERY OF WATER

THIS MEMORANDUM OF AN AGREEMENT FOR THE EXCHANGE OF EASEMENTS AND FOR DELIVERY OF WATER is executed this 6th day of October, 1981, by and between the MERCED IRRIGATION DISTRICT, an irrigation district existing pursuant to the laws of the State of California, (hereinafter "MID"), and the MERCED COUNTY BOARD OF EDUCATION AS TRUSTEES OF THE VIRGINIA SMITH TESTAMENTARY TRUST, (hereinafter "SMITH").

1. The parties hereto entered into an agreement for the exchange of easements and delivery of water dated the 21st day of September, 1981, which document sets forth an agreement for the matters therein specified, said document setting forth the particulars in connection with the exchange of easements between MID and SMITH and for an agreement by MID to sell certain excess water to SMITH.

2. As pertains to the easements, said agreement provides for the following easements to be conveyed to the MID by SMITH, and affects property of SMITH in Section 34 and 35, T6S, R14E, M.D.B.&M., Merced County, California:

a. A permanent easement over a strip of land one hundred ten (110) feet in width and approximately seven hundred fifty (750) feet long, said easement running generally southeasterly from the Le Grand Canal to the Fairfield Canal, said strip to be located as shown on Exhibit "A" attached hereto and incorporated herein.

b. A construction easement consisting of an additional one hundred (100) feet parallel to and on both sides of said one hundred ten (110) foot easement as described in subparagraph a above, said construction easement to exist for so long as needed for the MID to complete construction of

all improvements of the MID, which improvements will consist of certain channels, canals, concrete improvements, power generating facilities, metering facilities and related equipment in said one hundred ten (110) foot strip, said construction easement to terminate thirty (30) days after acceptance of said Fairfield Mini-Hydro power plant by the MID.

c. A permanent easement on that strip of land the center line of which is the currently existing center line of the Le Grand Canal across properties of SMITH, as said canal now exists and extending seventy-five (75) feet on both sides of the center line of said Le Grand Canal, making a total easement strip one hundred fifty (150) feet in width, the center line of which is the center line of said Le Grand Canal as shown on Exhibit "B" attached hereto and incorporated herein.

d. A permanent easement over that certain strip of land the center line of which is the currently existing center line of the Fairfield Canal across properties of SMITH, as said canal now exists and extending seventy-five (75) feet on both sides of the center line of said Fairfield Canal, making a total easement strip one hundred fifty (150) feet in width, the center line of which is the center line of said Fairfield Canal as shown on Exhibit "C" attached hereto and incorporated herein.

3. Further, said agreement states that, for purposes of said agreement a permanent easement shall be defined as follows:

Wherever SMITH is to grant to MID a permanent easement, said easement shall contain the following wording: Said easement being for the construction, installation, alteration, relocation, maintenance and improvement, including ingress and egress thereto, of all manner of irrigation and power generating facilities, as may now exist or may exist in the future, regardless of nature, including but not limited to canals, ditches, channels, flumes, siphons, water courses, valves, dams, weirs, reservoirs, powerhouses, power generating facilities, headgates, transmission lines, transformers, metering devices and all other equipment and improvements in connection therewith, the intent

herein being that said easement is to be given the broadest possible interpretation to permit the MID to do all said things within the MID's legal power to do on the land subject to said easement. Further, Grantee herein may grant and convey additional easements over the same property subject to this easement to Pacific Gas & Electric Company or any other public utility or agency for service to the general public, the right from time to time to install, maintain, operate and use such gas and electric facilities, both above ground and underground as it may deem necessary over, under, along and within the lands subject to this easement.

4. As said agreement pertains to the delivery of excess water by the MID to SMITH, said agreement provides for delivery by the MID to SMITH of such water, in accordance with the terms and conditions of said aforementioned agreement to those properties generally described as the Southeast one-half of Section 34 and all of Section 35 of T6S, R14E, M.D.B.&M.

This Memorandum of Agreement is executed this 6th day of October, 1981.

MERCED IRRIGATION DISTRICT

By Joseph Plagenza
Joseph Plagenza, President

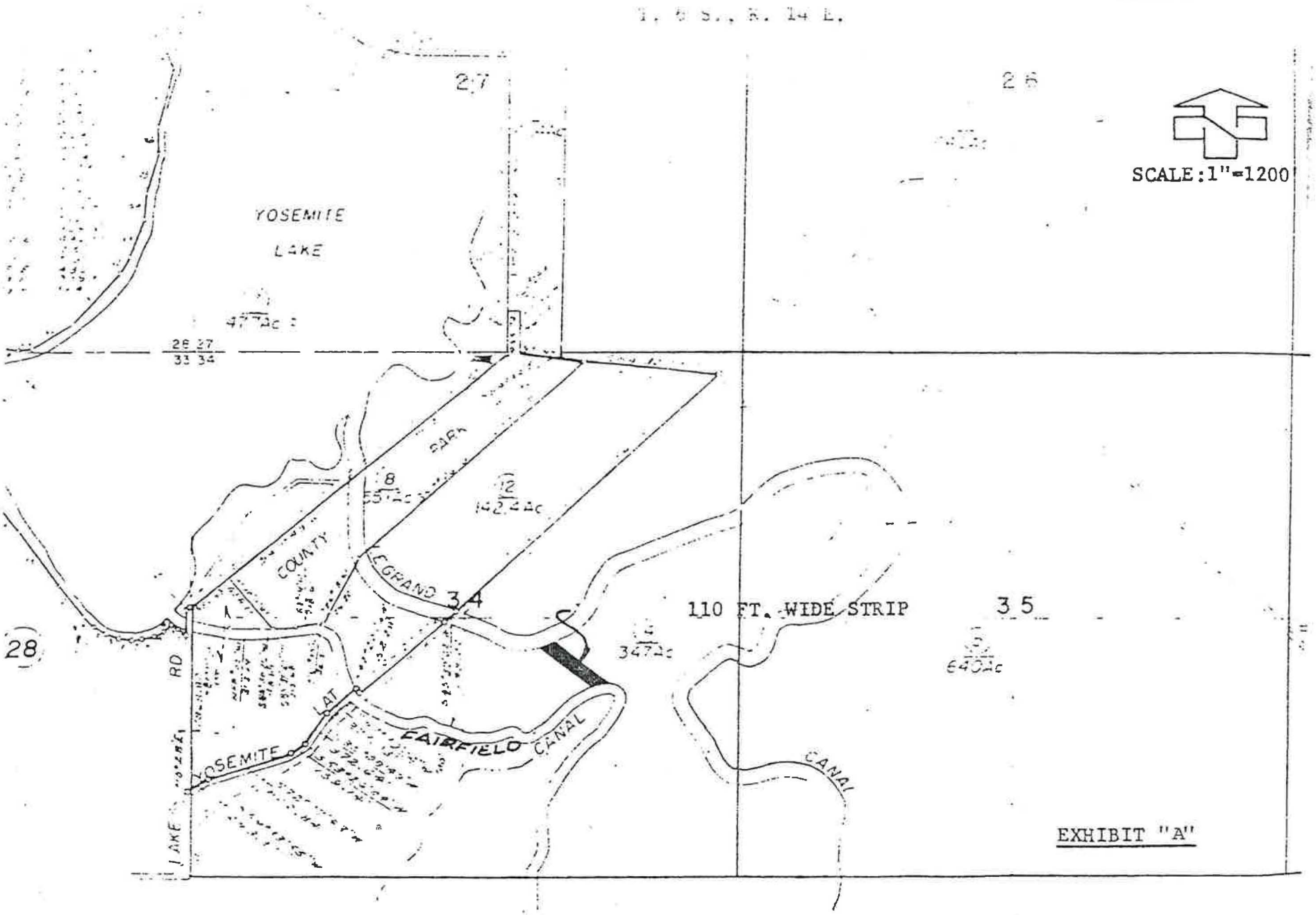
By Jay Anderson
Jay Anderson, Secretary

MERCED COUNTY BOARD OF EDUCATION
TRUSTEES OF THE VIRGINIA SMITH
TESTAMENTARY TRUST

By William Stockard
William Stockard, County
Superintendent of Schools

By
Chairman of the Merced County
Board of Education

LAW OFFICES OF
FLANAGAN & CORMAN
820 WEST 18th STREET
P.O. BOX 2067
MERCED, CALIFORNIA 95344
TELEPHONE (209) 383-9334


T. 6 S., R. 14 E.
27
26
SCALE: 1"=1200
YOSEMITE
LAKE
28 27
33 34
PARK
COUNTY
LEGRAND
34
110 FT. WIDE STRIP
35
28
RD
LAT
YOSEMITE
FAIRFIELD
CANAL
CANAL
LAKE
347Ac
640Ac
142.4Ac
EXHIBIT "A"

Bk.6C

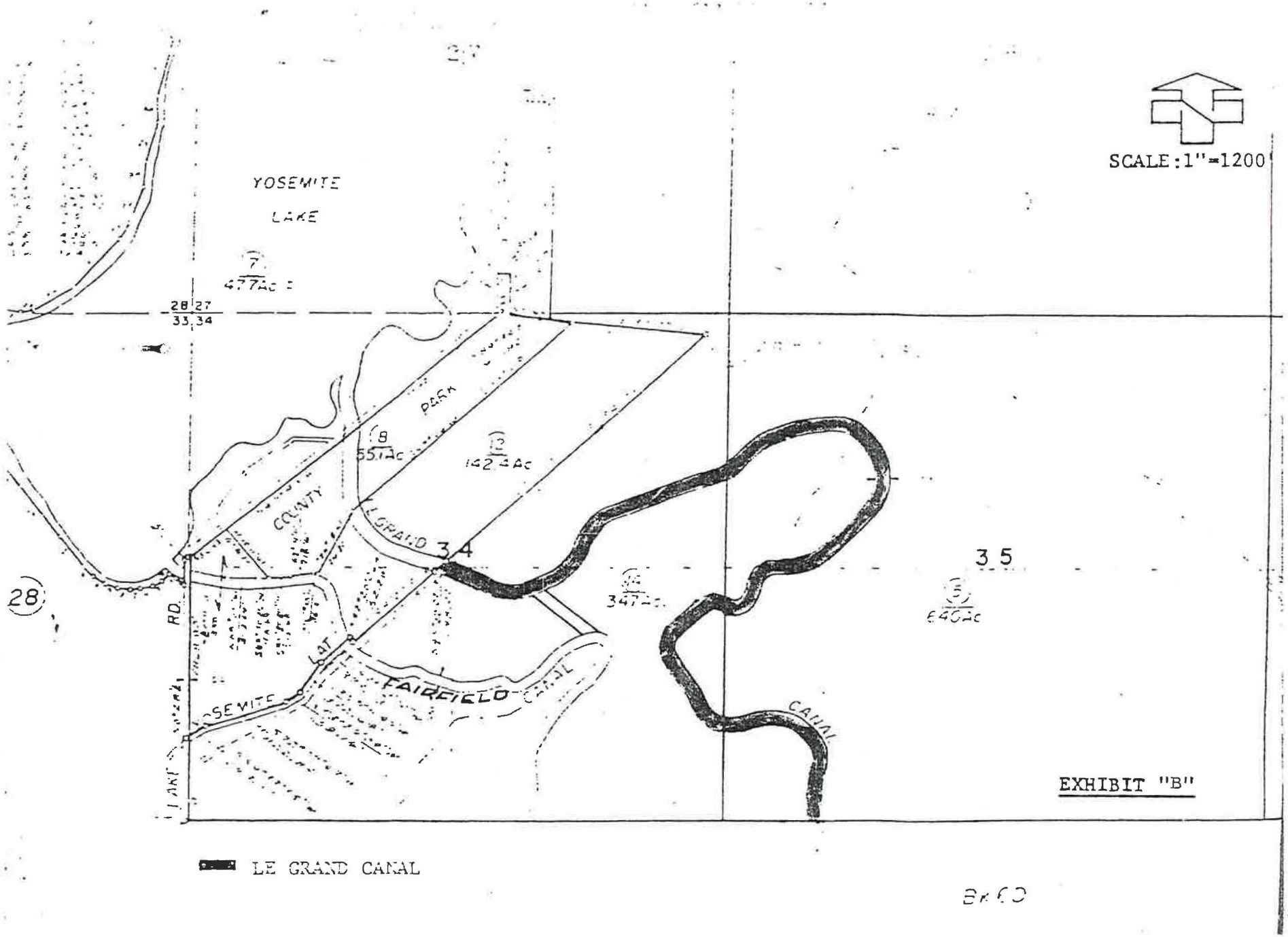
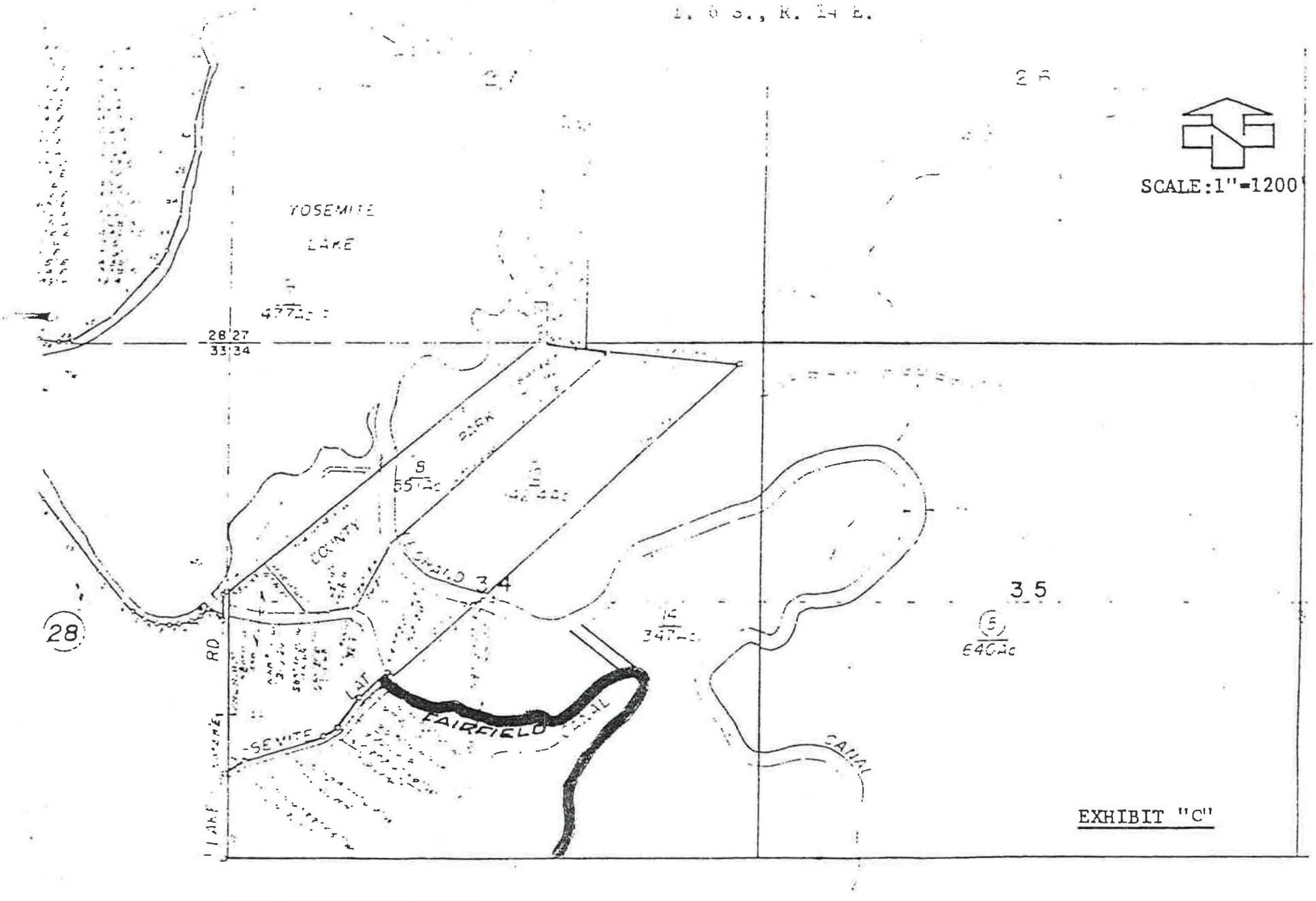

SCALE: 1"=1200'
YOSEMITE
LAKE
7
477Ac
28 27
33 34
PARK
8
55.1Ac
12
142.4Ac
COUNTY
L GRAND
3 4
3 5
28
RD.
LAT
FAIRFIELD
CANAL
YOSEMITE
LAKE
CANAL
5
640Ac
LE GRAND CANAL

EXHIBIT "B"



FAIRFIELD CANAL

STATE OF CALIFORNIA,
County of MERCED } ss.

On this 6th day of October in the year one thousand nine hundred and 81, before me, LILLIAN V. STARING, a Notary Public in and for the MERCED County of, State of California, duly commissioned and sworn, personally appeared JAY ANDERSON known to me to be the Secretary of Merced Irrigation District of the corporation described in and that executed the within instrument, and also known to me to be the person who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

OFFICIAL SEAL
LILLIAN V. STARING
NOTARY PUBLIC-CALIFORNIA
PRINCIPAL OFFICE IN
MERCED COUNTY
My Commission Expires Nov. 16, 1984

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal in the County of Merced the day and year in this certificate first above written.

Lillian V. Staring

Notary Public in and for the County of MERCED State of California.

Cowdery's Form No. 28—(Acknowledgment—Corporation). (C. C. Secs. 1190-1190.1) 41976

My Commission Expires November 16, 1984

STATE OF CALIFORNIA,
County of MERCED } ss.

On this 6th day of October in the year one thousand nine hundred and 81, before me, LILLIAN V. STARING, a Notary Public in and for the Merced County of, State of California, duly commissioned and sworn, personally appeared JOSEPH PLAGENZA known to me to be the President of Merced Irrigation District of the corporation described in and that executed the within instrument, and also known to me to be the person who executed the within instrument on behalf of the corporation therein named, and acknowledged to me that such corporation executed the same.

OFFICIAL SEAL
LILLIAN V. STARING
NOTARY PUBLIC CALIFORNIA
PRINCIPAL OFFICE IN
MERCED COUNTY
My Commission Expires Nov. 16, 1984

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal in the County of Merced the day and year in this certificate first above written.

Lillian V. Staring

Notary Public in and for the County of Merced State of California.

Cowdery's Form No. 28—(Acknowledgment—Corporation). (C. C. Secs. 1190-1190.1) 41976

My Commission Expires November 16, 1984

STATE OF CALIFORNIA
COUNTY OF MERCED } ss.

On this 5th day of October in the year one thousand nine hundred and 81 before me, DUDLEY J. GOUL, a Notary Public, State of California, duly commissioned and sworn, personally appeared William Stockard, Merced County Superintendent of Schools known to me to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same.

DUDLEY J. GOUL
NOTARY PUBLIC
MERCED COUNTY, CALIFORNIA
My Commission Expires Sep. 16, 1985

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal in the County of Merced the day and year in this certificate first above written.

Dudley J. Goul
Notary Public, State of California

My commission expires Sept. 16, 1985

Cowdery's Form No. 32—Acknowledgement—General (C. C. Sec. 1190a)

Printed 12/72

STATE OF CALIFORNIA
COUNTY OF MERCED } ss.

On this 5th day of October in the year one thousand nine hundred and 81 before me, DUDLEY J. GOUL, a Notary Public, State of California, duly commissioned and sworn, personally appeared SAM BENIDETTINO, Chairman of the Merced County Board of Education

known to me to be the person ..... whose name ....is..... subscribed to the within instrument and acknowledged to me that .....he..... executed the same.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my official seal in the ..... County of .....Merced.. the day and year in this certificate first above written.

DUDLEY J. GOUL
NOTARY PUBLIC
MERCED COUNTY, CALIFORNIA
My Commission Expires Sep. 16, 1985

Dudley J. Goul
Notary Public, State of California

My commission expires Sept. 16, 1985

Cowdery's Form No. 32—Acknowledgement—General (C. C. Sec. 1190a) Printed 12/72

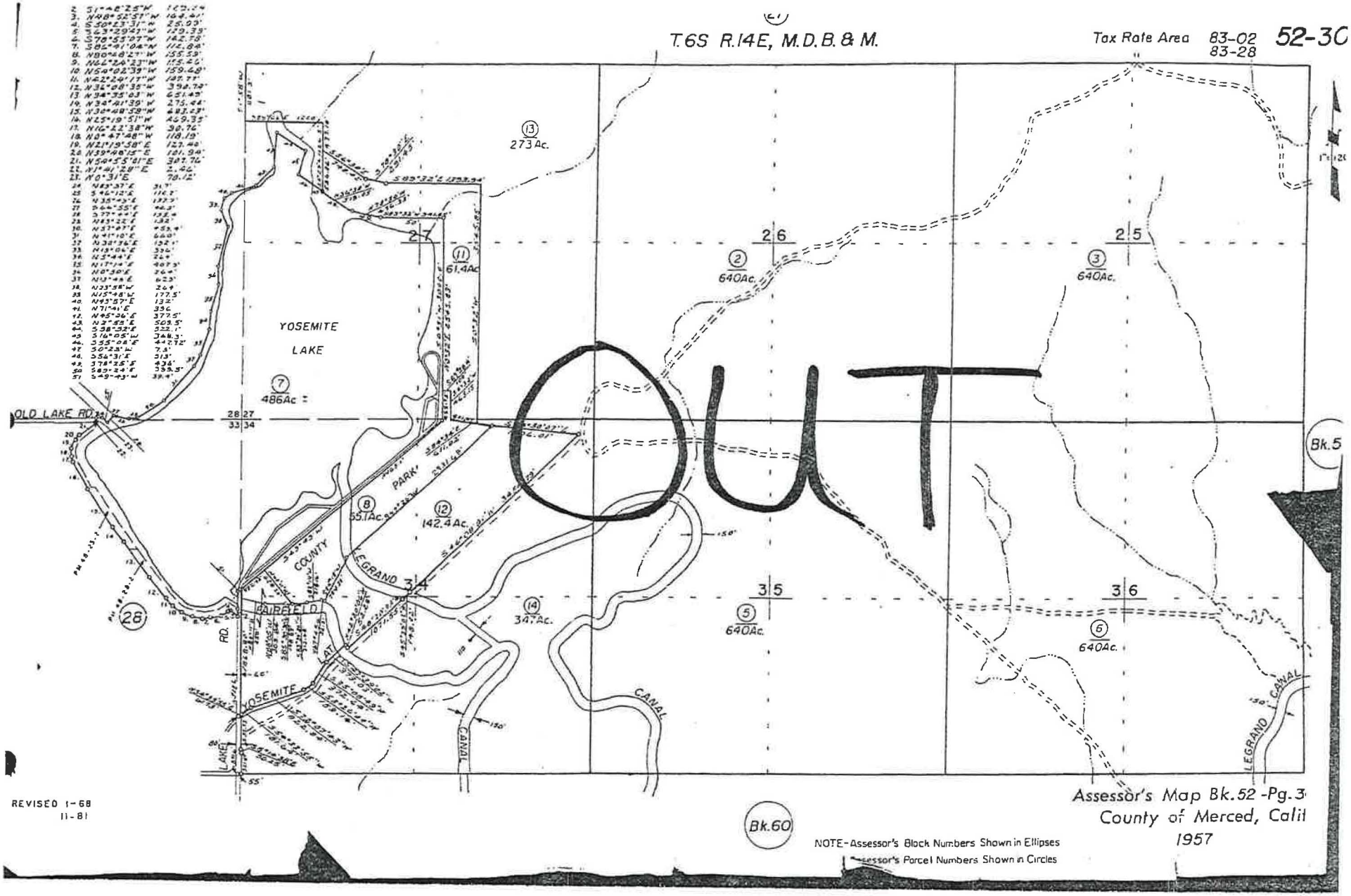
LAW OFFICES OF
FLANAGAN & CORMAN
820 WEST 18th STREET
P.O. BOX 2067
MERCED, CALIFORNIA 95344
TELEPHONE (209) 383-9334

END OF DOCUMENT

T.6S R.14E, M.D.B. & M.

Tax Rate Area 83-02 83-28

52-30



REVISED 1-68
11-81

Assessor's Map Bk.52 -Pg.3
County of Merced, Calif
1957

NOTE-Assessor's Block Numbers Shown in Ellipses
Assessor's Parcel Numbers Shown in Circles

11 April 2016

Phillip Woods
University of California, Merced
5200 N. Lake Road
Merced, CA 95343

CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE UC MERCED AND UNIVERSITY NORTH PROJECT, WDID#5B24CR00013, MERCED COUNTY

This Order responds to the 2 November 2015 application submitted by University of California, Merced (Applicant) for a Clean Water Act § 401 Water Quality Certification of an educational and commercial project permanently impacting 77.79 acres of waters of the United States.

This Order serves as certification of the subject Project permitted by the United States Army Corps of Engineers' Individual Permit under § 401 of the Clean Water Act, and a Waste Discharge Requirement under the Porter-Cologne Water Quality Control Act and State Water Resources Control Board Order 2003-0017-DWQ.

WATER QUALITY CERTIFICATION STANDARD CONDITIONS:

1. This Certification is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to § 13330 of the California Water Code and § 3867 of Title 23 of the California Code of Regulations (23 CCR).

2. This Certification is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR § 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR § 3860. **This Certification is not valid until payment of the full fee of $90,000 is received.**

4. In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and § 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Certification.

WATER QUALITY CERTIFICATION GENERAL CONDITIONS:

1. Certification is valid for the duration of the UC Merced and University North Project (Project) described in the attached "Project Information Sheet." This Certification is no longer valid if the Project (as summarized in the "Project Information Sheet" and described in the water quality

certification application) is modified, or coverage under the project permit issued by the U.S. Army Corps of Engineers pursuant to § 404 of the Clean Water Act has expired.

2. The Applicant shall **annually by 1 March**, provide a copy of the annual monitoring reports for the short-term and long-term monitoring of the wetland restoration.

3. The Applicant shall **annually by 1 March**, provide a copy of the annual monitoring reports for the long-term monitoring for the Tier 1A Preservation Lands.

4. All reports, notices, or other documents required by this Certification or requested by the Central Valley Water Board shall be signed by a person described below or by a duly authorized representative of that person.

   a. For a corporation: by a responsible corporate officer such as (1) a president, secretary, treasurer, or vice president of the corporation in charge of a principal business function; (2) any other person who performs similar policy or decision-making functions for the corporation; or (3) the manager of one or more manufacturing, production, or operating facilities if *authority* to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

   b. For a partnership or sole proprietorship: by a general partner or the proprietor.

   c. For a municipality, State, federal, or other public agency: by either a principal executive officer or ranking elected official.

5. Any person signing a document under General Condition No. 4 shall make the following certification, whether written or implied:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

ADDITIONAL TECHNICALLY CONDITIONED CERTIFICATION CONDITIONS:

In addition to the standard and general conditions above, the Applicant shall satisfy the following:

1. Except for activities permitted by the U.S. Army Corps of Engineers under § 404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.

2. All areas disturbed by Project activities shall be protected from washout or erosion.

3. The Applicant shall maintain a copy of this Certification and supporting documentation (Project Information Sheet) at the Project site during construction for review by site personnel and agencies. All personnel (employees, contractors, and subcontractors) performing work on the proposed Project shall be adequately informed and trained regarding the conditions of this Certification.

4. An effective combination of erosion and sediment control Best Management Practices (BMPs) shall be implemented and adequately working during all phases of construction.

5. The discharge of petroleum products or other excavated materials to surface water is prohibited. Activities shall not cause visible oil, grease, or foam in the work area or downstream. The Applicant shall notify the Central Valley Water Board immediately of any spill of petroleum products or other organic or earthen materials.

6. Prior to arrival at the project site and prior to leaving the project site, construction equipment that may contain invasive plants and/or seeds shall be cleaned to reduce the spreading of noxious weeds.

7. The Applicant shall notify the Central Valley Water Board immediately if any of the above conditions are violated, along with a description of measures it is taking to remedy the violation.

8. The Applicant shall comply with all California Department of Fish and Game Code § 1600 requirements for the Project.

9. The Applicant must obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction Activities issued by the State Water Resources Control Board for any project disturbing an area of one acre or greater.

10. In the event of any violation or threatened violation of the conditions of this Certification, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and § 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Certification.

11. If the Applicant or a duly authorized representative of the Applicant fails or refuses to furnish technical or monitoring reports, as required under this Certification, or falsifies any information provided in the monitoring reports, the Applicant will be subject to civil liability, for each day of violation, or criminal liability.

12. In response to a suspected violation of any condition of this Certification, the Central Valley Water Board may require the Applicant to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including cost of the reports, shall be in reasonable relationship to the need for the reports and the benefits to be obtained from them.

13. The Applicant shall allow staff of the Central Valley Water Board, or an authorized representative(s), upon the presentation of credentials and other documents, as may be required by law, to enter the Project premises for inspection, including taking photographs and securing copies of project-related records, for the purpose of assuring compliance with this Certification and determining the ecological success of the Project.

CENTRAL VALLEY WATER BOARD CONTACT PERSON:

Debra Mahnke, Water Resource Control Engineer
1685 E Street
Fresno, CA 93706
(559) 445-6281
debra.mahnke@waterboards.ca.gov

WATER QUALITY CERTIFICATION:

I hereby issue an order certifying that the proposed discharge from the University of California, Merced and University North Project, WDID 5B24CR00013, will comply with the applicable provisions of § 301 ("Effluent Limitations"), § 302 ("Water Quality Related Effluent Limitations"), § 303 ("Water Quality Standards and Implementation Plans"), § 306 ("National Standards of Performance"), and § 307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges That Have Received State Water Quality Certification."

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited to and all proposed mitigation being completed in strict compliance with the Applicant's project description, the attached "Project Information Sheet," and the Applicant's water quality certification application; and (b) compliance with all applicable requirements of the Central Valley Water Board's *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised June 2015.

Any person aggrieved by this action may petition the State Water Resources Control Board to review the action in accordance with California Water Code § 13320 and California Code of Regulations, title 23, § 2050 and following. The State Water Resources Control Board must receive the petition by 5:00 p.m., 30 days after the date of this action, except that if the thirtieth day following the date of this action falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Resources Control Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

for Pamela C. Creedon
Executive Officer

Enclosure: Water Quality Order No. 2003-0017 DWQ
Attachments: Project Information Sheet
Addendum to the 2009 UC Merced and University Community Project Environmental Impact Statement / Environmental Impact Report

cc: Jason Brush, Supervisor, Wetlands Regulatory Office, U.S. Environmental Protection Agency, Region 9, San Francisco (email)
Kate Dadey, Sacramento South Branch Chief, Regulatory Unit, Department of the Army, Corps of Engineers, Sacramento
Bill Orme, Water Quality Certification Unit Chief, Division of Water Quality, State Water Resources Control Board, Sacramento (email)
Julie Vance, Regional Manager, San Joaquin Valley-Southern Sierra Region, California Department of Fish and Wildlife, Fresno

PROJECT INFORMATION SHEET

Application Date: 2 November 2015

Applicant: University of California, Merced

Applicant Representatives: Phillip Woods

Project Name: UC Merced and University North Project

Application Number: WDID 5B24CR00013

Type of Project: Educational and commercial development

Project Location: 5200 N. Lake Road, Merced
Sections 26, 34, and 35, Township 6 South, Range 14 East, and Sections 2 and 3, Township 7 South, Range 14 East, MDB&M.
Latitude: 37°21'50" and Longitude: -120° 24' 59"

Project Duration: The Project began in 2009 and is expected to continue to 2030.

County: Merced

Receiving Water: Vernal pools, swale wetlands, and other wetlands features adjacent to, or tributary to Cottonwood Creek, Le Grand Canal, and Fairfield Canal, tributaries to the San Joaquin River.

Water Body Type: Vernal pools, swale wetlands, and other wetlands features

Designated Beneficial Uses: The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, Fourth Edition, revised June 2015 (Basin Plan), has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include, but are not limited to: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Industrial Supply (IND); Hydropower Generation (POW); Groundwater Recharge (GWR); Water Contact Recreation (REC-1); Non-Contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); Preservation of Biological Habitats of Special Significance (BIOL); Rare, Threatened, or Endangered Species (RARE); Migration of Aquatic Organisms (MIGR); Spawning, Reproduction, and/or Early Development (SPWN); and Wildlife Habitat (WILD). A comprehensive and specific list of the beneficial uses applicable for the project area can be found at http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/index.shtml.

Project Description: The Project consists of the development of a new university campus to eventually support a projected student body of 25,000 full-time equivalent students on up to 815 net acres of land in Merced County. The development of these lands on the Campus and Community North would result in the filling of a variety of wetlands.

Preliminary Water Quality Concerns: Construction activities may impact surface waters with increased turbidity and settleable matter. Construction activities may introduce invasive species to the Project area.

Proposed Mitigation to Address Concerns: Erosion control and pollution prevention best management practices will be implemented to protect water quality.

Fill/Excavation Area:

Current and Projected Wetland Fill (acres)

Type	Permitted Fill	Current Fill	Additional Fill by 2020	Total Fill by 2020	Remaining Fill
Vernal pools, swales, and clay slope wetlands	40.41	22.04	1.30	23.34	17.07
Seasonal (Canal and Irrigated) wetlands	37.38	4.48	4.95	9.43	27.95
TOTAL	**77.79**	**26.52**	**6.25**	**32.77**	**45.02**

Dredge Volume: None

U.S. Army Corps of Engineers Permit Number: Individual Permit SPK-1999-00203

Department of Fish and Wildlife Streambed Alteration Agreement: A Streambed Alteration Agreement is not required for this Project as all impacts are to wetlands.

Status of CEQA Compliance: As a responsible agency with the discretionary approval authority to approve, condition, or deny the Water Quality Certification renewal requested by UC Merced, the Central Valley Water Board reviewed the 2009 UC Merced and University Community Project Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) certified by UC Merced. The Central Valley Water Board has prepared an EIS/EIR Addendum pursuant to California Environmental Quality Act (CEQA) to document the change in the compensatory wetlands mitigation from the original mitigation in the EIS/EIR, and to analyze the potential environmental impacts that could result from the change.

Compensatory Mitigation: To compensate for loss of 77.79 acres of waters, the Applicant will complete the following mitigation, as discussed in the attached *Addendum to the 2009 UC Merced and University Community Project Environmental Impact Statement / Environmental Impact Report*, prepared by the Central Valley Water Board in compliance with CEQA:

1) Reestablishment of 10.5 acres of vernal pool wetlands on a portion of Lazy K Ranch in Madera County;

2) Reestablishment of 25 acres of vernal pool wetlands on the 5G's Corporation Yosemite Lake mitigation site in Merced County; and

3) Placement of a conservation easement on a 167-acre property owned by Merced County adjacent to the campus. The conservation of 30.74 acres of wetlands present on this property will serve as compensation for the filling of up to 37.38 acres of non-vernal pool seasonal wetlands authorized under the UC Merced 404 permit.

4) Compensation for filling 4.91 acres of vernal pools by any one or a combination of the following measures: avoid filling the remaining vernal pool wetlands still present on Campus Buildout lands;

restore previously filled vernal pool wetlands and/or create new vernal pool wetlands on the Campus Buildout lands; or pay the USACE in-lieu fee for the required acreage.

Additionally, approximately 1,048 acres of wetlands have been preserved under conservation easements, as described in the Compensatory Wetland Mitigation and Monitoring Plan, revised 2008.

Application Fee Provided: Total fees of $90,000 are required to be submitted as required by 23 CCR §3833(b)(3)(A) and by 23 CCR §2200(e) in order for this Certification to be valid.

California Department of Fish and Game
Central Region
1234 East Shaw Avenue
Fresno, California 93710

California Endangered Species Act
Incidental Take Permit No. 2081-2009-010-04

University of California, Merced
Campus and Community North Project

Authority: This California Endangered Species Act (CESA) Incidental Take Permit (ITP) is issued by the Department of Fish and Game (DFG) pursuant to Fish and Game Code section 2081, subdivisions (b) and (c), and California Code of Regulations, Title 14, section 783.0 et seq. CESA prohibits the take[1] of any species of wildlife designated by the California Fish and Game Commission as an endangered, threatened, or candidate species.[2] DFG, however, may authorize the take of any such species by permit if the conditions set forth in Fish and Game Code section 2081, subdivisions (b) and (c) are met. (See also Cal. Code Regs., tit. 14, § 783.4.)

Permittee:	**Regents of the University of California**
Principal Officer:	**Sung-Mo (Steve) Kang, Chancellor**
Contact Person:	**Brad Samuelson** **(209) 658-8487**
Mailing Address:	**University of California, Merced** **Post Office Box 2039** **Merced, California 95344**

Effective Date and Expiration Date of this ITP:
This ITP shall be executed in duplicate original form and shall become effective once a duplicate original is acknowledged by signature of the Permittee on the last page of this ITP and returned to DFG's Habitat Conservation Planning Branch at the address listed in the Notices section of this ITP. Unless renewed by DFG, this ITP's authorization to take the Covered Species shall expire on **February 28, 2036.**

Notwithstanding the expiration date on the take authorization provided by this ITP, Permittee's obligations pursuant to this ITP do not end until DFG accepts as complete the Permittee's Final Mitigation Report required by Condition 6.7 of this ITP.

---

[1]Pursuant to Fish and Game Code section 86, "'Take' means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill."

[2]"Candidate species" are species of wildlife that have not yet been placed on the list of endangered species or the list of threatened species, but which are under formal consideration for listing pursuant to Fish and Game Code section 2074.2.

Project Location:
The inclusive Project site is located in eastern Merced County, approximately two miles northeast of the limits of the City of Merced; occupying portions of Sections 26, 27, 34, and 35; Township 6 south; Range 14 east; and Sections 3 and 2; Township 7 south; Range 14 east (Mount Diablo Base and Meridian). The site is south-southeast of Lake Yosemite Regional Park, east of Lake Road, and the southern boundary of the Project site is Yosemite Avenue (Figures 1, 2, and 3).

Project Description:
In 2002, the Regents of the University of California (The Regents) approved the development of the University of California, Merced (UCM) Project (Project) which consisted of an approximately 2,000-acre UCM Campus and an adjacent 2,133-acre University Community with a 750-acre Campus Natural Reserve. Shortly thereafter, the University of California (UC) began construction of the first phase of the UCM Campus on a 910-acre portion of the 2,000-acre site that did not contain any wetlands or species protected pursuant to CESA. During the construction of the first phase of the Project, DFG staff met over the course of two years with the UCM staff, United States Fish and Wildlife Service (USFWS), United States Army Corps of Engineers (USACE), United States Environmental Protection Agency (USEPA), and others to assist the UC in developing focused mitigation strategies for inclusion in the Conservation Strategy for the Project and a modified Campus and associated Community footprint which would further reduce impacts to species protected pursuant to CESA.

Through the process, the configuration of the Project was compressed. In 2009, the University prepared an updated UCM Long Range Development Plan to address the changes in location and footprint and to guide the development of the Project. The Project now consists of the construction and operation of a major research University campus in Merced County which will sustain up to 25,000 full time students and a contiguous associated community to support the needs of the University. The Project site is comprised of an approximately 815-acre Campus; a 1,951-acre University Community; and a 1,307-acre Campus Natural Reserve which is not intended to be developed but would be used for the purposes of research, a vernal pool-grassland habitat/species laboratory for students, and for general education and outreach opportunities.

At full build-out, the Campus would include an academic core consisting of instruction, research, and administrative buildings; student housing; campus support; limited commercial development; parking; recreation facilities; transit, bike, and pedestrian paths; and infrastructure (stormwater collection/retention; potable water delivery; wastewater collection and treatment; fire and irrigation water; telecommunications, electric, and gas). The proposed University Community is divided into an approximately 833-acre Community North and a 1,118-acre Community South. The University Community North would be developed with a town center, a business park; mixed use commercial; cultural facilities; a range of

density levels of multi-family housing and single family residential neighborhoods; parks; open space; transit, bike, and pedestrian paths; schools; roads; parking; and other associated infrastructure. The University Community South would be developed in accordance with the County of Merced's previously adopted University Community Plan.

It is important to note that due to the contiguous location of the UC exclusively controlled Campus and Community North to the Community South; the Community South has been analyzed as part of the University Campus and the entire Community Project under both the California Environmental Quality Act (CEQA) and the National Environmental Protection Act. However, absent the execution of development agreements between the University of California, the County of Merced Local Agency Formation Commission, and the City of Merced, development of the Community South portion of the Project is not ready to move forward and is not covered under this ITP. However, the Community South is an integral part of the Project description in the broader context of analyzing the cumulative effects on the proposed Covered Species. Only the 819-acre Campus and the 839-acre Community North are currently being developed by the UC. Therefore, these two individual components collectively define the Project Area to be covered under this ITP. The expected North and South Campus Community at full build-out would include 11,616 dwelling units and a total residential population of approximately 30,780 persons.

Covered Species:

This ITP covers the following species:

Name	**Status**[3]
1. California tiger salamander (*Ambystoma californiense*)	Threatened[4]
2. Swainson's hawk (*Buteo swainsoni*)	Threatened[5]
3. Succulent owl's clover (*Castilleja campestris* ssp. *succulenta*)	Endangered[6]
4. Colusa grass (*Neostapfia colusana*)	Endangered[7]
5. San Joaquin orcutt grass (*Orcuttia inaequalis*)	Endangered[8]
6. San Joaquin kit fox (*Vulpes macrotis mutica*)	Threatened[9]

These species and only these species are hereinafter referred to as "Covered Species."

---

[3]Under CESA, a species may be on the list of endangered species, the list of threatened species, or the list of candidate species. All other species are "unlisted."

[4] See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(3)(G).

[5] See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(5)(A).

[6] See Cal. Code Regs. tit. 14 § 670.2, subd. (a)(33)(A).

[7] See Cal. Code Regs. tit. 14 § 670.2, subd. (a)(25)(B).

[8] See Cal. Code Regs. tit. 14 § 670.2, subd. (a)(25)(D).

[9] See Cal. Code Regs. tit. 14 § 670.5, subd. (b)(6)(B).

Impacts of the Taking on Covered Species:

Project activities and their resulting impacts are expected to result in the incidental take of individuals of the Covered Species. The UC conducted a number of biological resource surveys in 2000 and 2001 on Project lands and Habitat Management (HM) lands to establish the environmental baseline in support of the USFWS issued 2002 Biological Opinion. Since those initial surveys were conducted, the UC conducted additional surveys in 2003, 2004, 2007, and 2008 to determine the density and distribution of the proposed Covered Species and the results were incorporated into the Final Conservation Strategy for the UC Merced Project (October 2008). The combined survey effort provided an intensive analysis that informed the calculation of occupied habitat acreages and number of known occurrences of species within the UCM Campus footprint and the Community North Project Area (Figures 4 through 9).

The activities described above that are expected to result in incidental take of individuals of the Covered Species include all of the ground and vegetation disturbance, construction, operation of heavy equipment, vehicle and foot traffic, and other activities necessary for the full development, operation, and maintenance of the UCM Campus and Community North (Covered Activities). Incidental take of individuals of the Covered Species may occur from the Covered Activities in the form of mortality ("kill") from habitat loss and modification; Project-related ground and vegetation disturbance; removal or modification of the seed bank; heavy equipment operation; vehicle and foot traffic; inadvertent burrow collapse, and take during habitat restoration, management, and monitoring. Incidental take of individuals of the Covered Species may also occur from the Covered Activities in the form of catch, capture, or attempt to do so during trapping and relocation of individuals from the Project Area (salvage). The Project will also cause permanent and temporary loss of Covered Species habitat in the amounts indicated in Table 1, below. Other Project-related impacts are changes in the habitat that make the species more vulnerable to competition, disease, or predation; introduction or spread of invasive species; changes in drainage patterns that favors different vegetative growth; pesticide use; continued impacts from the routine operation and maintenance of Project infrastructure; temporal losses; increased habitat fragmentation and edge effects; and the Project's incremental contribution to cumulative impacts (indirect impacts).

Incidental Take Authorization of Covered Species:

This ITP authorizes incidental take of the Covered Species and only the Covered Species. With respect to incidental take of the Covered Species, DFG authorizes the Permittee, its employees, contractors, and agents to take Covered Species incidentally in carrying out the Covered Activities, subject to the limitations described in this section and the Conditions of Approval identified below. This ITP does not authorize take of Covered Species from activities outside the scope of the Covered Activities, take of Covered Species outside of the Project Area, take of Covered Species resulting from violation of this ITP, or intentional take

of Covered Species except for capture and relocation (salvage) of Covered Species as authorized by this ITP.

Table 1: Covered Species Habitat Impacts

Species	Habitat Type	Number of Acres Impact
1. California tiger salamander	Non-native grassland (upland refugia)	1,870 acres permanent
	Wetland breeding	7.5 acres permanent
2. Swainson's hawk	Non-native grassland (foraging)	1,514 acres permanent[a]
	Nesting	1 nesting tree(s)
3. San Joaquin kit fox	Non-native grassland	1,293 acres permanent[a] 676 acres temporary
4. Succulent owl's clover	Vernal pool	31 acres permanent
5. Colusa grass	Vernal pool	0 acres permanent[b]
6. San Joaquin orcutt grass	Vernal pool	0 acres permanent[b]

[a] Permanent habitat impacts are based on the ability of the species to utilize open space within the fully built Project Area on a limited basis for foraging, movement corridors, and/or nesting and denning.

[b] While Colusa grass and San Joaquin orcutt grass have not been identified in vernal pool habitat located on the UCM Campus and Community North, there is a strong likelihood both may be present within the Project Area based on the known abundance and distribution of these species on the adjacent HM lands.

Fully Protected Species:
This ITP does not authorize the take of any fully protected species. (See Fish and Game Code, §§ 3511, 4700, 5050, and 5515). DFG believes the Permittee can implement the Project as described in this ITP in a manner consistent with the Fish and Game Code provisions governing fully protected species. DFG's determination regarding Project consistency with Fish and Game Code provisions governing fully protected species is based, in part, on the Permittee's commitment independent of this ITP to implement and adhere to avoidance and minimization measures during Project implementation related to Golden eagle (*Aquila chrysaetos*) and White-tailed kite (*Elanus caeruleus*).

Conditions of Approval:
Unless specified otherwise, the following measures shall pertain to all Covered Activities within the Project Area, including areas used for ingress and egress. DFG's issuance of this

ITP and Permittee's authorization to take the Covered Species are subject to Permittee's compliance with and implementation of the following Conditions of Approval:

1. Legal Compliance. Permittee shall comply with all applicable State, federal, and local laws in existence on the effective date of this ITP or adopted thereafter.

2. CEQA Compliance. Permittee shall implement and adhere to the mitigation measures related to the Covered Species in the Biological Resources section of the Final Environmental Impact Statement/Environmental Impact Report (SCH Number: 2008041009) certified by the lead agency, the University of California, for the Project pursuant to CEQA in March 2009.

3. ESA Compliance. Permittee shall implement and adhere to the terms and conditions related to the Covered Species in the Formal Section 7 consultation on the University of California, Merced Campus and Infrastructure Project (199900203), Merced County, California (August 19, 2002) Biological Opinion (BO) and the Supplement to the Biological Assessment (BA) for the University of California, Merced Campus and University Community North (September 2008) for the Project pursuant to the Federal Endangered Species Act (ESA), unless those terms and conditions are less protective of the Covered Species or conflict with the conditions of this ITP. Permittee shall adhere to and implement all of the avoidance, minimization, and mitigation measures and all other conservation actions in accordance with the Requirements and Parameters of the BO which include, but are not limited to, the Final Conservation Strategy for the UC Merced Project (October 2008) and the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008).

4. ITP Time Frame Compliance. Permittee shall fully implement and adhere to the Conditions of this ITP within the time frames set forth below and as set forth in the Mitigation Monitoring and Reporting Program (MMRP), which is included as Attachment 1 to this ITP.

5. **General Provisions:**

   5.1. Designated Representative. Before initiating Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with DFG and overseeing compliance with this ITP. Permittee shall notify DFG in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify DFG in writing if a substitute Designated Representative is selected or identified at any time during the term of this ITP.

5.2. Designated Biologist. Permittee shall submit to DFG in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain DFG approval of the Designated Biologist in writing before starting Covered Activities, and shall also obtain approval in advance in writing if the Designated Biologist must be changed.

5.3. Designated Biologist Authority. To ensure compliance with the Conditions of Approval of this ITP, the Designated Biologist shall have authority to immediately stop any activity that is not in compliance with this ITP, and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species, or a species not covered by this ITP.

5.4. DFG Access. Permittee shall provide DFG staff with reasonable access to the Project Area and mitigation lands under Permittee control, and shall otherwise fully cooperate with DFG efforts to verify compliance with or effectiveness of mitigation measures set forth in this ITP.

5.5. Education Program. Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before they perform any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species; information about the distribution and habitat needs of the Covered Species; sensitivity of the Covered Species to human activities; the status of the Covered Species pursuant to CESA including legal protection; recovery efforts; penalties for violations; and the Project-specific protective measures described in this ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided for any new workers before their performing work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. The Permittee shall also maintain a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs.

5.6. Construction Monitoring Notebook. The Designated Biologist shall maintain a construction-monitoring notebook on-site throughout the construction period which shall include a copy of this ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review in the Project Area upon request by DFG.

5.7. Trash Abatement. Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in closed (animal-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.

5.8. Firearms and Dogs. Permittee shall prohibit firearms and domestic dogs from the Project Area and access routes during construction activities, except those in the possession of authorized security personnel or local, State, or federal law enforcement officials.

5.9. Animal Control Program. Permittee shall develop and establish a leash rules and an animal control program.

5.10. Erosion Control Materials. Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as mono-filament netting (erosion control matting) or similar material, in potential Covered Species' habitat.

5.11. Delineation of Property Boundaries. Before starting Covered Activities Permittee shall clearly delineate the boundaries of the construction area with fencing, stakes, or flags. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes and flags until the completion of construction.

5.12. Delineation of Habitat. Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord, and place fencing as necessary to minimize the disturbance of Covered Species' habitat.

5.13. Dust Control. Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles.

5.14. Project Access. Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. Permittee shall ensure that vehicle speeds do not exceed 20 miles per hour to avoid Covered Species on or traversing the roads. Permittee shall strictly prohibit off-road traffic outside the designated Project Area. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact DFG for written approval before carrying out such an activity. DFG may require an amendment to this ITP if additional take of Covered Species may result from Project modification.

5.15. Staging Areas. Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area.

5.16. Hazardous Materials. Permittee shall immediately stop and following pertinent State and federal statutes and regulations arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.

5.17. Refuse Removal. Upon completion of construction Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.

6. **Monitoring, Notification and Reporting Provisions:**

6.1. Notification Before Commencement. The Designated Representative shall notify DFG 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.

6.2. Notification of Non-compliance. The Designated Representative shall immediately notify DFG in writing if it determines that the Permittee is not in compliance with any Condition of Approval of this ITP, including but not limited to any actual or anticipated failure to implement measures within the time

periods indicated in this ITP and/or the MMRP. The Designated Representative shall report any non-compliance with this ITP to DFG within 24 hours.

6.3. Compliance Monitoring. Initially, the Designated Biologist shall be on-site daily when Covered Activities occur. The Designated Biologist shall conduct compliance inspections to (1) minimize incidental take of the Covered Species and to check for compliance with all mitigation and avoidance measures; (2) prevent unlawful take of species; (3) check for compliance with all measures of this ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing: oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by this ITP. Eventually, DFG may approve, in writing, periodic inspections once maintenance activities are on-going and more routine in nature.

6.4. CNDDB Observations. The Designated Biologist shall submit all confirmed Covered Species sightings to the California Natural Diversity Database (CNDDB) within 60 calendar days of the observation. The Designated Biologist(s) shall include the following documented information: the date, time, and location of each occurrence using Global Positioning System (GPS) technology, the name of the party that actually identified the plant or animal, circumstances of the incident, the general condition and health of each individual, any diagnostic markings, sex, age (juvenile or adult), actions undertaken, and habitat description.

6.5. Monthly Compliance Report. The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition 6.3 into a Monthly Compliance Report and submit it to DFG along with a copy of the MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted to DFG's Regional Office at the office listed in the Notices section of this ITP and via e-mail to DFG's Regional Representative. At the time of this ITP's approval, the DFG Regional Representative is Annee Ferranti (aferranti@dfg.ca.gov). DFG may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If DFG determines the reporting schedule must be changed, DFG will notify Permittee in writing of the new reporting schedule.

6.6. Annual Status Report. Permittee shall provide DFG with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of this ITP and continuing until DFG accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all Monthly Compliance Reports identified in Condition 6.5, (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and mitigating Project impacts; (5) all available information about Project-related take of the Covered Species; and (6) information about other Project impacts on the Covered Species.

6.7. Final Mitigation Report. No later than 45 days after completion of all mitigation measures, Permittee shall provide DFG with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of this ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.

6.8. Notification of Take. Permittee shall immediately notify the Designated Biologist if a Covered Species is killed or taken by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to DFG by calling the Regional Office at (559) 243-4005. The initial notification to DFG shall include information regarding the location, species, number of animals taken and the ITP Number. Following initial notification, Permittee shall send DFG a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the animal or carcass, and if possible provide a photograph, explanation as to cause of take, and any other pertinent information.

7. **Take Avoidance and Minimization Measures:**
The following requirements are intended to ensure the minimization of incidental take of Covered Species in the Project Area during Covered Activities. Permittee shall

implement and adhere to the following conditions to minimize take of Covered Species:

7.1. California Tiger Salamander Surveys. The Designated Biologist shall survey the work site before the Permittee begins Covered Activities. If the Designated Biologist finds any life stages of California tiger salamander (adults, eggs, or larvae) the Designated Biologist or Designated Representative shall immediately contact USFWS and DFG. The Designated Biologist shall hold the appropriate State and federal Scientific Collecting Permits (SCP) for amphibians to be authorized to capture and handle California tiger salamander. The Designated Biologist may be assisted by approved biologists that do not have an SCP; these biologists shall be identified as Designated Monitors.

7.2. California Tiger Salamander Relocation Plan. The Designated Biologist shall prepare a California tiger salamander relocation plan and submit it to USFWS and DFG for approval at least 30 days prior to the beginning of Covered Activities occurring within 1.3 miles of known California tiger salamander breeding pools. Covered Activities within these areas may not proceed until the relocation plan is approved by DFG.

7.3. California Tiger Salamander in Project Area. If California tiger salamander is found by any person in the Project Area before or during Covered Activities, the Permittee shall immediately stop all work that could potentially harm the California tiger salamander until the Designated Biologist can relocate the California tiger salamander to an active rodent burrow system in accordance with the approved relocation plan.

7.4. Small Mammal Burrow Excavation. The Designated Biologist shall fully excavate by hand any small mammal burrows present within the construction footprint that are within 1.3 miles of potential or known California tiger salamander breeding sites. The Designated Biologist shall relocate any live California tiger salamander discovered during burrow excavation in accordance with the approved relocation plan.

7.5. California Tiger Salamander Exclusion Fencing. Permittee shall place California tiger salamander exclusion fencing around the construction footprint following the hand excavation of burrows in upland habitat areas within 1.3 miles of potential or known California tiger salamander breeding sites. Permittee shall maintain the California tiger salamander exclusion fencing throughout all construction activities. Permittee shall use wildlife fencing, which consists of a fine (less then 0.4 inch) mesh equipped with one-way exits to avoid entrapment of amphibians inside the fence. Permittee shall bury fencing

to a depth of six inches and fencing shall be a minimum of 3.3 feet tall following installation. The fencing shall include the optional barrier lip designed to prevent species such as California tiger salamander from climbing over. The Permittee shall avoid small mammal burrows to the maximum extent possible during installation of the exclusion fencing. Where burrows cannot be avoided, the Designated Biologist shall excavate them by hand before the fence is installed.

7.6. Rain Forecast. The Designated Biologist and Permittee shall monitor the National Weather Service 72-hour forecast for the Project Area. If a 70 percent or greater chance of rainfall is predicted within 72 hours, Permittee shall cease all Covered Activities in areas within 1.3 miles of potential or known California tiger salamander no further rain is forecast. If work must continue when rain is forecast, a Designated Biologist shall survey the Project construction footprint before construction begins each day that rain is forecast. If a Designated Monitor is used to conduct surveys, a Designated Biologist must remain on site to capture and relocate any California tiger salamander that are discovered during the surveys. If rain exceeds ¼ inch during a 24-hour period, Permittee shall cease work until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known California tiger salamander breeding sites once they have been encircled with California tiger salamander exclusion fencing pursuant to ITP Condition 7.5. However, even after California tiger salamander exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.3 miles of potential or known California tiger salamander breeding sites but outside of the salamander exclusion fencing (e.g., on roads).

7.7. Night Work. Permittee shall strictly prohibit all night work in areas within 1.3 miles of potential or known California tiger salamander breeding sites when a 70 percent or greater chance of rainfall is predicted within 72 hours of Covered Activities until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known California tiger salamander breeding sites once they have been encircled with California tiger salamander exclusion fencing pursuant to ITP condition 7.5. However, even after salamander exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.3 miles of potential or known California tiger salamander breeding sites but outside of the California tiger salamander exclusion fencing (e.g., on roads).

7.8. Soil Stockpiles. Permittee shall ensure that soil stockpiles are placed where soil will not pass into potential California tiger salamander breeding pools or into

any other "Waters of the State," in accordance with Fish and Game Code 5650. Permittee shall appropriately protect stockpiles to prevent soil erosion.

7.9. Barriers to California Tiger Salamander Movement. Permittee shall construct roadways within 1.3 miles of known or potential California tiger salamander breeding sites, including but not limited to the sites shown on Figure 1, without steep curbs, berms, or dikes, which could prevent California tiger salamander from exiting the roadway. If curbs are necessary for safety and/or surface runoff, Permittee shall design and construct them to allow California tiger salamander to walk over them. If steep dikes are required, Permittee shall design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow California tiger salamander passage.

7.10. Fieldwork Code of Practice. To ensure that disease is not conveyed between work sites all Biologists shall follow the fieldwork code of practice developed by the Declining Amphibian Populations Task Force Fieldwork Code of Practice (Attachment 2). The Designated Biologist may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

7.11. Open Trenches. The Designated Biologist shall inspect all open holes, sumps, and trenches within the Project Area at the beginning, middle, and end of each day for trapped animals. To prevent inadvertent entrapment of Covered Species or any other animals the Designated Biologist shall oversee the covering of all excavated, steep-walled holes or trenches more than two feet deep, or of any depth if they contain water or other material, with plywood or other barrier materials at the close of each working day such that animals are unable to enter and become entrapped. Alternatively, Permittee shall provide earthen escape ramps of no more than 3:1 slope every 200 feet. Before holes or trenches are filled, the Designated Biologist shall thoroughly inspect them for trapped animals. If any worker discovers that Covered Species have become trapped, Permittee shall cease all Covered Activities in the vicinity and notify the Designated Biologist immediately. Project workers and the Designated Biologist shall allow the Covered Species to escape unimpeded if possible, or the Designated Biologist Covered Activities are allowed to continue. If an injured Covered Species is discovered at any time, the Designated Representative shall contact the USFWS Sacramento Fish and Wildlife Office and DFG's Regional Representative within one working day of the incident.

7.12. Equipment Inspection. Workers shall inspect for Covered Species under vehicles and equipment before the vehicles and equipment are moved. If a

Covered Species is present, the worker shall notify the Designated Biologist and wait for the Covered Species to move unimpeded to a safe location. Alternatively, especially if the animal is inside the fenced Project Area, the Designated Biologist shall move the Covered Species out of harm's way outside of the Project Area and in compliance with the approved relocation plan, if applicable.

7.13. Materials Inspection. Workers shall thoroughly inspect all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored for one or more overnight periods for Covered Species before the pipe is subsequently moved, buried, or capped. If during inspection a Covered Species is discovered inside a pipe, workers shall notify the Designated Biologist and allow the animal to safely escape that section of pipe before moving and utilizing the pipe.

7.14. Raptor Surveys. The Designated Biologist shall conduct preconstruction surveys during the raptor nesting season (February 15 through September 15), within 0.5 mile of Covered Activities. The Designated Biologist or Designated Representative shall provide the survey results to DFG in a written report within 30 days of beginning Covered Activities.

7.15. Nesting Swainson's Hawk. If a nesting Swainson's hawk is found within 0.5 mile of the Project Area, including access routes, during the nesting season (February 15 through September 15), the Designated Biologist shall be present daily for the entire duration of any Covered Activities to monitor the behavior of any Swainson's hawk nesting within 500 feet to 0.5 mile of Covered Activities. The Designated Biologist shall have the authority to order the cessation of all activities within 0.5 mile of any Swainson's hawk nest if the birds exhibit distress and/or abnormal nesting behavior (swooping/stooping, excessive vocalization (distress calls), agitation, failure to remain on nest, failure to deliver prey items for an extended time period, etc.) which may cause reproductive failure (nest abandonment and loss of eggs and/or young). Permittee shall not resume Covered Activities until DFG has been consulted by the Designated Biologist, and both the Designated Biologist and DFG confirm that the bird's behavior has normalized.

7.16. Swainson's Hawk Nest Buffer. The Permittee and Designated Biologist shall ensure that no Covered Activities occur within 500 feet of a Swainson's hawk nest during the nesting season (February 15 through September 15).

7.17. Tree Removal. Permittee shall prohibit removal of trees to between September 16 and February 14 of any year to avoid impacts to nesting Swainson's hawk.

7.18. Tree Replacement. If Covered Activities affecting Swainson's hawk result in the removal of a Swainson's hawk nest tree in the Project Area, the Permittee shall plant native species replacement trees at a 4:1 ratio (four trees for each nest tree removed) on HM lands in close proximity to suitable foraging habitat. The HM Lands manager shall monitor the tree survival rates and shall report them in the ASR pursuant to the reporting requirements of Condition 6.6 of this ITP. Permittee shall ensure that the number of trees required as compensation under this ITP matches the number of healthy and thriving trees at the end of the initial five-years monitoring period. Permittee shall plant replacement trees that are separated from each other by at least 0.75 mile and shall not plant trees within 1.5 miles of a known Swainson's hawk nest tree.

7.19. San Joaquin Kit Fox Survey. No more than 30 days prior to Permittee beginning Covered Activities, the Designated Biologist shall perform a pre-construction survey for San Joaquin kit fox that covers the Project Area and a buffer zone of 200 feet beyond the Project Area.

7.20. Den Monitoring and Excavation. The Designated Biologist shall monitor all potential, atypical, active, and known San Joaquin kit fox dens (USFWS 1999) identified in the Project Area during preconstruction or previous surveys for a minimum of three consecutive nights using standard methods, including "dusting" the den entrance and apron and other means (infrared camera) if necessary. Only when the den is determined to be unoccupied may the den be excavated under the direction of the Designated Biologist. If a San Joaquin kit fox is still present after three or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of the Designated Biologist, it is temporarily vacant. The Designated Biologist may excavate the den during the animal's normal foraging activities. The Designated Biologist shall excavate the den by hand unless soil conditions necessitate the use of excavating equipment; however, extreme caution must be exercised. The Designated Biologist shall accomplish the destruction of the den by careful excavation until it is certain that no San Joaquin kit fox are inside. The Designated Biologist shall fully excavate the den, fill it with dirt, and compact it to ensure that San Joaquin kit fox cannot reenter or use the den during the Covered Activities. If at any point during excavation a San Joaquin kit fox is discovered inside the den, the Designated Biologist shall immediately cease the excavation activity and continue monitoring of the den as described above. Destruction of the den may be completed when, in the judgment of the Designated Biologist, the San Joaquin kit fox has escaped from the partially destroyed den. Exclusion of San Joaquin kit fox from active natal dens may not occur during the pupping/rearing season.

7.21. Replacement San Joaquin Kit Fox Dens. Permittee shall replace each potential, known, and active San Joaquin kit fox den that must be destroyed with an artificial den to compensate for the loss of important shelter used for protection, reproduction, and escape from predators. The Designated Biologist shall determine the appropriate design and placement of replacement dens through consultation with USFWS and DFG on a site-specific basis.

7.22. Covered Species Injury. If a Covered Species is injured as a result of Covered Activities, the Designated Biologist shall immediately take it to a DFG-approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility before starting Covered Activities. Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. Permittee shall notify DFG of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report. Notification shall include the date, time, location (GPS coordinates) and circumstances of the incident, and the name of the facility where the animal was taken.

7.23. Salvage Plan. The Permittee shall develop a salvage plan for succulent owls' clover, San Joaquin orcutt grass, and Colusa grass and submit it to USFWS and DFG for approval at least 30 days prior to beginning Covered Activities within 1,000 feet of known vernal pools, swales, or other wetland habitat. Covered Activities within these areas may not proceed until the salvage plan is approved by DFG.

7.24. Botanical Surveys. In areas with intact vernal pool, swale, or wetland habitat the Designated Biologist shall conduct botanical surveys prior to the Permittee beginning Covered Activities. The botanical surveys shall be floristic in nature, cover the entire area of direct and indirect effects, and should be timed appropriately to detect all species which may occur within the Project Area. The Designated Biologist or Designated Representative shall provide the survey results to DFG in a written report within 30 days of the beginning of Covered Activities within areas with intact vernal pool, swale, or wetland habitat.

7.25. Placement of Exclusion Fencing. Temporary fencing that delineates the Project Area as required by Condition 5.11 and 5.12 shall be placed by the Permittee such that it excludes the greatest number of Covered Species possible. Exact fencing locations shall be determined by the Designated Biologist.

7.26. Plant Salvage and Relocation. If any of the plant Covered Species are found in the Project Area, the Designated Biologist shall salvage and transplant them in accordance with the DFG-approved salvage plan.

7.27. Notification of Plant Damage. If a plant Covered Species is destroyed or damaged as a result of Project-related activities outside of the identified Project Area, or because avoidance and minimization measures included in this ITP were not followed, the Permittee shall notify DFG of the incident immediately, including the extent to which damage to the Covered Species occurred via telephone and email, followed by a written incident report submitted to DFG. Notification shall include the date, time, location (GPS coordinates), and circumstances of the incident.

8. **Habitat Management Land Acquisition:**
DFG has determined that permanent protection and perpetual management of compensatory habitat is necessary and required pursuant to CESA to fully mitigate Project-related impacts of the taking on Covered Species that will result with implementation of the Covered Activities. This determination is based on factors including an assessment of the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and DFG's estimate of the acreage required to provide for adequate compensation.

To meet this requirement, the Permittee shall provide for the permanent protection and management of 6,236 acres of HM Lands by recording a conservation easement, selecting a land manager, and funding the long-term management of the HM Lands.

8.1. There are two types of conservation lands associated with the Project: lands owned in fee title by the UC and The Nature Conservancy and located immediately adjacent to the campus (i.e.: Tier 1 properties – Virginia Smith Trust, Campus Natural Reserve, Myers Easterly, and Cyril Smith Trust), and other lands in the region set aside for resource conservation and held under easement (i.e.: Tier 2 properties – the Robinson, Chance, Carlson, Nelson, and Cunningham properties). Permittee shall permanently preserve 6,236 acres of Tier 1 HM lands which are currently owned in fee title by the UC and located in eastern Merced County (Figure 2). The Cyril Smith Trust is not included in the acreage of HM Lands because it is not owned in fee title by the Permittee. The Tier 1 lands to be used as HM Lands for the Project include:

8.1.1. The 5,098-acre Virginia Smith Trust Preserve (VST);

8.1.2. The 1,307-acre Campus Natural Reserve (CNR); and

8.1.3. The 101-acre Myers Easterly.

8.2. The HM lands consist of high quality habitat for the Covered Species as determined through extensive biological resource surveys spanning multiple

years. Based upon these surveys, Table 2 contains the acreage of habitat on the HM lands known to be occupied by Covered Species:

Table 2. Acreage of Habitat on HM Lands Known to be Occupied by Covered Species

Species	Habitat Type	Number of Acres		
		VST	CNR	Myers Easterly
1. California tiger salamander	Non-native grassland (upland refugia)	5,098	1,270	94
2. Swainson's hawk	Non-native grassland (foraging)	5,098	1,270	94
3. San Joaquin kit fox	Non-native grassland	5,048	1,181	48
4. Succulent owl's clover	Vernal pool, wetland	194	111	0
5. SJV orcutt grass	Vernal pool, wetland	0	16	0
6. Colusa grass	Vernal pool, wetland	0	14	0

8.3. As part of this condition, Permittee shall:

8.3.1. Convey a conservation easement to DFG over the VST, CNR, and Meyers Easterly HM lands under terms approved by DFG within 18 months of execution of this ITP. Alternatively, the transfer may be to a DFG-approved non-profit organization qualified pursuant to California Government Code section 65965, with DFG named as a third party easement beneficiary.

8.3.2. Provide a recent preliminary title report, initial hazardous materials survey report, and other documents that may be necessary for the conservation easement (see Attachment 3). All documents are subject to the approval of DFG, and if applicable, the Wildlife Conservation Board and the Department of General Services.

8.3.3. Manage the VST, CNR, and Meyers Easterly in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008) and incorporate the plan by reference into the conservation easements. In addition, Permittee shall implement the Take Avoidance and Minimization required in ITP Condition 8 when conducting

biological monitoring, infrastructure maintenance or improvement, and management activities.

8.3.4. Permittee may select the conservation easement grantee, land owner, or other party as the land manager. Documents related to land management shall identify the land manager. Permittee shall notify DFG of any subsequent changes in the land manager within 30 days of the change.

8.3.5. Reimburse DFG for reasonable expenses incurred during title and documentation review, expenses incurred from other State agency reviews, and overhead related to transfer of HM lands to DFG. DFG estimates that this Project will create an additional cost to DFG of no more than $3,000 for every fee title deed or easement processed.

9. Performance Security:

9.1. Sung Mo "Steve" Kang, UCM Chancellor, has submitted a letter dated January 26, 2011 (Attachment 4) confirming that the William and Flora Hewlett Foundation (Hewlett Foundation) has already provided $2 million for the long-term management of the HM lands. This $2 million will continue to be managed through the UC General Endowment Pool and it is estimated that it will provide $80,000 per year of interest income in perpetuity. This interest income shall be available for the operation, management and protection of HM lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the HM lands, in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008). Take Avoidance and Minimization required in ITP Condition 8 shall also be implemented when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.

9.2. Within one week of executing this ITP, Permittee shall provide DFG with the following:

a) A draft Memorandum of Understanding (MOU) between the UC and DFG outlining the conditions under which the UC could hold endowment monies. These monies would be held in a special deposit account established pursuant to Fish and Game Code section 13014 and based on DFG's pilot program for Local Government and Special Districts (November 2010, Attachment 4).

b) The MOU must be finalized within three months of executing this ITP, except that this period may be extended if DFG has approved a draft MOU, and requires additional time for its internal processing. Absent finalization of this MOU within three months of executing this ITP, $2 million shall be submitted to DFG, where it shall be deposited in a special deposit account established pursuant to Fish and Game Code section 13014. Alternatively, the $2 million shall be provided to the National Fish and Wildlife Foundation (NFWF). DFG may pool the endowment with other endowments for the operation, management and protection of HM lands for local populations of the Covered Species. The land manager may be reimbursed for actual costs associated with HM land management (in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008), for up to the amount generated annually.

Amendment:
This ITP may be amended as provided by California Code of Regulations, Title 14, section 783.6, subdivision (c), and other applicable regulations and law. This ITP may also be amended without the concurrence of the Permittee as required by law, including if DFG determines that continued implementation of the Project under existing ITP conditions would jeopardize the continued existence of the Covered Species or that Project changes or changed biological conditions necessitate an ITP amendment to ensure that impacts to the Covered Species are minimized and fully mitigated.

Stop-Work Order:
DFG may issue Permittee a written stop-work order to suspend any activity covered by this ITP for an initial period of up to 25 days to prevent or remedy a violation of any ITP condition(s) (including but not limited to failure to comply with reporting, monitoring, or habitat acquisition obligations) or to prevent the illegal take of an endangered, threatened, or candidate species. Permittee shall comply with the stop-work order immediately upon receipt thereof. DFG may extend a stop-work order under this provision for a period not to exceed 25 additional days, upon written notice to the Permittee. DFG may commence the formal suspension process, pursuant to California Code of Regulations, Title 14, section 783.7, within five working days of issuing a stop-work order. Neither the Designated Biologist nor DFG shall be liable for any costs incurred in complying with the Conditions of Approval, including stop-work orders.

Compliance with Other Laws:
This ITP contains DFG's requirements for the Project pursuant to CESA. This ITP does not necessarily create an entitlement to proceed with the Project. Permittee is responsible for complying with all other applicable State, federal, and local laws.

Notices:
The Permittee shall deliver a fully executed duplicate original ITP by registered first class mail or overnight delivery to the following address:

Habitat Conservation Planning Branch
California Department of Fish and Game
Attention: CESA Permitting Program
1416 Ninth Street, Suite 1260
Sacramento, California 95814

Written notices, reports and other communications relating to this ITP shall be delivered to DFG by registered first class mail at the following addresses, or at addresses DFG may subsequently provide the Permittee. Notices, reports, and other communications shall reference the Project name, Permittee, and ITP Number (2081-2009-010-04) in a cover letter and on any other associated documents.

Original cover with attachment(s) to:

Jeffrey R. Single, Ph.D.; Regional Manager
Central Region
Department of Fish and Game
1234 East Shaw Avenue
Fresno, California 93710
Telephone (559) 243-4005, extension 121
Fax (559) 243-4026

Copy of cover without attachment(s) to:

Office of the General Counsel
California Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, California 95814

And:

Habitat Conservation Planning Branch
California Department of Fish and Game
1416 Ninth Street, Suite 1260
Sacramento, California 95814

Unless Permittee is notified otherwise, DFG's Regional Representative for purposes of addressing issues that arise during implementation of ITP is:

Annee Ferranti, Senior Environmental Scientist
Central Region
Department of Fish and Game
1234 East Shaw Avenue
Fresno, California 93710
Telephone (559) 243-4014, extension 227
Fax (559) 243-4020

Compliance with CEQA:
DFG's issuance of this ITP is subject to CEQA. DFG is a responsible agency pursuant to CEQA with respect to this ITP because of prior environmental review of the Project by the lead agency, the Regents of the University of California (See generally Pub. Resources Code, §§ 21067, 21069.) The lead agency's prior environmental review of the Project is set forth in the University of California, Merced Campus and Community North Project Environmental Impact Report (EIR) (State Clearinghouse Number 2008041009) dated November 7, 2008 that the lead agency certified for the University of California, Merced Campus and Community North on March 19, 2009. At the time the lead agency certified the EIR and approved the Project it also adopted all mitigation measures described in the EIR as conditions of Project approval.

In fulfilling its obligations as a responsible agency, DFG's obligations pursuant to CEQA are more limited than those of the lead agency. DFG, in particular, is responsible for considering only the effects of those Project activities that it is required by law to carry out or approve, and mitigating or avoiding only the direct or indirect environmental effects of those parts of the Project that it decides to carry out, finance, or approve (Pub. Resources Code § 21002.1, subd. (d); CEQA Guidelines, §§ 15041, subd. (b), 15096, subds. (f)-(g).)[10]. Accordingly, because DFG's exercise of discretion is limited to issuance of this ITP, DFG is responsible for considering only the environmental effects that fall within its permitting authority pursuant to CESA.

This ITP, along with DFG's CEQA findings for this ITP and Project, which are available as a separate document, provide evidence of DFG's consideration of the lead agency's EIR for the Project and the environmental effects related to issuance of this ITP (CEQA Guidelines, § 15096, subd. (f)). DFG finds that issuance of this ITP will not result in any previously undisclosed potentially significant effects on the environment or a substantial increase in the severity of any potentially significant environmental effects previously disclosed by the lead

[10] The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

agency. Furthermore, to the extent the potential for such effects exists, DFG finds adherence to and implementation of the Conditions of Project Approval adopted by the lead agency, as well as adherence to and implementation of the Conditions of Approval imposed by DFG through the issuance of this ITP, will avoid or reduce to below a level of significance any such potential effects. DFG consequently finds that issuance of this ITP will not result in any significant, adverse impacts on the environment.

Findings Pursuant to CESA:
These findings are intended to document DFG's compliance with the specific findings requirements set forth in CESA and related regulations. (Fish & G. Code § 2081, subs. (b)-(c); Cal. Code Regs., tit. 14, §§ 783.4, subds, (a)-(b), 783.5, subd. (c)(2).)

DFG finds that issuance of this ITP complies and is consistent with the criteria governing the issuance of ITPs pursuant to CESA:

(1) Take of Covered Species as defined in this ITP will be incidental to the otherwise lawful activities covered under this ITP;

(2) Impacts of the taking of the Covered Species will be minimized and fully mitigated through the implementation of measures required by this ITP and as described in the MMRP. Measures include: (1) Monthly Compliance Reports; (2) establishment of avoidance zones; (3) worker education; and 4) permanent habitat protection. DFG evaluated factors including an assessment of the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and DFG's estimate of the acreage required to provide for adequate compensation. This determination was based in part on the impact analysis contained in the *Biological Assessment CWA Section 404 Permit Applications for UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project* (February, 2002, see Chapter IX), the *Supplement to the Biological Assessment for the UC Merced Campus Project* (July 2002, see Section 5), the *2008 Supplement to the Biological Assessment for the University of California, Merced Campus and University Community North* (September, 2008, see Chapter 7) and the *UC Merced and University Community Project Final Environmental Impact Statement/Environmental Impact Report,* SCH No. 2008041009 (March 2009), as well as the conservation approach and mitigation strategy contained in the *Formal Section 7 Consultation on the University of California, Merced Campus and Infrastructure Project (199900203), Merced County, California (*reference # 1-1-02-F-0107), and the *Final Conservation Strategy for the UC Merced Project* (October, 2008, see page 1-7 and Chapters 5, 6, and 8), the latter of which was developed with significant DFG input. Based on the above referenced material, DFG has determined that the protection and management in perpetuity of 6,506 acres of compensatory habitat that is contiguous with other protected Covered Species

habitat and/or is of higher quality than the habitat being destroyed by the Project, along with the minimization, monitoring, reporting, and funding requirements of this ITP minimizes and fully mitigates the impacts of the taking caused by the Project;

(3) The take avoidance and mitigation measures required pursuant to the conditions of this ITP and its attachments are roughly proportional in extent to the impacts of the taking authorized by this ITP. This determination is based on the information contained in the *Final Conservation Strategy for the UC Merced Project* (October, 2008) and the *Formal Section 7 Consultation on the University of California, Merced Campus and Infrastructure Project (199900203), Merced County, California* (reference # 1-1-02-F-0107), both of which describe the Covered Species habitat and resources present on the Project site and HM lands. The ability for the HM lands to be managed in a way that sufficiently offsets Project-related take is based on information contained in the *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced* (September, 2008).

(4) The measures required by this ITP maintain Permittee's objectives to the greatest extent possible;

(5) All required measures are capable of successful implementation;

(6) This ITP is consistent with any regulations adopted pursuant to Fish and Game Code sections 2112 and 2114;

(7) Permittee has ensured adequate funding to implement the measures required by this ITP as well as for monitoring compliance with, and the effectiveness of, those measures for the Project; and

(8) Issuance of this ITP will not jeopardize the continued existence of the Covered Species based on the best scientific and other information reasonably available, such as the *Final Conservation Strategy for the UC Merced Project* (October, 2008) which was made available to the general public as an Appendix to *the UC Merced and University Community Project Draft Environmental Impact Statement/Environmental Impact Report* (November 2008). This finding includes consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of (1) known population trends; (2) known threats to the species; and (3) reasonably foreseeable impacts on the species from other related projects and activities. Moreover, DFG's finding is based, in part, on DFG's express authority to amend the terms and conditions of this ITP without concurrence of the Permittee as necessary to avoid jeopardy and as required by law.

Attachments:

FIGURE 1	Project Location
FIGURE 2	Conservation Lands Associated with the UCM Project
FIGURE 3	UCM Campus and University Community – Project Lands
FIGURE 4	UCM Proposed Action and University's Proposed Project
FIGURE 5	Vernal Pools, Swales, and Clay Playas in the UCM Project Area
FIGURE 6	Distribution of California Tiger Salamander Observations in the UCM Project Area
FIGURE 7	Succulent Owl's-Clover in the USM Project Area
FIGURE 8	Colusa Grass in the UCM Project Area
FIGURE 9	San Joaquin Valley Orcutt Grass in the UCM Project Area

ATTACHMENT 1	Mitigation Monitoring and Reporting Program
ATTACHMENT 2	Declining Amphibian Populations Task Force Fieldwork Code of Practice
ATTACHMENT 3	Habitat Management Lands Checklist
ATTACHMENT 4	Hewlett Foundation Confirmation Letter

ISSUED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME

on 3/30/11.

JEFFREY R. SINGLE, PH.D.
Regional Manager
CENTRAL REGION

ACKNOWLEDGMENT

The undersigned: (1) warrants that he or she is acting as a duly authorized representative of the Permittee, (2) acknowledges receipt of this ITP, and (3) agrees on behalf of the Permittee to comply with all terms and conditions of this ITP.

By: S.M. Kang Date: 4/6/11

Printed Name: S.M. Kang Title: Chancellor

Figure 1. Project Location

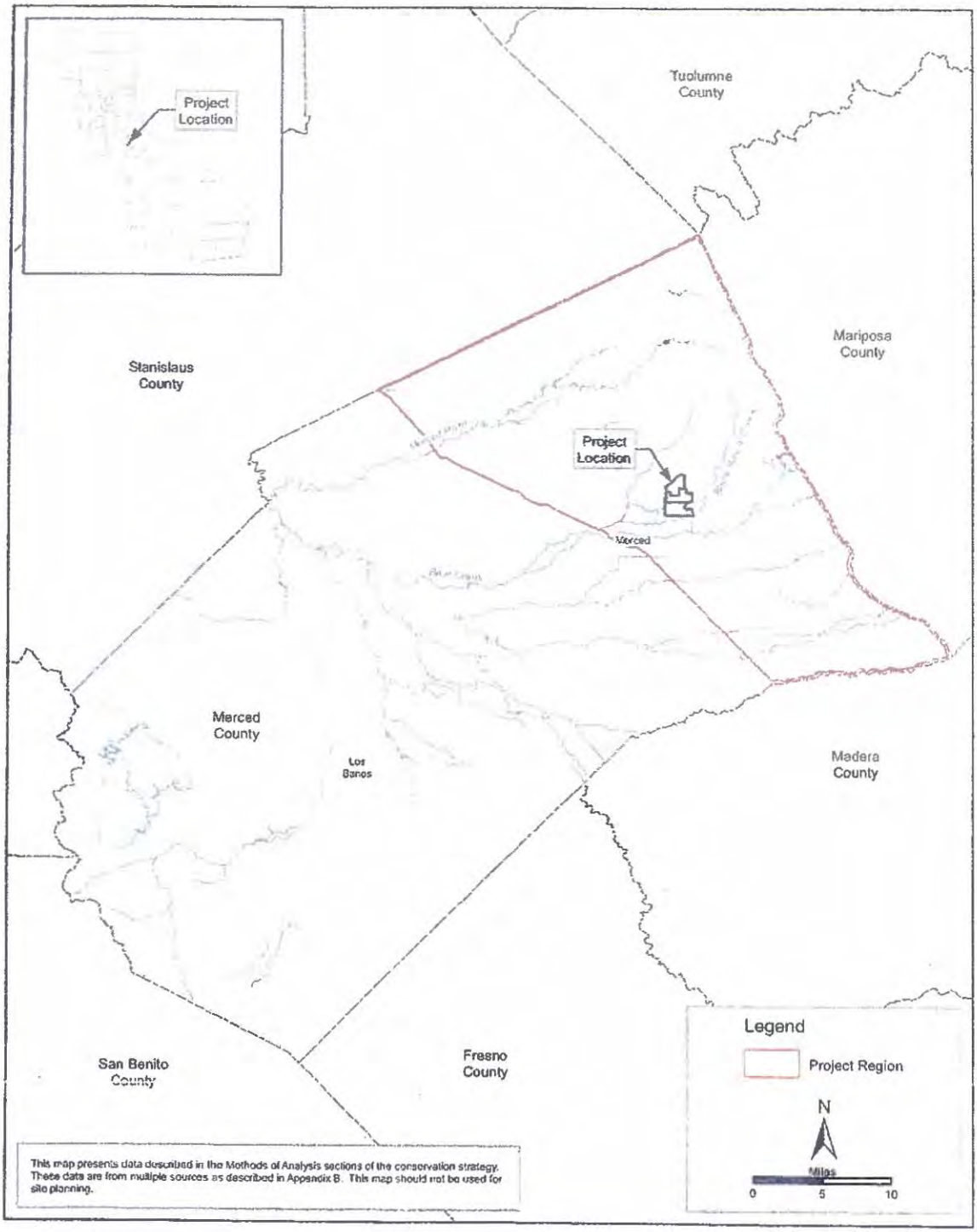


Figure 2. Conservation Lands Associated with the UCM Project

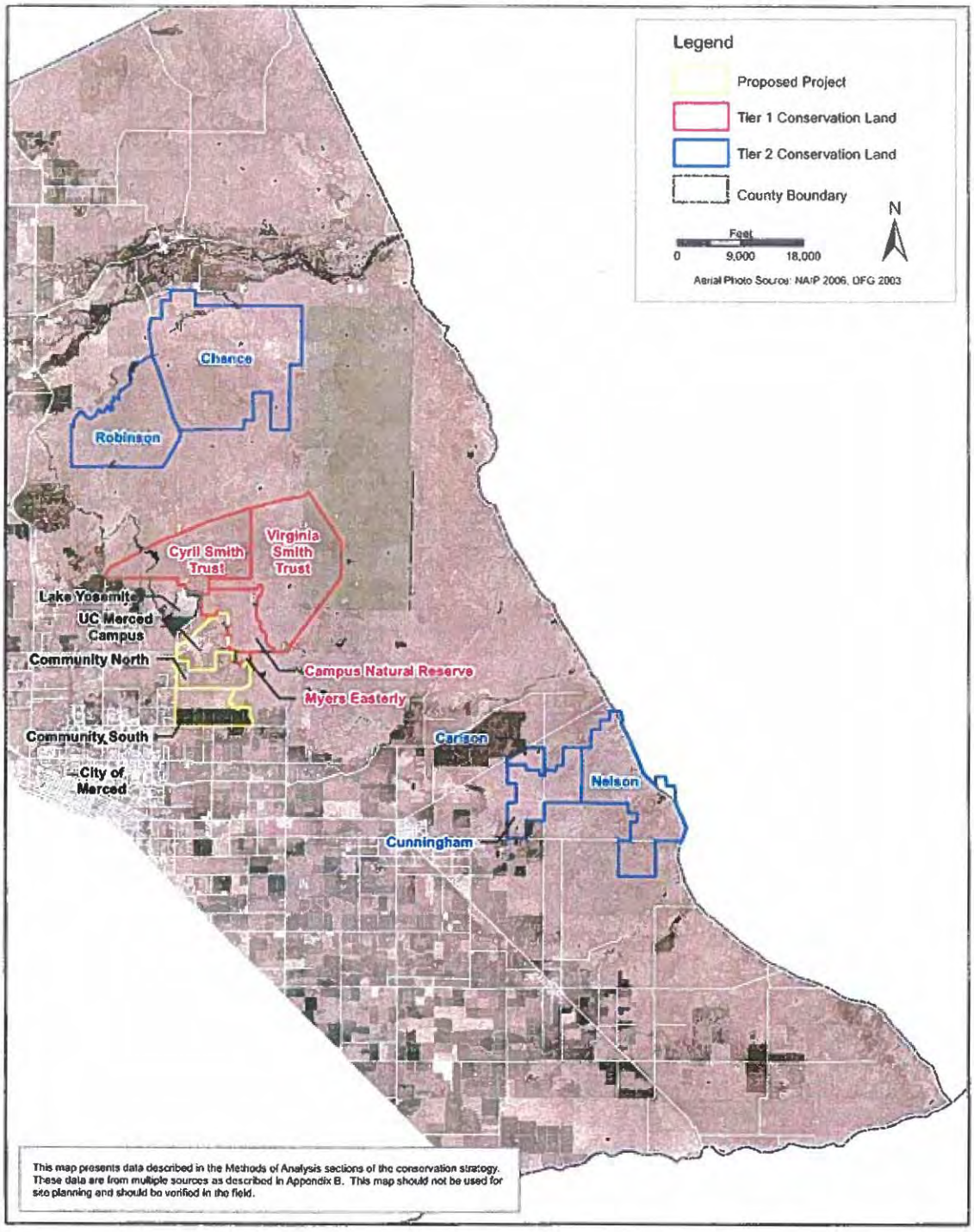


Figure 3. UCM Campus and University Community – Project Lands

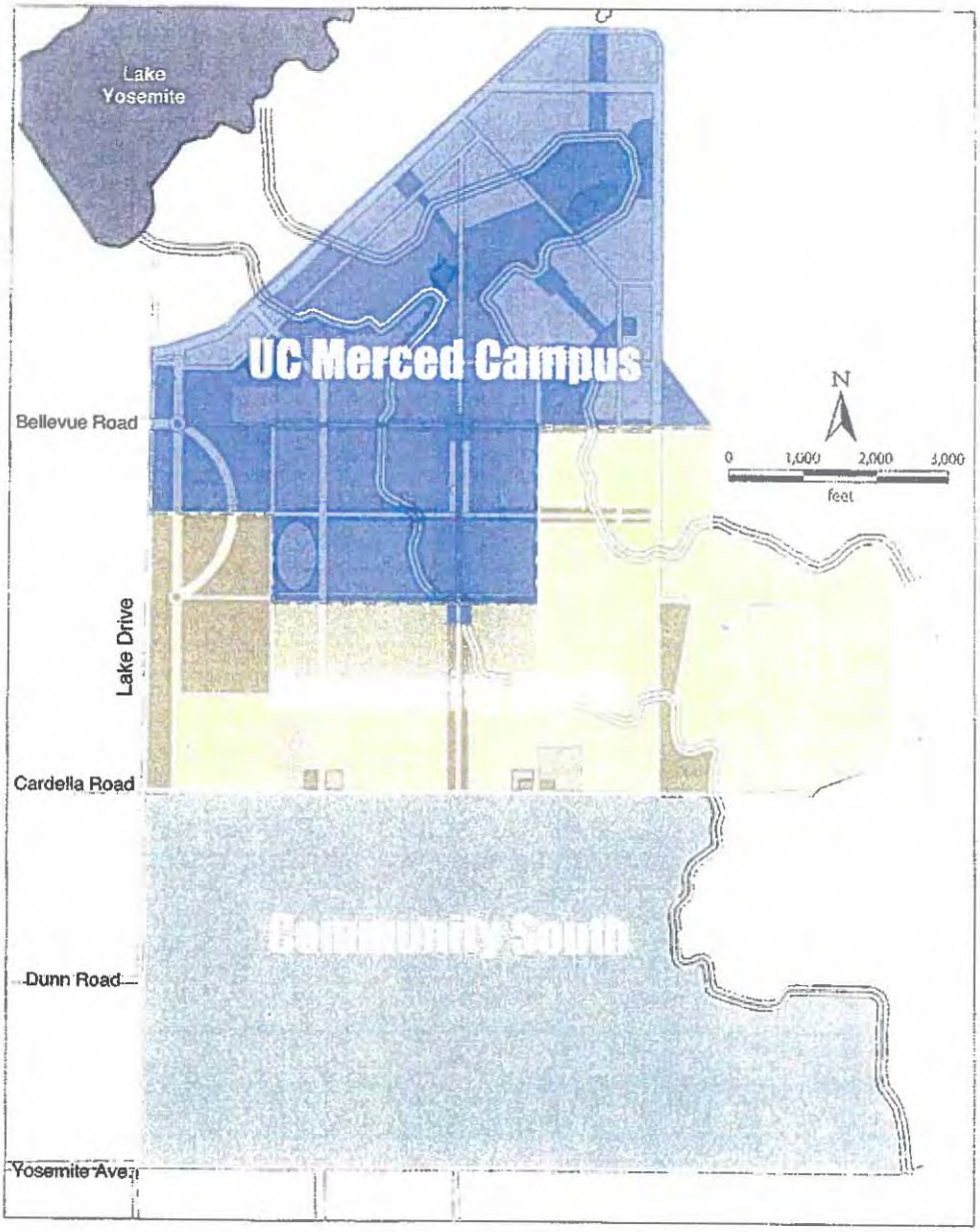


Figure 4. UCM Proposed Action and University's Proposed Project

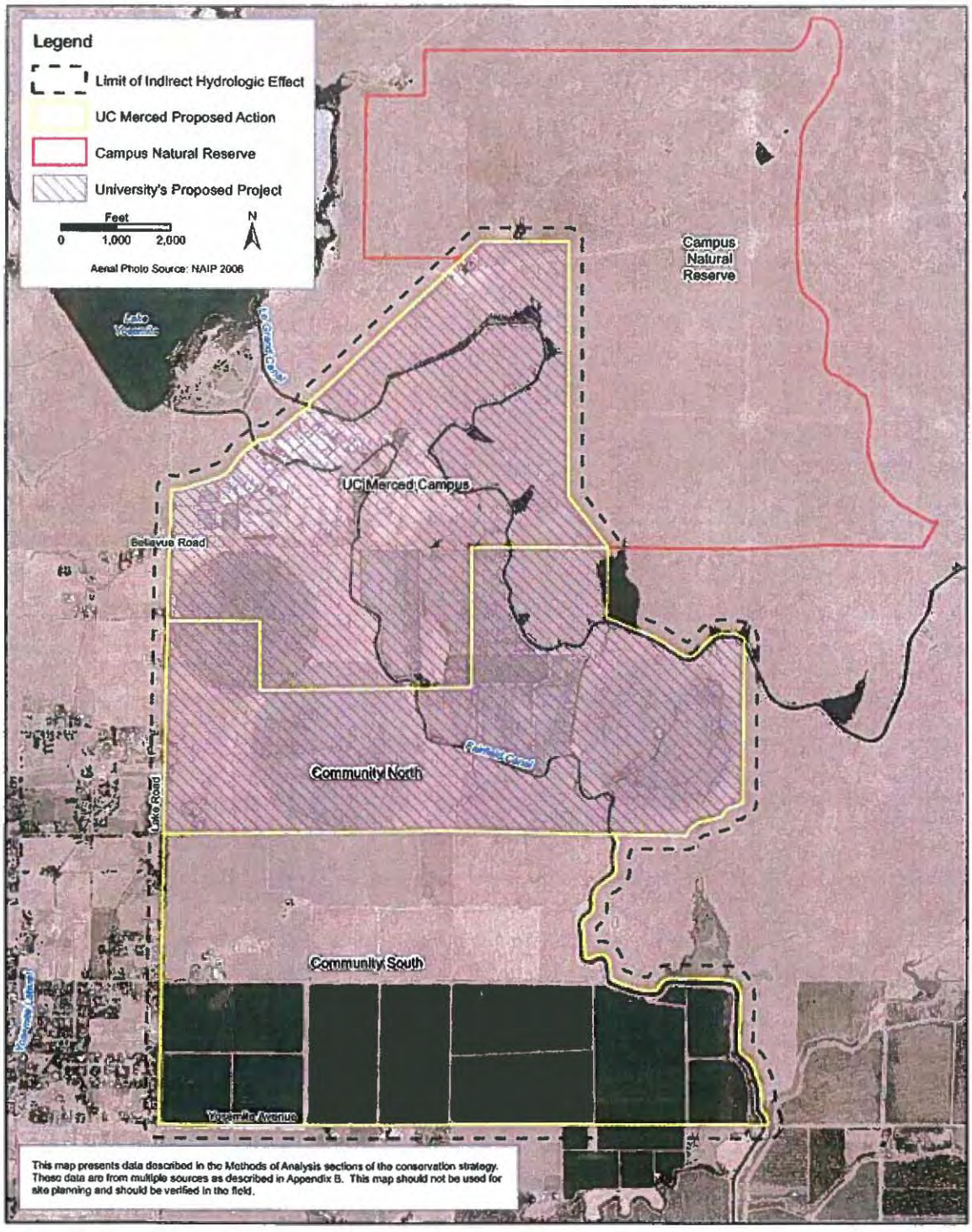


Figure 5. Vernal Pools, Swales, and Clay Playas in the UCM Project Area

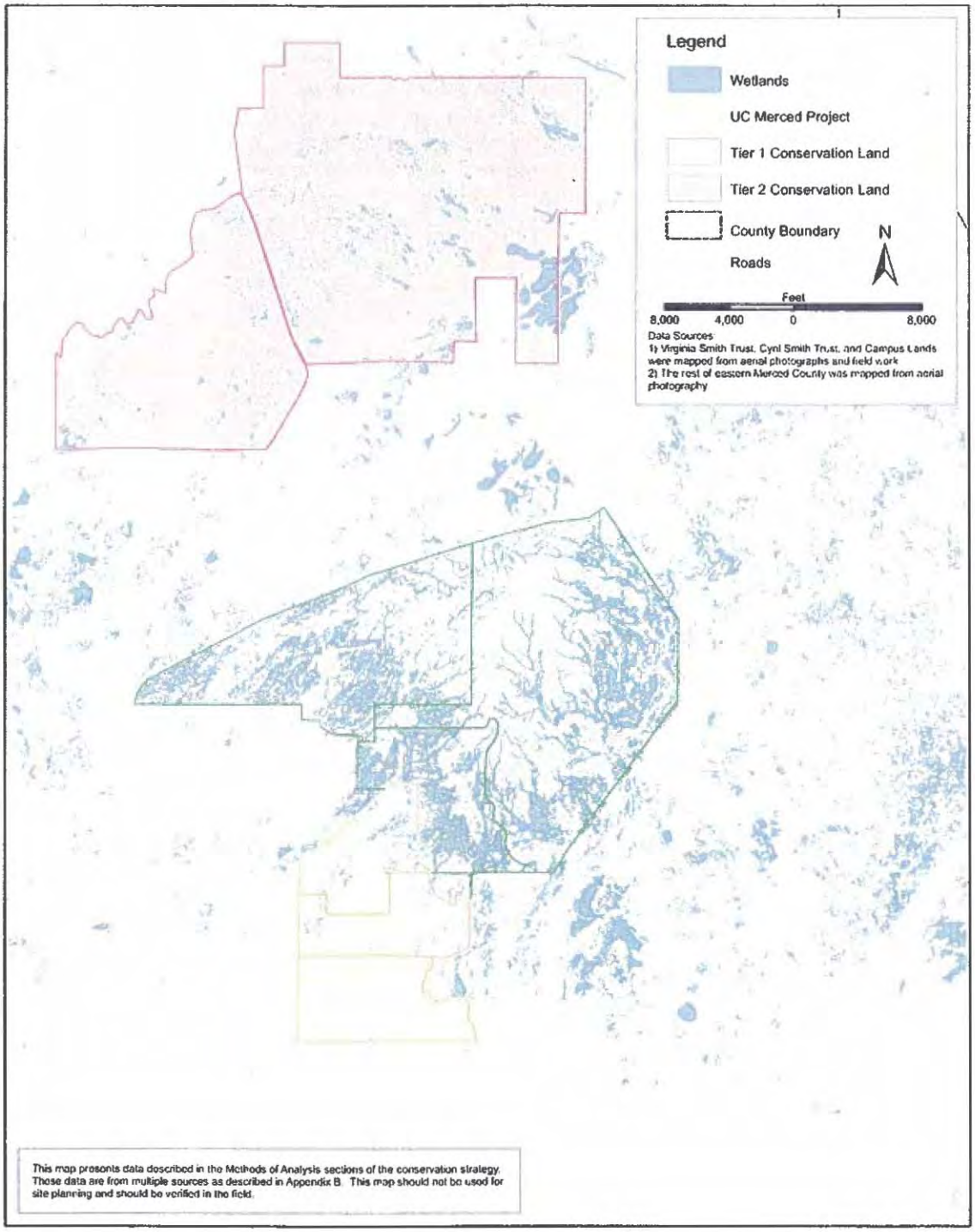


Figure 6. Distribution of California Tiger Salamander Observations in the UCM Project Area

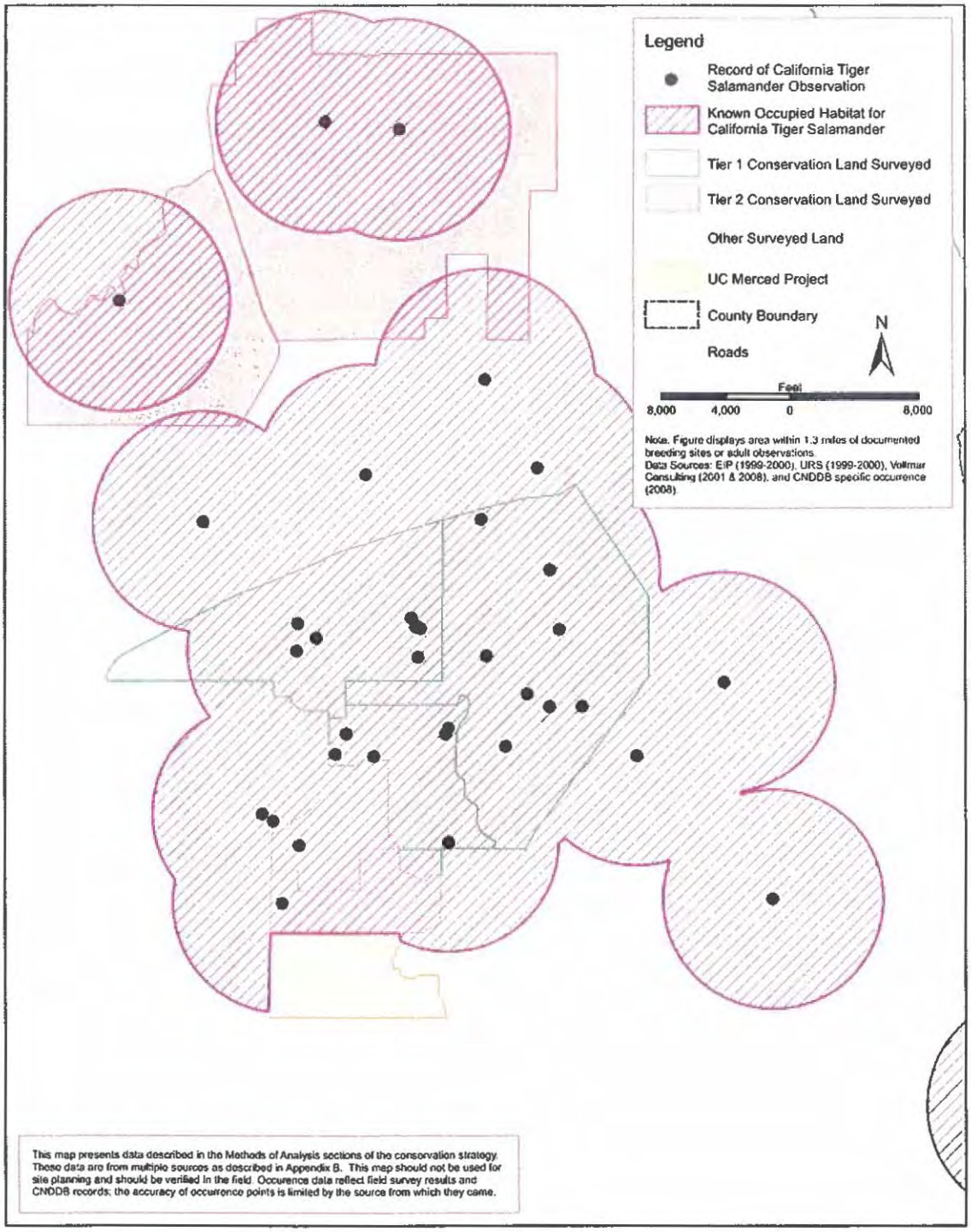


Figure 7. Succulent Owl's-Clover in the UCM Project Area

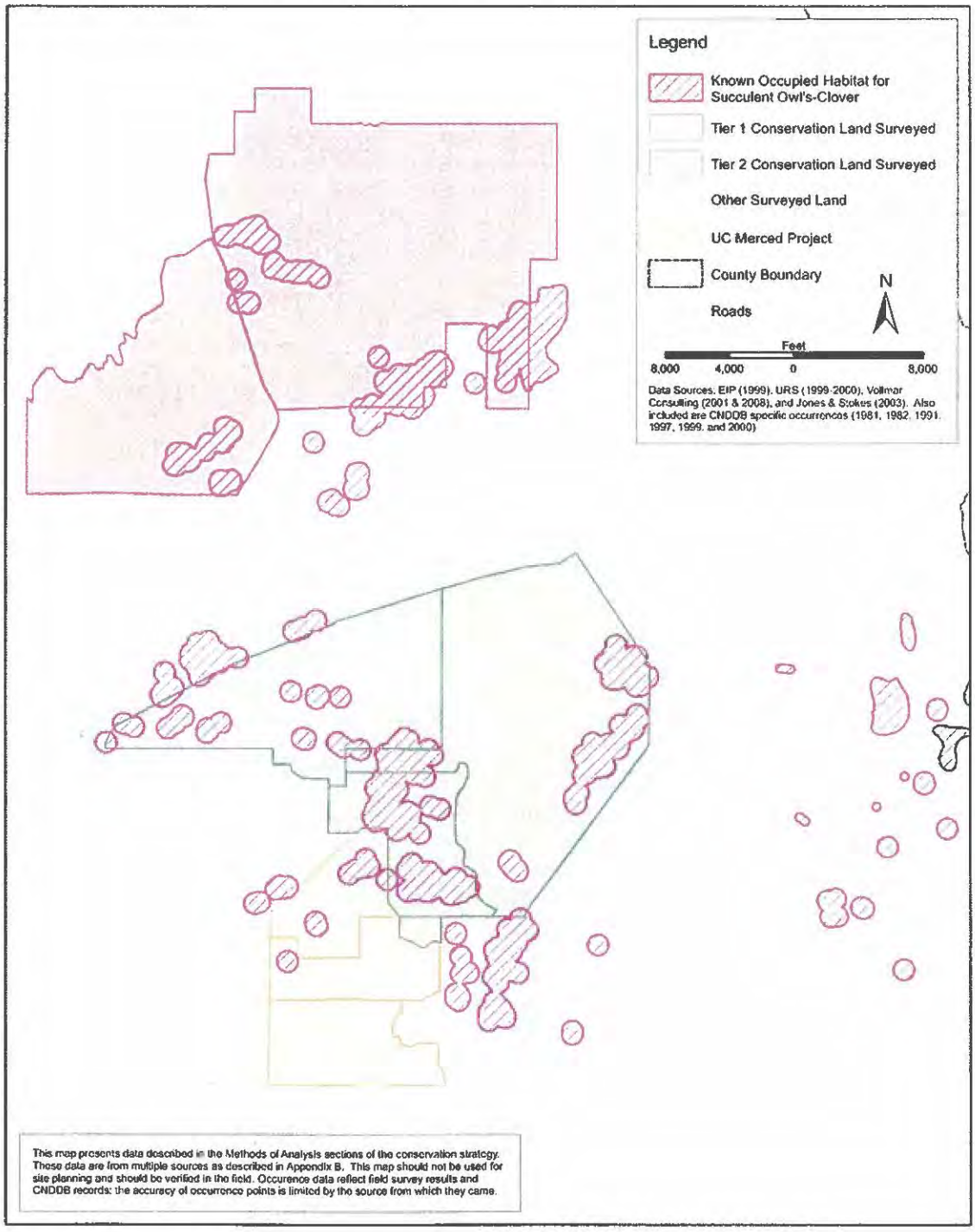


Figure 8. Colusa Grass in the UCM Project Area

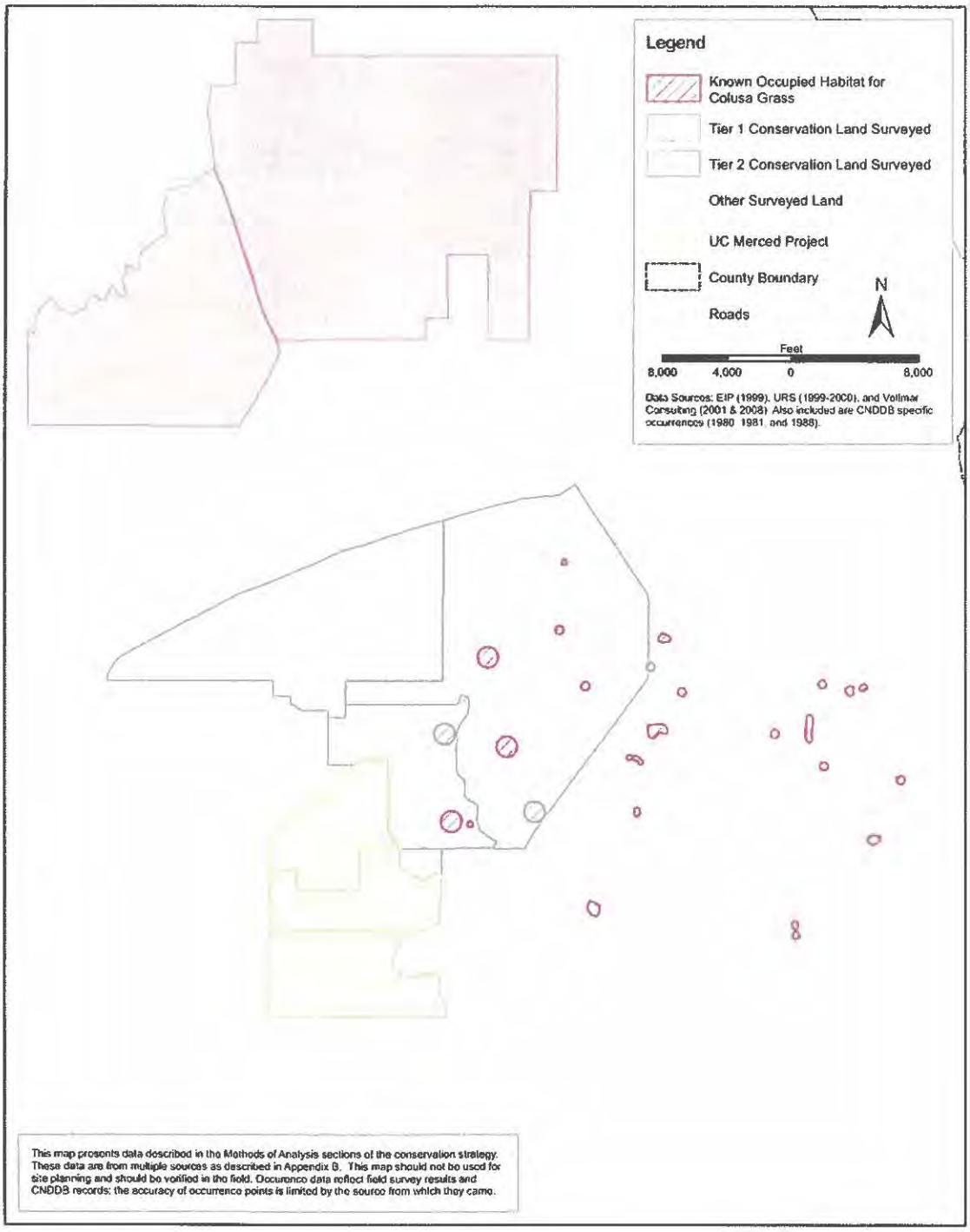
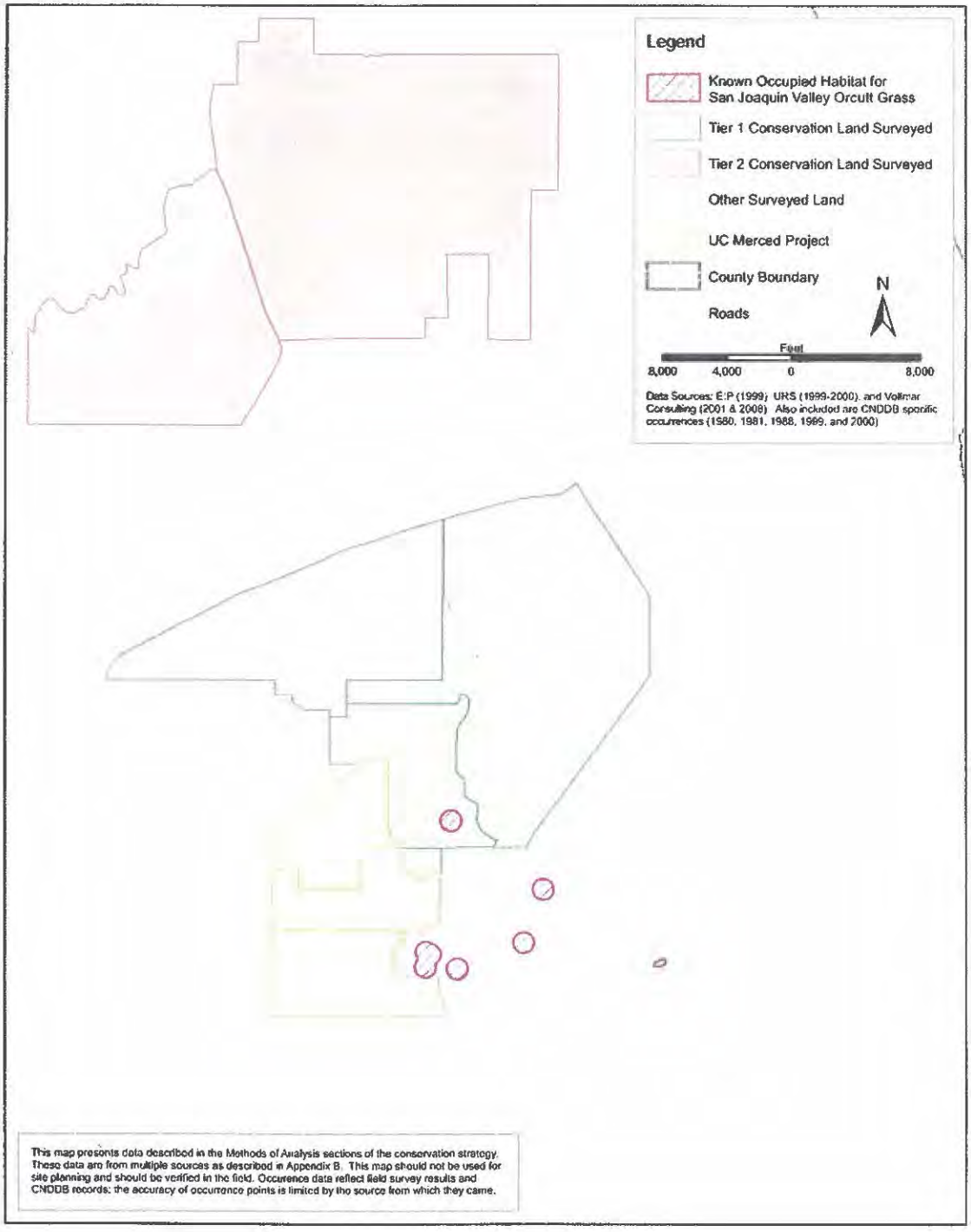


Figure 9. San Joaquin Valley Orcutt Grass in the UCM Project Area



Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND GAME
MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
CALIFORNIA ENDANGERED SPECIES ACT

INCIDENTAL TAKE PERMIT NO. 2081-2009-010-04

PERMITTEE: **Regents of the University of California**

PROJECT: **Campus and Community North Project**

PURPOSE OF THE MMRP

The purpose of the MMRP is to ensure that the impact minimization and mitigation measures required by the Department of Fish and Game (DFG) for the above-referenced Project are properly implemented, and thereby to ensure compliance with section 2081(b) of the Fish and Game Code and section 21081.6 of the Public Resources Code. A table summarizing the mitigation measures required by DFG is attached. This table is a tool for use in monitoring and reporting on implementation of mitigation measures, but the descriptions in the table do not supersede the mitigation measures set forth in the California Incidental Take Permit (ITP) and in attachments to the ITP, and the omission of a ITP requirement from the attached table does not relieve the Permittee of the obligation to ensure the requirement is performed.

OBLIGATIONS OF PERMITTEE

Mitigation measures must be implemented within the time periods indicated in the table that appears below. Permittee has the primary responsibility for monitoring compliance of all mitigation measures and for reporting to DFG on the progress in implementing those measures. These monitoring and reporting requirements are set forth in the ITP itself and are summarized at the front of the attached table.

VERIFICATION OF COMPLIANCE, EFFECTIVENESS

DFG may, at its sole discretion, verify compliance with any mitigation measure or independently assess the effectiveness of any mitigation measure.

TABLE OF MITIGATION MEASURES

The following items are identified for each mitigation measure: Mitigation Measure, Source, Implementation Schedule, Responsible Party, and Status/Date/Initials. The Mitigation Measure column summarizes the mitigation requirements of the ITP. The Source column identifies the ITP condition that sets forth the mitigation measure. The Implementation Schedule column shows the date or phase when each mitigation

measure will be implemented. The Responsible Party column identifies the person or agency that is primarily responsible for implementing the mitigation measure. The Status/Date/Initials column shall be completed by the Permittee during preparation of each Status Report and the Final Mitigation Report, and must identify the implementation status of each mitigation measure, the date that status was determined, and the initials of the person determining the status.

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
BEFORE DISTURBING SOIL OR VEGETATION					
1	Before initiating Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with DFG and overseeing compliance with the ITP. Permittee shall notify DFG in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify DFG in writing if a substitute Designated Representative is selected or identified at any time during the term of the ITP.	ITP Condition #5.1	Before commencing ground- or vegetation-disturbing activities /	Permittee	
2	Permittee shall submit to DFG in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain DFG approval of the Designated Biologist in writing before starting Covered Activities, and shall also obtain approval in advance in writing if the Designated Biologist must be changed.	ITP Condition #5.2	Before commencing ground- or vegetation-disturbing activities /	Permittee	
3	Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before they perform any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species; information about the distribution and habitat needs of the Covered Species; sensitivity of the Covered Species to human activities; the status of the Covered Species pursuant to CESA including legal protection; recovery efforts; penalties for violations; and the Project-specific protective measures described in the ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided for any new workers before their performing work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. The Permittee shall also maintain a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs.	ITP Condition #5.5	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
4	The Designated Biologist shall maintain a construction-monitoring notebook on-site throughout the construction period which shall include a copy of the ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review in the Project Area upon request by DFG.	ITP Condition #5.6	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
5	Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in closed (animal-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	ITP Condition #5.7	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
6	Before starting Covered Activities Permittee shall clearly delineate the boundaries of the construction area with fencing, stakes, or flags. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes and flags until the completion of construction.	ITP Condition #5.11	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
7	Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord, and place fencing as necessary to minimize the disturbance of Covered Species' habitat.	ITP Condition #5.12	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
8	Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area.	ITP Condition #5.15	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
9	The Designated Representative shall notify DFG 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.	ITP Condition #6.1	14 days before commencing ground- or vegetation-disturbing activities	Permittee	
10	The Designated Biologist shall survey the work site before the Permittee begins Covered Activities. If the Designated Biologist finds any life stages of California tiger salamander (adults, eggs, or larvae) the Designated Biologist or Designated Representative shall immediately contact USFWS and DFG. The Designated Biologist shall hold the appropriate State and federal Scientific Collecting Permits (SCP) for amphibians to be authorized to capture and handle California tiger salamander. The Designated Biologist may be assisted by approved biologists that do not have an SCP; these biologists shall be identified as Designated Monitors.	ITP Condition #7.1	Before commencing ground- or vegetation-disturbing activities	Permittee	
11	The Designated Biologist shall prepare a California tiger salamander relocation plan and submit it to USFWS and DFG for approval at least 30 days prior to the beginning of Covered Activities occurring within 1.3 miles of known California tiger salamander breeding pools. Covered Activities within these areas may not proceed until the relocation plan is approved by DFG.	ITP Condition #7.2	Before commencing ground- or vegetation-disturbing activities	Permittee	
12	The Designated Biologist shall fully excavate by hand any small mammal burrows present within the construction footprint that are within 1.3 miles of potential or known California tiger salamander breeding sites. The Designated Biologist shall relocate any live California tiger salamander discovered during burrow excavation in accordance with the approved relocation plan.	ITP Condition #7.4	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
13	Permittee shall place California tiger salamander exclusion fencing around the construction footprint following the hand excavation of burrows in upland habitat areas within 1.3 miles of potential or known California tiger salamander breeding sites. Permittee shall maintain the California tiger salamander exclusion fencing throughout all construction activities. Permittee shall use wildlife fencing, which consists of a fine (less then 0.4 inch) mesh equipped with one-way exits to avoid entrapment of amphibians inside the fence. Permittee shall bury fencing to a depth of six inches and fencing shall be a minimum of 3.3 feet tall following installation. The fencing shall include the optional barrier lip designed to prevent species such as California tiger salamander from climbing over. The Permittee shall avoid small mammal burrows to the maximum extent possible during installation of the exclusion fencing. Where burrows cannot be avoided, the Designated Biologist shall excavate them by hand before the fence is installed.	ITP Condition #7.5	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
14	The Designated Biologist shall conduct preconstruction surveys during the raptor nesting season (February 15 through September 15), within 0.5 mile of Covered Activities. The Designated Biologist or Designated Representative shall provide the survey results to DFG in a written report within 30 days of beginning Covered Activities.	ITP Condition #7.14	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
15	No more than 30 days prior to Permittee beginning Covered Activities, the Designated Biologist shall perform a pre-construction survey for San Joaquin kit fox that covers the Project Area and a buffer zone of 200 feet beyond the Project Area.	ITP Condition #7.19	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
16	The Permittee shall develop a salvage plan for succulent owls' clover, San Joaquin orcutt grass, and Colusa grass and submit it to USFWS and DFG for approval at least 30 days prior to beginning Covered Activities within 1,000 feet of known vernal pools, swales, or other wetland habitat. Covered Activities within these areas may not proceed until the salvage plan is approved by DFG.	ITP Condition #7.23	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
17	In areas with intact vernal pool, swale, or wetland habitat the Designated Biologist shall conduct botanical surveys prior to the Permittee beginning Covered Activities. The botanical surveys shall be floristic in nature, cover the entire area of direct and indirect effects, and should be timed appropriately to detect all species which may occur within the Project Area. The Designated Biologist or Designated Representative shall provide the survey results to DFG in a written report within 30 days of the beginning of Covered Activities within areas with intact vernal pool, swale, or wetland habitat.	ITP Condition #7.24	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
18	Temporary fencing that delineates the Project Area as required by Condition 5.11 and 5.12 shall be placed by the Permittee such that it excludes the greatest number of Covered Species possible. Exact fencing locations shall be determined by the Designated Biologist.	ITP Condition #7.25	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
19	If any of the plant Covered Species are found in the Project Area, the Designated Biologist shall salvage and transplant them in accordance with the DFG-approved salvage plan.	ITP Condition #7.26	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
DURING CONSTRUCTION					

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
20	To ensure compliance with the Conditions of Approval of the ITP, the Designated Biologist shall have authority to immediately stop any activity that is not in compliance with the ITP, and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species, or a species not covered by the ITP.	ITP Condition #5.3	Entire Project	Permittee	
21	Permittee shall provide DFG staff with reasonable access to the Project Area and mitigation lands under Permittee control, and shall otherwise fully cooperate with DFG efforts to verify compliance with or effectiveness of mitigation measures set forth in the ITP.	ITP Condition #5.4	Entire Project	Permittee	
22	Permittee shall prohibit firearms and domestic dogs from the Project Area and access routes during construction activities, except those in the possession of authorized security personnel or local, State, or federal law enforcement officials.	ITP Condition #5.8	Entire Project	Permittee	
23	Permittee shall develop and establish a leash rules and an animal control program.	ITP Condition #5.9	Entire Project	Permittee	
24	Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as mono-filament netting (erosion control matting) or similar material, in potential Covered Species' habitat.	ITP Condition #5.10	Entire Project	Permittee	
25	Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles.	ITP Condition #5.13	Entire Project	Permittee	
26	Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. Permittee shall ensure that vehicle speeds do not exceed 20 miles per hour to avoid Covered Species on or traversing the roads. Permittee shall strictly prohibit off-road traffic outside the designated Project Area. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact DFG for written approval before carrying out such an activity. DFG may require an amendment to the ITP if additional take of Covered Species may result from Project modification.	ITP Condition #5.14	Entire Project	Permittee	
27	Permittee shall immediately stop and following pertinent State and federal statutes and regulations arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.	ITP Condition #5.16	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
28	The Designated Representative shall immediately notify DFG in writing if it determines that the Permittee is not in compliance with any Condition of Approval of the ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in the ITP and/or the MMRP. The Designated Representative shall report any non-compliance with the ITP to DFG within 24 hours.	ITP Condition #6.2	Entire Project	Permittee	
29	Initially, the Designated Biologist shall be on-site daily when Covered Activities occur. The Designated Biologist shall conduct compliance inspections to (1) minimize incidental take of the Covered Species and to check for compliance with all mitigation and avoidance measures; (2) prevent unlawful take of species; (3) check for compliance with all measures of the ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing: oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by the ITP. Eventually, DFG may approve, in writing, periodic inspections once maintenance activities are on-going and more routine in nature.	ITP Condition #6.3	Entire Project	Permittee	
30	The Designated Biologist shall submit all confirmed Covered Species sightings to the California Natural Diversity Database (CNDDB) within 60 calendar days of the observation. The Designated Biologist(s) shall include the following documented information: the date, time, and location of each occurrence using Global Positioning System (GPS) technology, the name of the party that actually identified the plant or animal, circumstances of the incident, the general condition and health of each individual, any diagnostic markings, sex, age (juvenile or adult), actions undertaken, and habitat description.	ITP Condition #6.4	Entire Project	Permittee	
31	The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition 6.3 into a Monthly Compliance Report and submit it to DFG along with a copy of the the MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted to DFG's Regional Office at the office listed in the Notices section of the ITP and via e-mail to DFG's Regional Representative. At the time of the ITP's approval, the DFG Regional Representative is Annee Ferranti (aferranti@dfg.ca.gov). DFG may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If DFG determines the reporting schedule must be changed, DFG will notify Permittee in writing of the new reporting schedule.	ITP Condition #6.5	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
32	Permittee shall provide DFG with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of the ITP and continuing until DFG accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all Monthly Compliance Reports identified in Condition 6.5, (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in the MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and mitigating Project impacts; (5) all available information about Project-related take of the Covered Species; and (6) information about other Project impacts on the Covered Species.	ITP Condition #6.6	Entire Project	Permittee	
33	Permittee shall immediately notify the Designated Biologist if a Covered Species is killed or taken by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to DFG by calling the Regional Office at (559) 243-4005. The initial notification to DFG shall include information regarding the location, species, number of animals taken and the ITP Number. Following initial notification, Permittee shall send DFG a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the animal or carcass, and if possible provide a photograph, explanation as to cause of take, and any other pertinent information.	ITP Condition #6.8	Entire Project	Permittee	
34	If California tiger salamander is found by any person in the Project Area before or during Covered Activities, the Permittee shall immediately stop all work that could potentially harm the California tiger salamander until the Designated Biologist can relocate the California tiger salamander to an active rodent burrow system in accordance with the approved relocation plan.	ITP Condition #7.3	Entire Project	Permittee	
35	The Designated Biologist and Permittee shall monitor the National Weather Service 72-hour forecast for the Project Area. If a 70 percent or greater chance of rainfall is predicted within 72 hours, Permittee shall cease all Covered Activities in areas within 1.3 miles of potential or known California tiger salamander no further rain is forecast. If work must continue when rain is forecast, a Designated Biologist shall survey the Project construction footprint before construction begins each day that rain is forecast. If a Designated Monitor is used to conduct surveys, a Designated Biologist must remain on site to capture and relocate any California tiger salamander that are discovered during the surveys. If rain exceeds ¼ inch during a 24-hour period, Permittee shall cease work until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known California tiger salamander breeding sites once they have been encircled with California tiger salamander exclusion fencing pursuant to ITP Condition 7.5. However, even after California tiger salamander exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.3 miles of potential or known California tiger salamander breeding sites but outside of the salamander exclusion fencing (e.g., on roads).	ITP Condition #7.6	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
36	Permittee shall strictly prohibit all night work in areas within 1.3 miles of potential or known California tiger salamander breeding sites when a 70 percent or greater chance of rainfall is predicted within 72 hours of Covered Activities until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known California tiger salamander breeding sites once they have been encircled with California tiger salamander exclusion fencing pursuant to ITP Condition 7.5. However, even after salamander exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.3 miles of potential or known California tiger salamander breeding sites but outside of the California tiger salamander exclusion fencing (e.g., on roads).	ITP Condition #7.7	Entire Project	Permittee	
37	Permittee shall ensure that soil stockpiles are placed where soil will not pass into potential California tiger salamander breeding pools or into any other "Waters of the State," in accordance with Fish and Game Code 5650. Permittee shall appropriately protect stockpiles to prevent soil erosion.	ITP Condition #7.8	Entire Project	Permittee	
38	Permittee shall construct roadways within 1.3 miles of known or potential California tiger salamander breeding sites, including but not limited to the sites shown on Figure 1, without steep curbs, berms, or dikes, which could prevent California tiger salamander from exiting the roadway. If curbs are necessary for safety and/or surface runoff, Permittee shall design and construct them to allow California tiger salamander to walk over them. If steep dikes are required, Permittee shall design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow California tiger salamander passage.	ITP Condition #7.9	Entire Project	Permittee	
39	To ensure that disease is not conveyed between work sites all Biologists shall follow the fieldwork code of practice developed by the Declining Amphibian Populations Task Force Fieldwork Code of Practice (Attachment 2). The Designated Biologist may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.	ITP Condition #7.10	Entire Project	Permittee	
40	The Designated Biologist shall inspect all open holes, sumps, and trenches within the Project Area at the beginning, middle, and end of each day for trapped animals. To prevent inadvertent entrapment of Covered Species or any other animals the Designated Biologist shall oversee the covering of all excavated, steep-walled holes or trenches more than two feet deep, or of any depth if they contain water or other material, with plywood or other barrier materials at the close of each working day such that animals are unable to enter and become entrapped. Alternatively, Permittee shall provide earthen escape ramps of no more than 3:1 slope every 200 feet. Before holes or trenches are filled, the Designated Biologist shall thoroughly inspect them for trapped animals. If any worker discovers that Covered Species have become trapped, Permittee shall cease all Covered Activities in the vicinity and notify the Designated Biologist immediately. Project workers and the Designated Biologist shall allow the Covered Species to escape unimpeded if possible, or the Designated Biologist Covered Activities are allowed to continue. If an injured Covered Species is discovered at any time, the Designated Representative shall contact the USFWS Sacramento Fish and Wildlife Office and DFG's Regional Representative within one working day of the incident.	ITP Condition #7.11	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
41	Workers shall inspect for Covered Species under vehicles and equipment before the vehicles and equipment are moved. If a Covered Species is present, the worker shall notify the Designated Biologist and wait for the Covered Species to move unimpeded to a safe location. Alternatively, especially if the animal is inside the fenced Project Area, the Designated Biologist shall move the Covered Species out of harm's way outside of the Project Area and in compliance with the approved relocation plan, if applicable.	ITP Condition #7.12	Entire Project	Permittee	
42	Workers shall thoroughly inspect all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored for one or more overnight periods for Covered Species before the pipe is subsequently moved, buried, or capped. If during inspection a Covered Species is discovered inside a pipe, workers shall notify the Designated Biologist and allow the animal to safely escape that section of pipe before moving and utilizing the pipe.	ITP Condition #7.13	Entire Project	Permittee	
43	If a nesting Swainson's hawk is found within 0.5 mile of the Project Area, including access routes, during the nesting season (February 15 through September 15), the Designated Biologist shall be present daily for the entire duration of any Covered Activities to monitor the behavior of any Swainson's hawk nesting within 500 feet to 0.5 mile of Covered Activities. The Designated Biologist shall have the authority to order the cessation of all activities within 0.5 mile of any Swainson's hawk nest if the birds exhibit distress and/or abnormal nesting behavior (swooping/stooping, excessive vocalization (distress calls), agitation, failure to remain on nest, failure to deliver prey items for an extended time period, etc.) which may cause reproductive failure (nest abandonment and loss of eggs and/or young). Permittee shall not resume Covered Activities until DFG has been consulted by the Designated Biologist, and both the Designated Biologist and DFG confirm that the bird's behavior has normalized.	ITP Condition #7.15	Entire Project	Permittee	
44	The Permittee and Designated Biologist shall ensure that no Covered Activities occur within 500 feet of a Swainson's hawk nest during the nesting season (February 15 through September 15).	ITP Condition #7.16	Entire Project	Permittee	
45	Permittee shall prohibit removal of trees to between September 16 and February 14 of any year to avoid impacts to nesting Swainson's hawk.	ITP Condition #7.17	Entire Project	Permittee	
46	If Covered Activities affecting Swainson's hawk result in the removal of a Swainson's hawk nest tree in the Project Area, the Permittee shall plant native species replacement trees at a 4:1 ratio (four trees for each nest tree removed) on HM lands in close proximity to suitable foraging habitat. The HM Lands manager shall monitor the tree survival rates and shall report them in the ASR pursuant to the reporting requirements of Condition 6.6 of the ITP. Permittee shall ensure that the number of trees required as compensation under the ITP matches the number of healthy and thriving trees at the end of the initial five-years monitoring period. Permittee shall plant replacement trees that are separated from each other by at least 0.75 mile and shall not plant trees within 1.5 miles of a known Swainson's hawk nest tree.	ITP Condition #7.18	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
47	The Designated Biologist shall monitor all potential, atypical, active, and known San Joaquin kit fox dens (USFWS 1999) identified in the Project Area during preconstruction or previous surveys for a minimum of three consecutive nights using standard methods, including "dusting" the den entrance and apron and other means (infrared camera) if necessary. Only when the den is determined to be unoccupied may the den be excavated under the direction of the Designated Biologist. If a San Joaquin kit fox is still present after three or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of the Designated Biologist, it is temporarily vacant. The Designated Biologist may excavate the den during the animal's normal foraging activities. The Designated Biologist shall excavate the den by hand unless soil conditions necessitate the use of excavating equipment; however, extreme caution must be exercised. The Designated Biolgist shall accomplish the destruction of the den by careful excavation until it is certain that no San Joaquin kit fox are inside. The Designated Biologist shall fully excavate the den, fill it with dirt, and compact it to ensure that San Joaquin kit fox cannot reenter or use the den during the Covered Activities. If at any point during excavation a San Joaquin kit fox is discovered inside the den, the Designated Biologist shall immediately cease the excavation activity and continue monitoring of the den as described above. Destruction of the den may be completed when, in the judgment of the Designated Biologist, the San Joaquin kit fox has escaped from the partially destroyed den. Exclusion of San Joaquin kit fox from active natal dens may not occur during the pupping/rearing season.	ITP Condition #7.20	Entire Project	Permittee	
48	Permittee shall replace each potential, known, and active San Joaquin kit fox den that must be destroyed with an artificial den to compensate for the loss of important shelter used for protection, reproduction, and escape from predators. The Designated Biologist shall determine the appropriate design and placement of replacement dens through consultation with USFWS and DFG on a site-specific basis.	ITP Condition #7.21	Entire Project	Permittee	
49	If a Covered Species is injured as a result of Covered Activities, the Designated Biologist shall immediately take it to a DFG-approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility before starting Covered Activities. Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. Permittee shall notify DFG of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report. Notification shall include the date, time, location (GPS coordinates) and circumstances of the incident, and the name of the facility where the animal was taken.	ITP Condition #7.22	Entire Project	Permittee	
50	If a plant Covered Species is destroyed or damaged as a result of Project-related activities outside of the identified Project Area, or because avoidance and minimization measures included in the ITP were not followed, the Permittee shall notify DFG of the incident immediately, including the extent to which damage to the Covered Species occurred via telephone and email, followed by a written incident report submitted to DFG. Notification shall include the date, time, location (GPS coordinates), and circumstances of the incident.	ITP Condition #7.27	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
51	Permittee shall permanently preserve 6,236 acres of Tier 1 HM lands which are currently owned in fee title by the UC and located in eastern Merced County (Figure 2). The Cyril Smith Trust is not included in the acreage of HM Lands because it is not owned in fee title by the Permittee. The Tier 1 lands to be used as HM Lands for the Project include: i) The 5,098-acre Virginia Smith Trust Preserve (VST); ii) The 1,307-acre Campus Natural Reserve (CNR); and iii) The 101-acre Myers Easterly.	ITP Condition #8.1	No later than 18 months from the effective date of the ITP if Security is provided. Entire Project	Permittee	
52	Permitee shall convey a conservation easement to DFG over the VST, CNR, and Meyers Easterly HM lands under terms approved by DFG within 18 months of execution of the ITP. Alternatively, the transfer may be to a DFG-approved non-profit organization qualified pursuant to California Government Code section 65965, with DFG named as a third party easement beneficiary.	ITP Condition #8.3.1	No later than 18 months from the effective date of the ITP if Security is provided	Permittee	
53	Permitee shall provide a recent preliminary title report, initial hazardous materials survey report, and other documents that may be necessary for the conservation easement (see Attachment 3). All documents are subject to the approval of DFG, and if applicable, the Wildlife Conservation Board and the Department of General Services.	ITP Condition #8.3.2	No later than 3 months from the effective date of the ITP if Security is provided	Permittee	
54	Permitee shall manage the VST, CNR, and Meyers Easterly in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008) and incorporate the plan by reference into the conservation easements. In addition, Permittee shall implement the Take Avoidance and Minimization required in ITP Condition 8 when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.	ITP Condition #8.3.3	Entire Project	Permittee	
55	Permittee may select the conservation easement grantee, land owner, or other party as the land manager. Documents related to land management shall identify the land manager. Permittee shall notify DFG of any subsequent changes in the land manager within 30 days of the change.	ITP Condition #8.3.4	Within 30 days of change; Entire Project	Permittee	
56	Permitee shall reimburse DFG for reasonable expenses incurred during title and documentation review, expenses incurred from other State agency reviews, and overhead related to transfer of HM lands to DFG. DFG estimates that this Project will create an additional cost to DFG of no more than $3,000 for every fee title deed or easement processed.	ITP Condition #8.3.5	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
57	Sung Mo "Steve" Kang, UCM Chancellor, has submitted a letter dated January 26, 2011 (Attachment 4) confirming that the William and Flora Hewlett Foundation (Hewlett Foundation) has already provided $2 million for the long-term management of the HM lands. This $2 million will continue to be managed through the UC General Endowment Pool and it is estimated that it will provide $80,000 per year of interest income in perpetuity. This interest income shall be available for the operation, management and protection of HM lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the HM lands, in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008). Take Avoidance and Minimization required in ITP Condition 8 shall also be implemented when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.	ITP Condition #9.1	Entire Project	Permittee	
58	Permittee shall provide DFG with the following: a) A draft Memorandum of Understanding (MOU) between the UC and DFG outlining the conditions under which the UC could hold endowment monies. These monies would be held in a special deposit account established pursuant to Fish and Game Code section 13014 and based on DFG's pilot program for Local Government and Special Districts (November 2010, Attachment 4). b) The MOU must be finalized within three months of executing the ITP, except that this period may be extended if DFG has approved a draft MOU, and requires additional time for its internal processing. Absent finalization of this MOU within three months of executing the ITP, $2 million shall be submitted to DFG, where it shall be deposited in a special deposit account established pursuant to Fish and Game Code section 13014. Alternatively, the $2 million shall be provided to the National Fish and Wildlife Foundation (NFWF). DFG may pool the endowment with other endowments for the operation, management and protection of HM lands for local populations of the Covered Species. The land manager may be reimbursed for actual costs associated with HM land management (in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008), for up to the amount generated annually.	ITP Condition #9.2	Within 1 week of ITP Issuance	Permittee	
POST-CONSTRUCTION					
59	Upon completion of construction Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	ITP Condition #5.17	Post-construction	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
60	No later than 45 days after completion of all mitigation measures, Permittee shall provide DFG with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in the MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.	ITP Condition #6.7	No more than 45 days after Project completion	Permittee	

Attachment 2

The Declining Amphibian Task Force Fieldwork Code of Practice

A code of practice, prepared by the Declining Amphibian Task Force (DAPTF) to provide guidelines for use by anyone conducting field work at amphibian breeding sites or in other aquatic habitats. Observations of diseased and parasite-infected amphibians are now being frequently reported from sites all over the world. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up unapparent infections of novel disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried in a variety of ways between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to novel localities containing species which have had little or no prior contact with such pathogens or parasites. Such occurrences may be implicated in some instances where amphibian populations have declined. Therefore, it is vitally important for those involved in amphibian research (and other wetland/pond studies including those on fish, invertebrates and plants) to take steps to minimize the spread of disease and parasites between study sites.

1. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires and all other surfaces. Rinse cleaned items with sterilized (e.g. boiled or treated) water before leaving each study site.

2. Boots, nets, traps, etc., should then be scrubbed with 70% ethanol solution (or sodium hypochlorite 3 to 6%) and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond or wetland.

3. In remote locations, clean all equipment as described above upon return to the lab or "base camp". Elsewhere, when washing machine facilities are available, remove nets from poles and wash with bleach on a "delicates" cycle, contained in a protective mesh laundry bag.

4. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolates species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean and store them separately and the end of each field day.

5. When amphibians are collected, ensure the separation of animals from different sites and take great care to avoid indirect contact between them (e.g. via handling, reuse of containers) or with other captive animals. Isolation from un-sterilized plants or soils which have been taken from other sites is also essential. Always use disinfected/disposable husbandry equipment.

6. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

7. Used cleaning materials (liquids, etc.) should be disposed of safely and if necessary taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

ATTACHMENT 3A
DEPARTMENT OF FISH AND GAME
HABITAT MANAGEMENT LAND ACQUISITION PACKAGE CHECKLIST FOR PROJECT APPLICANTS

The following checklist is provided to inform you of what documents are necessary to expedite Department processing of your Habitat Management Land acquisition proposal. Any land acquisition processing requests which are incomplete when received, will be returned. The Region contact will review and approve the document package and forward it to the Habitat Conservation Planning Branch Senior Land Agent with a request to process the land acquisition for formal acceptance.

To: _____
Regional Manager, Region Name

From: _____
Project Applicant

Phone: _____

Tracking #: _____
CDFG assigned permit or agreement #

Project Name: _____

Enclosed is the complete package for the ☐ Conservation Easement OR ☐ Grant Deed

Documents in this package include:

☐ Fully executed, approved as to form Conservation Easement Deed or Grant Deed.
Date executed: _____

☐ Proposed Lands for Acquisition Form (PLFAF)

☐ Phase I Environmental Site Assessment Report Date on report: _____
(An existing report may be used, but it must be less than two years old.)

☐ Preliminary Title Report(s) for subject property is enclosed and has been reviewed for encumbrances and other easements. The title report must be less than six months old when final processing is conducted.
Included are additional documents:
- ☐ document(s) to support title exceptions
- ☐ document(s) to explain title encumbrances
- ☐ a plot or map of easements/encumbrances on the property

☐ Policy of Title Insurance (an existing title policy is not acceptable)

☐ County Assessor Parcel Map(s) for subject property

☐ Site Location Map (Site location with property boundaries outline on a USGS 1:24,000 scale topo)

☐ Final Permit or Agreement (or other appropriate instrument)
Type of agreement: ☐ Bank Agreement ☐ Mitigation Agreement
☐ Permit _____ Other: _____
(write in type of permit)

☐ Final Management Plan (if required prior to finalizing permit or agreement or if this package is for a Grant Deed)

☐ Biological Resources Report

☐ Draft Summary of Transactions ☐ hard copy ☐ electronic copy (both are required)

PROPOSED LANDS FOR ACQUISITION FORM ("PLFAF")

Date: _____

TO: Regional Representative
_____
_____
_____
Facsimile:

FROM: _____
_____
_____
_____

Applicant proposes that the following parcel of land be considered for approval by the Department as suitable for purposes of habitat management lands to replace the adverse environmental impacts of the Project:

Section	Township	Range	Number of Acres
_____	_____	_____	_____

Current Legal Owner(s), include Parcel Number(s):
_____
_____
_____

Location of Parcel:
_____
_____
_____
_____
_____

APPROVED ___ By: _____ DATE: _____
REJECTED ___ _____
Region

Explanation: _____
_____
_____

Attachment 4

UNIVERSITY OF CALIFORNIA, MERCED

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

SUNG MO "STEVE" KANG
CHANCELLOR

UNIVERSITY OF CALIFORNIA, MERCED
OFFICE OF THE CHANCELLOR
5200 N. LAKE ROAD
MERCED, CA 95343
TEL: (209) 228-4417
FAX: (209) 228-4423

January 26, 2011

FEB 2011

Dr. Jeffrey R. Single
Manager, Region 4 – Central Region
California Department of Fish and Game
Fresno Office
1234 E. Shaw Avenue
Fresno, California 95344

Re: Letter of Financial Assurance for the Management of UC Merced Mitigation Lands

Dear Dr. Single:

On behalf of the University of California, Merced, I am pleased to submit this letter to the California Department of Fish and Game (CDFG) to confirm that the University of California has the necessary funds to manage UC Merced's preserve lands in perpetuity. The UC Merced California Endangered Species Act (CESA) Incidental Take Permit (ITP) application, which was submitted to CDFG on February 2, 2009, indicates that these preserve lands are the compensatory mitigation for the UC Merced campus and University Community.

As you know, The David and Lucile Packard Foundation (Packard Foundation) provided approximately $12 million in 2002 toward the development of UC Merced and the University Community, which included the money to purchase these preserve lands. In addition, The William and Flora Hewlett Foundation (Hewlett Foundation) provided $2 million for the long-term management of these lands. The $2 million is managed through the University of California General Endowment Pool. The University of California Office of the Treasurer manages the endowment pool and estimates that the Hewlett Foundation endowment will provide over $80,000 per year of income in perpetuity.

The Hewlett Foundation endowment fund principal and income, as well as the demonstrated success of the University of California in the ownership, management, and maintenance of conservation lands, indicates that the UC Merced mitigation lands will be managed appropriately in perpetuity.

We look forward to working with you during and after issuance of the ITP. Please feel free to call if you have any questions or need further information.

Sincerely,

S.M. "Steve" Kang
Chancellor

CALIFORNIA DEPARTMENT OF FISH AND GAME
CENTRAL REGION
1234 EAST SHAW AVENUE
FRESNO, CALIFORNIA 93710

AMENDMENT NO. 1
(A Major Amendment)
California Endangered Species Act
Incidental Take Permit No. 2081-2009-01-04
Regents of the University of California
University of California, Merced
Campus and Community North Project in Merced County

INTRODUCTION

On March 30, 2011, the California Department of Fish and Game (DFG) issued Incidental Take Permit No. 2081-2009-010-04 (ITP) to the Regents of the University of California (Permittee) for take of California tiger salamander (*Ambystoma californiense*), Swainson's hawk (*Buteo swainsoni*), succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), San Joaquin orcutt grass (*Orcuttia inaequalis*), and San Joaquin kit fox (*Vulpes macrotis mutica*) (collectively, the Covered Species) associated with the University of California, Merced Campus and Community North Project in Merced County, California (Project). The Project as described in the ITP includes the construction and operation of a major research University campus in Merced County which will sustain up to 25,000 full-time students and a contiguous associated community to support the needs of the University. The Project site is comprised of an approximately 815-acre Campus; a 1,951-acre University Community; and a 1,307-acre Campus Natural Reserve which is not intended to be developed but would be used for the purposes of research, a vernal pool-grassland habitat/species laboratory for students, and for general education and outreach opportunities. In issuing the ITP, DFG found, among other things, that Permittee's compliance with the Conditions of Approval of the ITP would fully mitigate impacts to the Covered Species and would not jeopardize the continued existence of the Covered Species.

The Project is comprised of 2,766 acres to be fully developed into the Campus and the University Community. Of that acreage, 1,870 acres is non-native grassland and California tiger salamander (CTS) upland refugia habitat. In the ITP, Take Minimization Measure 7.4 requires hand excavation of all small mammal burrows present within the construction footprint located within 1.3 miles of CTS breeding sites. This Measure required excavation of all small mammal burrows within an approximately 1,045-acre area, in order to reduce the potential for mortality of CTS. Based on initial surveys of an approximately 30-acre construction footprint within this larger area, an average of 2.2 small mammal burrow complexes (gopher and squirrel only) were found within an acre. Extrapolating this estimate of burrow abundance to encompass all CTS upland refugia within the Project site, over 4,000 burrow complexes would likely need to be

hand excavated, which is a cost prohibitive expense and logistically difficult to accomplish at this scale.

In a letter dated July 26, 2011, the Regents of the University of California requested Take Minimization Measure 7.4, *Small Mammal Burrow Excavation*, be deleted from the ITP due to the infeasibility of implementing such a measure on such a large scale. DFG is amending this measure to instead require that all small mammal burrows incidentally dug up during grading or excavation activities will be visually inspected for CTS by the Designated Biologist; this is so that salvage of CTS present in small mammal burrows within the construction footprint will still occur and direct take via mortality minimized. .

Major Amendment No. 1 (Amendment) allows the Regents of the University of California to cease implementation of Take Avoidance and Minimization Measure 7.4 as currently written and to employ an alternate means of minimizing direct take in the form of mortality. All other Take Avoidance and Minimization Measures shall remain in effect along with the permanent conservation of 6,458 acres of known occupied high quality CTS habitat.

AMENDMENT

The ITP is amended as follows (amended language in ***bold italics***; deleted language in ~~strikethrough~~):

1. ITP Condition 7.4, Page 12 of the ITP is amended to read:

~~Small Mammal Burrow Excavation: The Designated Biologist shall fully excavate by hand any small mammal burrows present within the construction footprint that are within 1.3 miles of potential or known California tiger salamander breeding sites. The Designated Biologist shall relocate any live California tiger salamander discovered during burrow excavation in accordance with the approved relocation plan.~~ ***CTS Salvage Efforts: The Designated Biologist shall survey all portions of the construction footprint within grassland habitat for the presence of all life stages of CTS immediately after initial ground disturbance (e.g., first ripping/discing/grading event). All small mammal burrows or burrow complexes incidentally dug up or otherwise disturbed during the grading or excavation activities shall be visually inspected for CTS by the Designated Biologist. The Designated Biologist shall relocate any live CTS discovered during these surveys in accordance with the approved CTS relocation plan.***

2. Attachment 1 of the ITP (Mitigation Monitoring and Reporting Program (MMRP) is removed and replaced by Attachment 1 of Amendment No. 1.

All terms and conditions of the ITP and MMRP that are not expressly amended herein remain in effect and must be implemented and adhered to by the Permittee.

FINDINGS

Issuance of Major Amendment No. 1 may increase the amount of direct take of CTS compared to the Project as originally approved; however, by implementing the avoidance, minimization and mitigation measures contained in the ITP and Major Amendment No. 1, it is not expected that Major Amendment No. 1 will increase Project impacts on CTS (i.e., "impacts of taking" as defined in Fish and Game Code section 2081, subdivision (b)(2)).

Discussion: This Amendment makes two specific changes to the ITP as originally issued: (1) Take Avoidance and Minimization Measure 7.4, *Small Mammal Burrow Excavation*, shall be amended and, (2) the corresponding MMRP Measure 12 shall be amended as well. The resulting impacts to the Covered Species, however, including the number of acres of habitat that will be lost as a result of the Project, will remain the same.

DFG has determined that changes to circumstances and/or conditions of approval will not increase the amount of take or the severity of other impacts of the taking on the Covered Species. Given the circumstances of this Project, DFG believes that the changes to the Project or Conditions of the ITP described in this Amendment will not increase impacts to the Covered Species.

Issuance of Major Amendment No. 1 does not affect DFG's previous determination that issuance of the ITP meets and is otherwise consistent with the permitting criteria set forth in Fish and Game Code section 2081, subdivisions (b) and (c).

Discussion: DFG determined in March 2011 that the Project, as approved, met the standards for issuance of an ITP under CESA. This determination included findings that, among other things, the impacts of the taking would be minimized and fully mitigated and that the Project would not jeopardize the continued existence of the Covered Species. Those findings are unchanged with respect to this Amendment because the Project and ITP as amended: (1) will have no effect on the amount or severity of Project impacts on the Covered Species, as discussed above, and (2) does not substantively alter the measures that will be undertaken to minimize and mitigate previously authorized impacts on the Covered Species. This amendment acknowledges that the number of acres of habitat that will be lost remains the same and Permittee's continued adherence

to, and implementation of, the avoidance and minimization measures set forth in the ITP's Conditions of Approval and MMRP will minimize and fully mitigate impacts of the taking on the Covered Species.

None of the factors that would trigger the need for subsequent or supplemental environmental analysis of the Project under Public Resources Code section 21166 or California Code of Regulations, title 4, sections 15162 and 15163, exist as a result of this Amendment.

Discussion: DFG issued the ITP in March 2011 as a responsible agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) after, among other things, considering the University of California, Merced Campus and Community North Project Environmental Impact Report (EIR) (State Clearinghouse Number 2008041009) dated November 7, 2008 and certified by the Regents of the University of California as the lead agency for the Project on March 19, 2009. As explained in the findings below, DFG finds for purposes of CESA that this Major Amendment represents a major change in the Project as originally approved. However, for the reasons explained above, DFG conclude Major Amendment No. 1 is not a change in the Project that has the potential to create new significant effects not previously analyzed, a substantial change in the circumstances under which the Project is being undertakes requiring major revisions to previous CEQA document, or new information of substantial importance. As a result, DFG finds that no additional subsequent or supplemental environmental review is required by CEQA as part of DFG's approval of this Amendment (Cal. Code Regs., tit. 14, Section 15164). Likewise, DFG finds that the impact of the taking authorized by this ITP as modified by Major Amendment No. 1 are and will be mitigated to below a level of significance for purposes of CEQA by and through the Conditions of Approval required by the ITP as amended. (Pub Resources Code, Section 21081, subd.(a)(1).)

DFG finds that Major Amendment No. 1 is a Major Amendment, as defined in California Code of Regulations, title 14, section 783.6, subdivision (c)(5).

Discussion: Major Amendment No. 1 will amend the Take Avoidance and Minimization Measure 7.4, *Small Mammal Burrow Excavation* and the corresponding MMRP Measure 12. As described above, these changes significantly modify a minimization measure associated with the Project. DFG finds that as a result that Major Amendment No. 1 is a major amendment of the ITP under CESA pursuant to California Code of Regulations, Title 14, section 783.6, subdivision (c)(5).

A revised MMRP is included as Attachment 1 to Major Amendment No. 1

The authorization provided by this Amendment is not valid until Permittee signs and dates the acknowledgement below, and returns one of the duplicate originals of this Amendment to DFG at:

Department of Fish and Game
Habitat Conservation Planning Branch
Attention: CESA Permitting Program
1416 Ninth Street, Suite 1260
Sacramento, California 95814

APPROVED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME

on 9/30/11

for Jeffrey R. Single, Ph.D.
Regional Manager
Central Region

ACKNOWLEDGMENT

The undersigned: (1) warrants that he or she is acting as a duly authorized representative of the Permittee, (2) acknowledges receipt of the original ITP and this Amendment, and (3) agrees on behalf of the Permittee to comply with all terms and conditions of the ITP as amended.

By: _____ Date: 10/3/11

Printed Name: DOROTHY LELAND Title: CHANCELLOR

Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND GAME
MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
CALIFORNIA ENDANGERED SPECIES ACT

INCIDENTAL TAKE PERMIT NO. 2081-2009-010-04

PERMITTEE: **Regents of the University of California**

PROJECT: **Campus and Community North Project**

PURPOSE OF THE MMRP

The purpose of the MMRP is to ensure that the impact minimization and mitigation measures required by the Department of Fish and Game (DFG) for the above-referenced Project are properly implemented, and thereby to ensure compliance with section 2081(b) of the Fish and Game Code and section 21081.6 of the Public Resources Code. A table summarizing the mitigation measures required by DFG is attached. This table is a tool for use in monitoring and reporting on implementation of mitigation measures, but the descriptions in the table do not supersede the mitigation measures set forth in the California Incidental Take Permit (ITP) and in attachments to the ITP, and the omission of a ITP requirement from the attached table does not relieve the Permittee of the obligation to ensure the requirement is performed.

OBLIGATIONS OF PERMITTEE

Mitigation measures must be implemented within the time periods indicated in the table that appears below. Permittee has the primary responsibility for monitoring compliance of all mitigation measures and for reporting to DFG on the progress in implementing those measures. These monitoring and reporting requirements are set forth in the ITP itself and are summarized at the front of the attached table.

VERIFICATION OF COMPLIANCE, EFFECTIVENESS

DFG may, at its sole discretion, verify compliance with any mitigation measure or independently assess the effectiveness of any mitigation measure.

TABLE OF MITIGATION MEASURES

The following items are identified for each mitigation measure: Mitigation Measure, Source, Implementation Schedule, Responsible Party, and Status/Date/Initials. The Mitigation Measure column summarizes the mitigation requirements of the ITP. The Source column identifies the ITP condition that sets forth the mitigation measure. The Implementation Schedule column shows the date or phase when each mitigation

measure will be implemented. The Responsible Party column identifies the person or agency that is primarily responsible for implementing the mitigation measure. The Status/Date/Initials column shall be completed by the Permittee during preparation of each Status Report and the Final Mitigation Report, and must identify the implementation status of each mitigation measure, the date that status was determined, and the initials of the person determining the status.

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
BEFORE DISTURBING SOIL OR VEGETATION					
1	Before initiating Covered Activities, Permittee shall designate a representative (Designated Representative) responsible for communications with DFG and overseeing compliance with the ITP. Permittee shall notify DFG in writing before starting Covered Activities of the Designated Representative's name, business address, and contact information, and shall notify DFG in writing if a substitute Designated Representative is selected or identified at any time during the term of the ITP.	ITP Condition #5.1	Before commencing ground- or vegetation-disturbing activities	Permittee	
2	Permittee shall submit to DFG in writing the name, qualifications, business address, and contact information of a biological monitor (Designated Biologist) at least 30 days before starting Covered Activities. Permittee shall ensure that the Designated Biologist is knowledgeable and experienced in the biology and natural history of the Covered Species. The Designated Biologist shall be responsible for monitoring Covered Activities to help minimize and fully mitigate or avoid the incidental take of individual Covered Species and to minimize disturbance of Covered Species' habitat. Permittee shall obtain DFG approval of the Designated Biologist in writing before starting Covered Activities, and shall also obtain approval in advance in writing if the Designated Biologist must be changed.	ITP Condition #5.2	Before commencing ground- or vegetation-disturbing activities	Permittee	
3	Permittee shall conduct an education program for all persons employed or otherwise working in the Project Area before they perform any work. The program shall consist of a presentation from the Designated Biologist that includes a discussion of the biology and general behavior of the Covered Species; information about the distribution and habitat needs of the Covered Species; sensitivity of the Covered Species to human activities; the status of the Covered Species pursuant to CESA including legal protection; recovery efforts; penalties for violations; and the Project-specific protective measures described in the ITP. Permittee shall provide interpretation for non-English speaking workers, and the same instruction shall be provided for any new workers before their performing work in the Project Area. Permittee shall prepare and distribute wallet-sized cards or a fact sheet handout containing this information for workers to carry in the Project Area. Upon completion of the program, employees shall sign a form stating they attended the program and understand all protection measures. The Permittee shall also maintain a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs.	ITP Condition #5.5	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
4	The Designated Biologist shall maintain a construction-monitoring notebook on-site throughout the construction period which shall include a copy of the ITP with attachments and a list of signatures of all personnel who have successfully completed the education program. Permittee shall ensure a copy of the construction-monitoring notebook is available for review in the Project Area upon request by DFG.	ITP Condition #5.6	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
5	Permittee shall initiate a trash abatement program before starting Covered Activities and shall continue the program for the duration of the Project. Permittee shall ensure that trash and food items are contained in closed (animal-proof) containers and removed regularly (at least once a week) to avoid attracting opportunistic predators such as ravens, coyotes, and feral dogs.	ITP Condition #5.7	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
6	Before starting Covered Activities Permittee shall clearly delineate the boundaries of the construction area with fencing, stakes, or flags. Permittee shall restrict all Covered Activities to within the fenced, staked, or flagged areas. Permittee shall maintain all fencing, stakes and flags until the completion of construction.	ITP Condition #5.11	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
7	Permittee shall clearly delineate habitat of the Covered Species within the Project Area with posted signs, posting stakes, flags, and/or rope or cord, and place fencing as necessary to minimize the disturbance of Covered Species' habitat.	ITP Condition #5.12	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
8	Permittee shall confine all Project-related parking, storage areas, laydown sites, equipment storage, and any other surface-disturbing activities to the Project Area using, to the extent possible, previously disturbed areas. Additionally, Permittee shall not use or cross Covered Species' habitat outside of the marked Project Area.	ITP Condition #5.15	Before commencing ground- or vegetation-disturbing activities / Entire Project	Permittee	
9	The Designated Representative shall notify DFG 14 calendar days before starting Covered Activities and shall document compliance with all pre-Project Conditions of Approval before starting Covered Activities.	ITP Condition #6.1	14 days before commencing ground- or vegetation-disturbing activities	Permittee	
10	The Designated Biologist shall survey the work site before the Permittee begins Covered Activities. If the Designated Biologist finds any life stages of California tiger salamander (adults, eggs, or larvae) the Designated Biologist or Designated Representative shall immediately contact USFWS and DFG. The Designated Biologist shall hold the appropriate State and federal Scientific Collecting Permits (SCP) for amphibians to be authorized to capture and handle California tiger salamander. The Designated Biologist may be assisted by approved biologists that do not have an SCP; these biologists shall be identified as Designated Monitors.	ITP Condition #7.1	Before commencing ground- or vegetation-disturbing activities	Permittee	
11	The Designated Biologist shall prepare a California tiger salamander relocation plan and submit it to USFWS and DFG for approval at least 30 days prior to the beginning of Covered Activities occurring within 1.3 miles of known California tiger salamander breeding pools. Covered Activities within these areas may not proceed until the relocation plan is approved by DFG.	ITP Condition #7.2	Before commencing ground- or vegetation-disturbing activities	Permittee	
12	Permittee shall place California tiger salamander exclusion fencing around the construction footprint following the hand excavation of burrows in upland habitat areas within 1.3 miles of potential or known California tiger salamander breeding sites. Permittee shall maintain the California tiger salamander exclusion fencing throughout all construction activities. Permittee shall use wildlife fencing, which consists of a fine (less then 0.4 inch) mesh equipped with one-way exits to avoid entrapment of amphibians inside the fence. Permittee shall bury fencing to a depth of six inches and fencing shall be a minimum of 3.3 feet tall following installation. The fencing shall include the optional barrier lip designed to prevent species such as California tiger salamander from climbing over. The Permittee shall avoid small mammal burrows to the maximum extent possible during installation of the exclusion fencing. Where burrows cannot be avoided, the Designated Biologist shall excavate them by hand before the fence is installed.	ITP Condition #7.5	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
13	The Designated Biologist shall conduct preconstruction surveys during the raptor nesting season (February 15 through September 15), within 0.5 mile of Covered Activities. The Designated Biologist or Designated Representative shall provide the survey results to DFG in a written report within 30 days of beginning Covered Activities.	ITP Condition #7.14	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
14	No more than 30 days prior to Permittee beginning Covered Activities, the Designated Biologist shall perform a pre-construction survey for San Joaquin kit fox that covers the Project Area and a buffer zone of 200 feet beyond the Project Area.	ITP Condition #7.19	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
15	The Permittee shall develop a salvage plan for succulent owls' clover, San Joaquin orcutt grass, and Colusa grass and submit it to USFWS and DFG for approval at least 30 days prior to beginning Covered Activities within 1,000 feet of known vernal pools, swales, or other wetland habitat. Covered Activities within these areas may not proceed until the salvage plan is approved by DFG.	ITP Condition #7.23	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
16	In areas with intact vernal pool, swale, or wetland habitat the Designated Biologist shall conduct botanical surveys prior to the Permittee beginning Covered Activities. The botanical surveys shall be floristic in nature, cover the entire area of direct and indirect effects, and should be timed appropriately to detect all species which may occur within the Project Area. The Designated Biologist or Designated Representative shall provide the survey results to DFG in a written report within 30 days of the beginning of Covered Activities within areas with intact vernal pool, swale, or wetland habitat.	ITP Condition #7.24	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
17	Temporary fencing that delineates the Project Area as required by Condition 5.11 and 5.12 shall be placed by the Permittee such that it excludes the greatest number of Covered Species possible. Exact fencing locations shall be determined by the Designated Biologist.	ITP Condition #7.25	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
18	If any of the plant Covered Species are found in the Project Area, the Designated Biologist shall salvage and transplant them in accordance with the DFG-approved salvage plan.	ITP Condition #7.26	Before commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
DURING CONSTRUCTION					
19	To ensure compliance with the Conditions of Approval of the ITP, the Designated Biologist shall have authority to immediately stop any activity that is not in compliance with the ITP, and/or order any reasonable measure to avoid the unauthorized take of an individual of the Covered Species, or a species not covered by the ITP.	ITP Condition #5.3	Entire Project	Permittee	
20	Permittee shall provide DFG staff with reasonable access to the Project Area and mitigation lands under Permittee control, and shall otherwise fully cooperate with DFG efforts to verify compliance with or effectiveness of mitigation measures set forth in the ITP.	ITP Condition #5.4	Entire Project	Permittee	
21	Permittee shall prohibit firearms and domestic dogs from the Project Area and access routes during construction activities, except those in the possession of authorized security personnel or local, State, or federal law enforcement officials.	ITP Condition #5.8	Entire Project	Permittee	
22	Permittee shall develop and establish a leash rules and an animal control program.	ITP Condition #5.9	Entire Project	Permittee	
23	Permittee shall prohibit use of erosion control materials potentially harmful to Covered Species and other species, such as mono-filament netting (erosion control matting) or similar material, in potential Covered Species' habitat.	ITP Condition #5.10	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
24	Permittee shall implement dust control measures during Covered Activities to facilitate visibility for monitoring of the Covered Species by the Designated Biologist. Permittee shall keep the amount of water used to the minimum amount needed, and shall not allow water to form puddles.	ITP Condition #5.13	Entire Project	Permittee	
25	Project-related personnel shall access the Project Area using existing routes and shall not cross Covered Species' habitat outside of or en route to the Project Area. Permittee shall restrict Project-related vehicle traffic to established roads, staging, and parking areas. Permittee shall ensure that vehicle speeds do not exceed 20 miles per hour to avoid Covered Species on or traversing the roads. Permittee shall strictly prohibit off-road traffic outside the designated Project Area. If Permittee determines construction of routes for travel are necessary outside of the Project Area, the Designated Representative shall contact DFG for written approval before carrying out such an activity. DFG may require an amendment to the ITP if additional take of Covered Species may result from Project modification.	ITP Condition #5.14	Entire Project	Permittee	
26	Permittee shall immediately stop and following pertinent State and federal statutes and regulations arrange for repair and clean up by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so. Permittee shall exclude the storage and handling of hazardous materials from the Project Area and shall properly contain and dispose of any unused or leftover hazardous products off-site.	ITP Condition #5.16	Entire Project	Permittee	
27	The Designated Representative shall immediately notify DFG in writing if it determines that the Permittee is not in compliance with any Condition of Approval of the ITP, including but not limited to any actual or anticipated failure to implement measures within the time periods indicated in the ITP and/or this MMRP. The Designated Representative shall report any non-compliance with the ITP to DFG within 24 hours.	ITP Condition #6.2	Entire Project	Permittee	
28	Initially, the Designated Biologist shall be on-site daily when Covered Activities occur. The Designated Biologist shall conduct compliance inspections to (1) minimize incidental take of the Covered Species and to check for compliance with all mitigation and avoidance measures; (2) prevent unlawful take of species; (3) check for compliance with all measures of the ITP; (4) check all exclusion zones; and (5) ensure that signs, stakes, and fencing are intact, and that Covered Activities are only occurring in the Project Area. The Designated Representative or Designated Biologist shall prepare daily written observation and inspection records summarizing: oversight activities and compliance inspections, observations of Covered Species and their sign, survey results, and monitoring activities required by the ITP. Eventually, DFG may approve, in writing, periodic inspections once maintenance activities are on-going and more routine in nature.	ITP Condition #6.3	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
29	The Designated Biologist shall submit all confirmed Covered Species sightings to the California Natural Diversity Database (CNDDB) within 60 calendar days of the observation. The Designated Biologist(s) shall include the following documented information: the date, time, and location of each occurrence using Global Positioning System (GPS) technology, the name of the party that actually identified the plant or animal, circumstances of the incident, the general condition and health of each individual, any diagnostic markings, sex, age (juvenile or adult), actions undertaken, and habitat description.	ITP Condition #6.4	Entire Project	Permittee	
30	The Designated Representative or Designated Biologist shall compile the observation and inspection records identified in Condition 6.3 into a Monthly Compliance Report and submit it to DFG along with a copy of the this MMRP table with notes showing the current implementation status of each mitigation measure. Monthly Compliance Reports shall be submitted to DFG's Regional Office at the office listed in the Notices section of the ITP and via e-mail to DFG's Regional Representative. At the time of the ITP's approval, the DFG Regional Representative is Annee Ferranti (aferranti@dfg.ca.gov). DFG may at any time increase the timing and number of compliance inspections and reports required under this provision depending upon the results of previous compliance inspections. If DFG determines the reporting schedule must be changed, DFG will notify Permittee in writing of the new reporting schedule.	ITP Condition #6.5	Entire Project	Permittee	
31	Permittee shall provide DFG with an Annual Status Report (ASR) no later than January 31 of every year beginning with issuance of the ITP and continuing until DFG accepts the Final Mitigation Report identified below. Each ASR shall include, at a minimum: (1) a summary of all Monthly Compliance Reports identified in Condition 6.5, (2) a general description of the status of the Project Area and Covered Activities, including actual or projected completion dates, if known; (3) a copy of the table in this MMRP with notes showing the current implementation status of each mitigation measure; (4) an assessment of the effectiveness of each completed or partially completed mitigation measure in minimizing and mitigating Project impacts; (5) all available information about Project-related take of the Covered Species; and (6) information about other Project impacts on the Covered Species.	ITP Condition #6.6	Entire Project	Permittee	
32	Permittee shall immediately notify the Designated Biologist if a Covered Species is killed or taken by a Project-related activity, or if a Covered Species is otherwise found dead or injured within the vicinity of the Project. The Designated Biologist or Designated Representative shall provide initial notification to DFG by calling the Regional Office at (559) 243-4005. The initial notification to DFG shall include information regarding the location, species, number of animals taken and the ITP Number. Following initial notification, Permittee shall send DFG a written report within two calendar days. The report shall include the date and time of the finding or incident, location of the animal or carcass, and if possible provide a photograph, explanation as to cause of take, and any other pertinent information.	ITP Condition #6.8	Entire Project	Permittee	
33	If California tiger salamander is found by any person in the Project Area before or during Covered Activities, the Permittee shall immediately stop all work that could potentially harm the California tiger salamander until the Designated Biologist can relocate the California tiger salamander to an active rodent burrow system in accordance with the approved relocation plan.	ITP Condition #7.3	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
34	The Designated Biologist shall survey all portions of the construction footprint within grassland habitat for the presence of all life stages of CTS immediately after initial ground disturbance (e.g. first ripping/discing/grading event). All small mammal burrows or burrow complexes incidentally dug up or otherwise disturbed during the grading or excavation activities shall be visually inspected for CTS by the Designated Biologist. The Designated Biologist shall relocate any live CTS discovered during these surveys in accordance with the approved CTS relocation plan.	ITP Condition #7.4	After commencing ground- or vegetation-disturbing activities. Entire Project	Permittee	
35	The Designated Biologist and Permittee shall monitor the National Weather Service 72-hour forecast for the Project Area. If a 70 percent or greater chance of rainfall is predicted within 72 hours, Permittee shall cease all Covered Activities in areas within 1.3 miles of potential or known California tiger salamander no further rain is forecast. If work must continue when rain is forecast, a Designated Biologist shall survey the Project construction footprint before construction begins each day that rain is forecast. If a Designated Monitor is used to conduct surveys, a Designated Biologist must remain on site to capture and relocate any California tiger salamander that are discovered during the surveys. If rain exceeds ¼ inch during a 24-hour period, Permittee shall cease work until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known California tiger salamander breeding sites once they have been encircled with California tiger salamander exclusion fencing pursuant to ITP Condition 7.5. However, even after California tiger salamander exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.3 miles of potential or known California tiger salamander breeding sites but outside of the salamander exclusion fencing (e.g., on roads).	ITP Condition #7.6	Entire Project	Permittee	
36	Permittee shall strictly prohibit all night work in areas within 1.3 miles of potential or known California tiger salamander breeding sites when a 70 percent or greater chance of rainfall is predicted within 72 hours of Covered Activities until no further rain is forecast. This restriction is not applicable for areas within 1.3 miles of potential or known California tiger salamander breeding sites once they have been encircled with California tiger salamander exclusion fencing pursuant to ITP Condition 7.5. However, even after salamander exclusion fencing is installed, this condition still applies to construction-related traffic moving though areas within 1.3 miles of potential or known California tiger salamander breeding sites but outside of the California tiger salamander exclusion fencing (e.g., on roads).	ITP Condition #7.7	Entire Project	Permittee	
37	Permittee shall ensure that soil stockpiles are placed where soil will not pass into potential California tiger salamander breeding pools or into any other "Waters of the State," in accordance with Fish and Game Code 5650. Permittee shall appropriately protect stockpiles to prevent soil erosion.	ITP Condition #7.8	Entire Project	Permittee	
38	Permittee shall construct roadways within 1.3 miles of known or potential California tiger salamander breeding sites, including but not limited to the sites shown on Figure 1, without steep curbs, berms, or dikes, which could prevent California tiger salamander from exiting the roadway. If curbs are necessary for safety and/or surface runoff, Permittee shall design and construct them to allow California tiger salamander to walk over them. If steep dikes are required, Permittee shall design and construct them to include over-side drains or curb/dike breaks spaced at intervals of 25 feet to allow California tiger salamander passage.	ITP Condition #7.9	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
39	To ensure that disease is not conveyed between work sites all Biologists shall follow the fieldwork code of practice developed by the Declining Amphibian Populations Task Force Fieldwork Code of Practice (Attachment 2). The Designated Biologist may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water) for the ethanol solution. Care shall be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.	ITP Condition #7.10	Entire Project	Permittee	
40	The Designated Biologist shall inspect all open holes, sumps, and trenches within the Project Area at the beginning, middle, and end of each day for trapped animals. To prevent inadvertent entrapment of Covered Species or any other animals the Designated Biologist shall oversee the covering of all excavated, steep-walled holes or trenches more than two feet deep, or of any depth if they contain water or other material, with plywood or other barrier materials at the close of each working day such that animals are unable to enter and become entrapped. Alternatively, Permittee shall provide earthen escape ramps of no more than 3:1 slope every 200 feet. Before holes or trenches are filled, the Designated Biologist shall thoroughly inspect them for trapped animals. If any worker discovers that Covered Species have become trapped, Permittee shall cease all Covered Activities in the vicinity and notify the Designated Biologist immediately. Project workers and the Designated Biologist shall allow the Covered Species to escape unimpeded if possible, or the Designated Biologist Covered Activities are allowed to continue. If an injured Covered Species is discovered at any time, the Designated Representative shall contact the USFWS Sacramento Fish and Wildlife Office and DFG's Regional Representative within one working day of the incident.	ITP Condition #7.11	Entire Project	Permittee	
41	Workers shall inspect for Covered Species under vehicles and equipment before the vehicles and equipment are moved. If a Covered Species is present, the worker shall notify the Designated Biologist and wait for the Covered Species to move unimpeded to a safe location. Alternatively, especially if the animal is inside the fenced Project Area, the Designated Biologist shall move the Covered Species out of harm's way outside of the Project Area and in compliance with the approved relocation plan, if applicable.	ITP Condition #7.12	Entire Project	Permittee	
42	Workers shall thoroughly inspect all construction pipe, culverts, or similar structures with a diameter of three inches or greater that are stored for one or more overnight periods for Covered Species before the pipe is subsequently moved, buried, or capped. If during inspection a Covered Species is discovered inside a pipe, workers shall notify the Designated Biologist and allow the animal to safely escape that section of pipe before moving and utilizing the pipe.	ITP Condition #7.13	Entire Project	Permittee	
43	If a nesting Swainson's hawk is found within 0.5 mile of the Project Area, including access routes, during the nesting season (February 15 through September 15), the Designated Biologist shall be present daily for the entire duration of any Covered Activities to monitor the behavior of any Swainson's hawk nesting within 500 feet to 0.5 mile of Covered Activities. The Designated Biologist shall have the authority to order the cessation of all activities within 0.5 mile of any Swainson's hawk nest if the birds exhibit distress and/or abnormal nesting behavior (swooping/stooping, excessive vocalization (distress calls), agitation, failure to remain on nest, failure to deliver prey items for an extended time period, etc.) which may cause reproductive failure (nest abandonment and loss of eggs and/or young). Permittee shall not resume Covered Activities until DFG has been consulted by the Designated Biologist, and both the Designated Biologist and DFG confirm that the bird's behavior has normalized.	ITP Condition #7.15	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
44	The Permittee and Designated Biologist shall ensure that no Covered Activities occur within 500 feet of a Swainson's hawk nest during the nesting season (February 15 through September 15).	ITP Condition #7.16	Entire Project	Permittee	
45	Permittee shall prohibit removal of trees to between September 16 and February 14 of any year to avoid impacts to nesting Swainson's hawk.	ITP Condition #7.17	Entire Project	Permittee	
46	If Covered Activities affecting Swainson's hawk result in the removal of a Swainson's hawk nest tree in the Project Area, the Permittee shall plant native species replacement trees at a 4:1 ratio (four trees for each nest tree removed) on HM lands in close proximity to suitable foraging habitat. The HM Lands manager shall monitor the tree survival rates and shall report them in the ASR pursuant to the reporting requirements of Condition 6.6 of the ITP. Permittee shall ensure that the number of trees required as compensation under the ITP matches the number of healthy and thriving trees at the end of the initial five-years monitoring period. Permittee shall plant replacement trees that are separated from each other by at least 0.75 mile and shall not plant trees within 1.5 miles of a known Swainson's hawk nest tree.	ITP Condition #7.18	Entire Project	Permittee	
47	The Designated Biologist shall monitor all potential, atypical, active, and known San Joaquin kit fox dens (USFWS 1999) identified in the Project Area during preconstruction or previous surveys for a minimum of three consecutive nights using standard methods, including "dusting" the den entrance and apron and other means (infrared camera) if necessary. Only when the den is determined to be unoccupied may the den be excavated under the direction of the Designated Biologist. If a San Joaquin kit fox is still present after three or more consecutive days of plugging and monitoring, the den may have to be excavated when, in the judgment of the Designated Biologist, it is temporarily vacant. The Designated Biologist may excavate the den during the animal's normal foraging activities. The Designated Biologist shall excavate the den by hand unless soil conditions necessitate the use of excavating equipment; however, extreme caution must be exercised. The Designated Biolgist shall accomplish the destruction of the den by careful excavation until it is certain that no San Joaquin kit fox are inside. The Designated Biologist shall fully excavate the den, fill it with dirt, and compact it to ensure that San Joaquin kit fox cannot reenter or use the den during the Covered Activities. If at any point during excavation a San Joaquin kit fox is discovered inside the den, the Designated Biologist shall immediately cease the excavation activity and continue monitoring of the den as described above. Destruction of the den may be completed when, in the judgment of the Designated Biologist, the San Joaquin kit fox has escaped from the partially destroyed den. Exclusion of San Joaquin kit fox from active natal dens may not occur during the pupping/rearing season.	ITP Condition #7.20	Entire Project	Permittee	
48	Permittee shall replace each potential, known, and active San Joaquin kit fox den that must be destroyed with an artificial den to compensate for the loss of important shelter used for protection, reproduction, and escape from predators. The Designated Biologist shall determine the appropriate design and placement of replacement dens through consultation with USFWS and DFG on a site-specific basis.	ITP Condition #7.21	Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
49	If a Covered Species is injured as a result of Covered Activities, the Designated Biologist shall immediately take it to a DFG-approved wildlife rehabilitation or veterinary facility. Permittee shall identify the facility before starting Covered Activities. Permittee shall bear any costs associated with the care or treatment of such injured Covered Species. Permittee shall notify DFG of the injury to the Covered Species immediately by telephone and e-mail followed by a written incident report. Notification shall include the date, time, location (GPS coordinates) and circumstances of the incident, and the name of the facility where the animal was taken.	ITP Condition #7.22	Entire Project	Permittee	
50	If a plant Covered Species is destroyed or damaged as a result of Project-related activities outside of the identified Project Area, or because avoidance and minimization measures included in the ITP were not followed, the Permittee shall notify DFG of the incident immediately, including the extent to which damage to the Covered Species occurred via telephone and email, followed by a written incident report submitted to DFG. Notification shall include the date, time, location (GPS coordinates), and circumstances of the incident.	ITP Condition #7.27	Entire Project	Permittee	
51	Permittee shall permanently preserve 6,236 acres of Tier 1 HM lands which are currently owned in fee title by the UC and located in eastern Merced County (Figure 2). The Cyril Smith Trust is not included in the acreage of HM Lands because it is not owned in fee title by the Permittee. The Tier 1 lands to be used as HM Lands for the Project include: i) The 5,098-acre Virginia Smith Trust Preserve (VST); ii) The 1,307-acre Campus Natural Reserve (CNR); and The 101-acre Myers Easterly.	ITP Condition #8.1	No later than 18 months from the effective date of the ITP if Security is provided. Entire Project	Permittee	
52	Permitee shall convey a conservation easement to DFG over the VST, CNR, and Meyers Easterly HM lands under terms approved by DFG within 18 months of execution of the ITP. Alternatively, the transfer may be to a DFG-approved non-profit organization qualified pursuant to California Government Code section 65965, with DFG named as a third party easement beneficiary.	ITP Condition #8.3.1	No later than 18 months from the effective date of the ITP if Security is provided	Permittee	
53	Permitee shall provide a recent preliminary title report, initial hazardous materials survey report, and other documents that may be necessary for the conservation easement (see Attachment 3). All documents are subject to the approval of DFG, and if applicable, the Wildlife Conservation Board and the Department of General Services.	ITP Condition #8.3.2	No later than 3 months from the effective date of the ITP if Security is provided	Permittee	
54	Permitee shall manage the VST, CNR, and Meyers Easterly in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008) and incorporate the plan by reference into the conservation easements. In addition, Permittee shall implement the Take Avoidance and Minimization required in ITP Condition 8 when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.	ITP Condition #8.3.3	Entire Project	Permittee	
55	Permittee may select the conservation easement grantee, land owner, or other party as the land manager. Documents related to land management shall identify the land manager. Permittee shall notify DFG of any subsequent changes in the land manager within 30 days of the change.	ITP Condition #8.3.4	Within 30 days of change; Entire Project	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
56	Permittee shall reimburse DFG for reasonable expenses incurred during title and documentation review, expenses incurred from other State agency reviews, and overhead related to transfer of HM lands to DFG. DFG estimates that this Project will create an additional cost to DFG of no more than $3,000 for every fee title deed or easement processed.	ITP Condition #8.3.5	Entire Project	Permittee	
57	Sung Mo "Steve" Kang, UCM Chancellor, has submitted a letter dated January 26, 2011 (Attachment 4) confirming that the William and Flora Hewlett Foundation (Hewlett Foundation) has already provided $2 million for the long-term management of the HM lands. This $2 million will continue to be managed through the UC General Endowment Pool and it is estimated that it will provide $80,000 per year of interest income in perpetuity. This interest income shall be available for the operation, management and protection of HM lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action designed to protect or improve the habitat values of the HM lands, in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008). Take Avoidance and Minimization required in ITP Condition 8 shall also be implemented when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.	ITP Condition #9.1	Entire Project	Permittee	
58	Permittee shall provide DFG with the following: a) A draft Memorandum of Understanding (MOU) between the UC and DFG outlining the conditions under which the UC could hold endowment monies. These monies would be held in a special deposit account established pursuant to Fish and Game Code section 13014 and based on DFG's pilot program for Local Government and Special Districts (November 2010, Attachment 4). b) The MOU must be finalized within three months of executing the ITP, except that this period may be extended if DFG has approved a draft MOU, and requires additional time for its internal processing. Absent finalization of this MOU within three months of executing the ITP, $2 million shall be submitted to DFG, where it shall be deposited in a special deposit account established pursuant to Fish and Game Code section 13014. Alternatively, the $2 million shall be provided to the National Fish and Wildlife Foundation (NFWF). DFG may pool the endowment with other endowments for the operation, management and protection of HM lands for local populations of the Covered Species. The land manager may be reimbursed for actual costs associated with HM land management (in accordance with the Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (September 2008), for up to the amount generated annually.	ITP Condition #9.2	Within 1 week of ITP Issuance	Permittee	
POST-CONSTRUCTION					
59	Upon completion of construction Permittee shall remove from the Project Area and properly dispose of all construction refuse, including, but not limited to, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes.	ITP Condition #5.17	Post-construction	Permittee	

	Mitigation Measure	Source	Implementation Schedule	Responsible Party	Status / Date / Initials
60	No later than 45 days after completion of all mitigation measures, Permittee shall provide DFG with a Final Mitigation Report. The Designated Biologist shall prepare the Final Mitigation Report which shall include, at a minimum: (1) a summary of all Monthly Compliance Reports and all ASRs; (2) a copy of the table in this MMRP with notes showing when each of the mitigation measures was implemented; (3) all available information about Project-related take of the Covered Species; (4) information about other Project impacts on the Covered Species; (5) beginning and ending dates of Covered Activities; (6) an assessment of the effectiveness of the ITP's Conditions of Approval in minimizing and fully mitigating Project impacts of the taking on Covered Species; (7) recommendations on how mitigation measures might be changed to more effectively minimize take and mitigate the impacts of future projects on the Covered Species; and (8) any other pertinent information.	ITP Condition #6.7	No more than 45 days after Project completion	Permittee	

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
CENTRAL REGION
1234 EAST SHAW AVENUE
FRESNO, CALIFORNIA 93710

AMENDMENT NO. 2
(A Major Amendment)
California Endangered Species Act
Incidental Take Permit No. 2081-2009-010-04
Regents of the University of California
University of California, Merced
Campus and Community North Project in Merced County

INTRODUCTION

On March 30, 2011, the California Department of Fish and Wildlife (CDFW) issued Incidental Take Permit No. 2081-2009-010-04 (ITP) to the Regents of the University of California (Permittee) authorizing take of California tiger salamander (*Ambystoma californiense*), Swainson's hawk (*Buteo swainsoni*), succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), San Joaquin orcutt grass (*Orcuttia inaequalis*), and San Joaquin kit fox (*Vulpes macrotis mutica*) (collectively, the Covered Species) associated with and incidental to the University of California, Merced Campus and Community North Project (Project) in Merced County for a term of 25 years.

The Project, as described in the ITP originally issued by CDFW in March 2011, includes the construction and operation of a major research university campus sustaining up to 25,000 full-time students and a contiguous student/faculty community to support the housing, retail, and commercial needs of the university. At full build-out under the ITP, the Project Site will encompass an 819-acre campus (University of California, Merced Campus) and an 839-acre student/faculty community (Community North), and set aside 6,236 acres of Habitat Management (HM) lands representing compensatory mitigation for the Project-related take of the Covered Species under the California Endangered Species Act (CESA). A portion of the HM lands (1,307 acres adjoining the campus) will constitute a vernal pool-grassland habitat/species laboratory providing research, general education, and student outreach opportunities. The ITP was acknowledged by the Permittee in April 2011 and progress towards full build-out of the Project is on-going. Although the development of another student/faculty community (the 1,118-acre Community South) was being contemplated during the environmental review of the Project, it was not included as part of the Project subject to the ITP, and is not included as part of the Project subject to this Amendment.

On September 30, 2011, CDFW issued Amendment No. 1 (A Major Amendment) removing the Small Mammal Burrow Excavation requirement originally set forth in Condition of Approval 7.4 of the ITP and allowing the Permittee to implement an alternate means of minimizing direct take of California tiger salamander (CTS) in the form of mortality. Amendment No. 1 was acknowledged by the Permittee in October 2011 and continues to guide CTS salvage and relocation activities at the Project Site. In issuing the ITP and Amendment No. 1 (collectively, this ITP as amended), CDFW found, among other things, that the Permittee's compliance with the Conditions of Approval of the ITP, as amended, would fully mitigate impacts to the Covered Species and would not jeopardize the continued existence of the Covered Species.

In a letter dated April 1, 2015, the Permittee requested that the ITP as amended, be amended a second time to: 1) extend incidental take coverage over some off-Site wetland restoration activities which have since been required of the Permittee by the United States Army Corps of Engineers (USACE) under Section 404 of the federal Clean Water Act; and 2) remove a remaining reference to the originally-required Small Mammal Burrow Excavation activities that were removed through the issuance of Amendment No. 1. Through electronic mail correspondence on July 7, 2015, the Permittee additionally requested the second amendment to the ITP revise the exclusion fence requirement allowing the Permittee and CDFW the flexibility to consider alternative fence designs that may better represent current practices.

The off-Site wetland restoration work will constitute compensatory mitigation for the Project-related loss of wetlands, and will include the restoration of historic vernal pools, vernal swales, and seasonal wetlands at portions of the nearby 1,556-acre-Lazy K Ranch (see Attachment 1) and 397.5-acre Yosemite Lake Conservation Area (see Attachment 2) properties. Neither the original ITP, nor the ITP as amended, authorized take associated with these off-Site wetland restoration activities. Although these efforts may ultimately benefit the Covered Species, take of one of the Covered Species (specifically CTS) may occur during ground-disturbing activities associated with the wetland restoration activities.

This Major Amendment No. 2 (Amendment) makes the following changes to the existing ITP as amended:

> First, this Amendment documents the location and description of the wetland restoration work, including details of the increased impacts to the Covered Species and an analysis of the potential for take;

Second, this Amendment adds measures to minimize the authorized take and fully mitigate the wetland restoration-related impacts to the Covered Species;

Third, this Amendment removes a remnant reference to the originally-required Small Mammal Burrow Excavation activities which was overlooked during preparation of Amendment No. 1; and

Fourth, this Amendment allows the Permittee to use alternative exclusion fence designs with CDFW's written approval.

AMENDMENT

The ITP is further amended as follows (amended language in ***bold italics***; deleted language in ~~strikethrough~~):

1. The following paragraphs shall be added to the Project Location section of the ITP, as amended:

In addition to development of the campus and north community at the inclusive Project Site, the Project will include wetland restoration work at portions of the nearby Lazy K Ranch (LKR) and Yosemite Lake Conservation Area (YLCA) properties.

The irregularly-shaped LKR property straddles the Merced-Madera County line approximately 18.5 miles southeast of the inclusive Project Site. The LKR constitutes approximately 1,556 acres of natural lands with some cultivated agriculture and a two-mile reach of the Chowchilla River with its associated riparian area. In general, the LKR is bound on the southwest by the Burlington-Northern Railroad right-of-way, on the southeast by Ash Slough, and on the north by Marguerite Road. The LKR occupies portions of Sections 12 and 13 of Township 9 South, Range 16 East, Mount Diablo Baseline and Meridian; and Sections 7, 8, 9, and 18 of Township 9 South, Range 17 East, Mount Diablo Baseline and Meridian. Figure 10 depicts the LKR.

The triangular-shaped YLCA is located across Yosemite Lake from the inclusive Project Site, and constitutes approximately 397.5 acres of natural lands bound by the shores of Yosemite Lake on the southeast, the Crocker-Hoffman Canal on the southwest, and by similar natural lands on the north. The YLCA occupies portions of Sections 28 and 27 of Township 6 South,

Range 14 East, Mount Diablo Baseline and Meridian. Figure 11 depicts the YLCA.

2. The last paragraph of the Project Description section of the ITP, as amended, shall be amended to read:

It is important to note that due to the contiguous location of the UC exclusively controlled Campus and Community North to the Community South; the Community South has been analyzed as part of the University Campus and the entire Community Project under both the California Environmental Quality Act (CEQA) and the National Environmental Protection Act. However, absent the execution of development agreements between the University of California, the County of Merced Local Agency Formation Commission, and the City of Merced, development of the Community South portion of the Project is not ready to move forward and is not covered under this ITP. However, the Community South is an integral part of the Project description in the broader context of analyzing the cumulative effects on the proposed Covered Species. Only the 819-acre Campus and the 839-acre Community North are currently being developed by the UC. ~~Therefore, these two individual components collectively define the Project Area to be covered under this ITP~~. The expected north and south Campus Community at full build-out would include 11,616 dwelling units and a total residential population of approximately 30,780 persons.

and will be followed by the insertion of the following paragraphs:

To mitigate for the Project-related loss of wetlands at the campus and community north under the Permittee's Section 404 Clean Water Act Permit (SPK-1999-00203), wetland restoration efforts are being required of the Permittee by the USACE. This wetland restoration work will be conducted within 50 acres of the 397.5-acre YLCA and 65.5 acres of the 1,556-acre LKR properties. The 65.5-acre restoration area at the LKR property will be permanently protected under conservation easement and perpetually managed representing compensatory mitigation for take of the Covered Species at both properties.

In general, the wetland restoration activities at both properties will constitute the conversion of uplands to seasonal wetlands in areas at both properties where wetlands historically existed. To accomplish the wetland restoration work, ATVs/UTVs, light trucks, and heavy equipment (including scrapers, excavators, back-hoes, dozers, tractors, fuel trucks, dump trucks, and water trucks) will be used to excavate, stockpile, contour, compact, and transport

soils. After the wetlands are restored at the mitigation areas at both the YLCA and LKR, inoculum will be collected from natural vernal pools at both properties and distributed within the restored vernal pools, coincident with, (but in advance of) the on-set of the 2016-2017 rainy season. The inoculum will include surface available soils, seeds, and organic materials hand-raked and hand-vacuumed from within the natural vernal (donor) pools at the designated inoculum collection areas at both properties. Permittee will ensure that at least 3.4 acres of the restored wetlands at the LKR are designed, constructed, re-vegetated, protected, and perpetually managed as vernal pools representing CTS breeding habitat. In addition, at least 1 acre of restored wetlands associated with the Project will be suitable CTS breeding habitat.

Mitigation for the Permittee's Section 404 Clean Water Act permit is also expected to include the permanent preservation of existing wetlands on three other parcels (Merced County Assessor's Parcel Numbers 052-300-008, 052-300-011, and 052-300-012) in Merced County. It should also be noted that similar wetland restoration work will occur at the YLCA alongside but not coincident with the aforementioned Project-related restoration work there. All of the restored wetlands at the YLCA will eventually be protected and perpetually managed under conservation easement but not as a requirement of this ITP.

For the purpose of discussion within this ITP, as amended, the Project Area includes the 1) development envelope within the inclusive Project Site encompassing the campus and community north areas; 2) the areas of wetland restoration at both the YLCA (50 acres) and LKR (65.5 acres) properties, and the inoculum collection areas at YLCA and LKR; and the 6,236 acres of Habitat Management Lands.

3. The first sentence of the second paragraph in the Impacts of the Taking on Covered Species section of the ITP, as amended, shall be amended to read:

The activities described above that are expected to result in incidental take of individuals of the Covered Species include all of the ground and vegetation disturbance, construction, operation of heavy equipment, vehicle and foot traffic, and other activities necessary for the full development, operation, and maintenance of the UCM Campus and Community North***, and the off-Site wetland restoration activities (collectively,*** Covered Activities). Any activities at Merced County Assessor's Parcel Numbers 052-300-008, 052-300-011, and 052-300-012 are not covered by this ITP.

4. The following paragraph shall be added to the end of the Impacts of the Taking on Covered Species section of the ITP, as amended:
In association with the off-Site Wetland Restoration work, wetland restoration is expected to result in an increase of potential breeding habitat at YLCA and LKR and enhance the value of the adjacent uplands resulting from the restored breeding habitat. The collection and distribution of inoculum at both YLCA and LKR will be conducted during the dry season using only hand tools and will involve only small portions of natural pools without state listed (threatened, endangered, or rare) plants; therefore, impacts to the Covered Species are not anticipated.

5. Table 1 of the Impacts of the Taking on Covered Species section of the ITP, shall be amended to read:

Species	Habitat Type	Number of Acres Impact
1. California tiger salamander	Non-native grassland (upland refugia)	~~1,870 acres permanent~~ ***1,905.5 acres permanent*** ***80 acres temporary***
	Wetland breeding	7.5 acres permanent
2 Swainson's hawk	Non-native grassland (foraging)	1,514 acres permanent[a]
	Nesting	1 nesting tree
3. San Joaquin kit fox	Non-native grassland	1,293 acres permanent[a] 676 acres temporary
4. Succulent owl's clover	Vernal pool	31 acres permanent
5. Colusa grass	Vernal pool	0 acres permanent[b]
6. San Joaquin orcutt grass	Vernal pool	0 acres permanent[b]

[a]Permanent habitat impacts are based on the ability of the species to utilize open space within the fully built Project Area on a limited basis for foraging, movement corridors, and/or nesting and denning.

[b]While Colusa grass and San Joaquin orcutt grass have not been identified in vernal pool habitat location on the UCM Campus and Community North, there is a strong likelihood both may be present within the Project Area based on the known abundance and distribution of these species on the adjacent HM lands.

6. Condition of Approval 2 of the ITP, as amended, shall be amended to read:

CEQA Compliance. Permittee shall implement and adhere to the mitigation measures related to the Covered Species in the Biological Resources section of: **1)** the Final Environmental Impact Statement/Environmental Impact Report (SCH Number: 2008041009) certified by the lead agency, the University of

California, for the Project pursuant to CEQA in March 2009; ***2) the Final Environmental Impact Report (SCH Number 1999011011) certified by the lead agency, the County of Merced, for the Yosemite Lake Estates General Plan Amendment project in March, 2004; and 3) the Mitigated Negative Declaration (SCH Number 2015041017) adopted by the lead agency, the University of California, for the Lazy K Ranch Permittee-Responsible Off-Site Mitigation Preserve project in July 2015.***

7. Condition of Approval 7.5 of the ITP, as amended, shall be amended to read:

California Tiger Salamander Exclusion Fencing. Permittee shall place California tiger salamander exclusion fencing around the construction footprint following the ***CTS salvage efforts described in Condition of Approval 7.4, above,*** ~~hand excavation of burrows~~ in upland habitat areas within 1.3 miles of potential or known California tiger salamander breeding sites. Permittee shall maintain the California tiger salamander exclusion fencing throughout all construction activities. Permittee shall use wildlife fencing, which consists of a fine (less the***a***n 0.4 inch) mesh equipped with one-way exits to avoid entrapment of amphibians inside the fence. Permittee shall bury fencing to a depth of six inches and fencing shall be a minimum of 3.3 feet tall following installation. The fencing shall include the optional barrier lip designed to prevent species such as California tiger salamander from climbing over. ***An alternative exclusion fence design may be used if CDFW's Regional Representative has provided written approval in advance of fence installation.*** The Permittee shall avoid small mammal burrows to the maximum extent possible during installation of the exclusion fencing. Where burrows cannot be avoided, the Designated Biologist shall ~~excavate them by hand before the fence is installed~~***visually inspect burrows incidentally dug up or disturbed during fence installation. The Designated Biologist shall relocate any live CTS discovered during these inspections in accordance with the approved CTS relocation plan***.

8. Condition of Approval 7.28 shall be added to the ITP, as amended, and read:

7.28 ***Inoculum Collection. The Permittee shall not collect inoculum from greater than 10 percent of the area of each donor pool. The Permittee shall not collect inoculum from vernal pools within the designated inoculum collection area where state listed (threatened, endangered, or rare) or invasive plants occur. At the LKR, the Permittee shall not collect inoculum from donor pools used for the California High-Speed Train project (ITP No. 2081-2013-025-04). The***

Permittee shall provide a written report to CDFW, including maps, documenting the vernal pools used for inoculum collection.

9. Condition of Approval 7.29 shall be added to the ITP, as amended, and read:

7.29 Wetland Restoration at YLCA. The Permittee shall notify CDFW in writing when wetland restoration work begins at YLCA and notify CDFW when wetland restoration work is completed at YLCA. Wetland restoration for the Permittee shall be limited to the areas designated in Figure 12. An alternative wetland restoration area for the Permittee may be designated with written approval from CDFW. Wetland restoration work for the Project shall not occur when wetland restoration activities occur for any other project or activity at YLCA.

10. Condition of Approval 8 of the ITP, as amended, shall be amended as follows:

Habitat Management Land Acquisition:
DFG has determined that permanent protection and perpetual management of compensatory habitat is necessary and required pursuant to CESA to fully mitigate Project-related impacts of the taking on Covered Species that will result with implementation of the Covered Activities. This determination is based on factors including an assessment of the importance of the habitat in the Project Area, the extent to which the Covered Activities will impact the habitat, and DFG's estimate of the acreage required to provide for adequate compensation.

To meet this requirement, the Permittee shall provide for the permanent protection and management of ~~6,236~~ ***6,301.5*** acres of HM Lands by recording a conservation easement, selecting a land manager, and funding the long-term management of the HM Lands.

8.1 There are two types of conservation lands associated with the Project: lands owned in fee title by ***the Knapp family,*** the UC, and The Nature Conservancy and ***which are remote or*** located immediately adjacent to the campus (i.e.: Tier 1 properties – ***Knapp Family***, Virginia Smith Trust, Campus Natural Reserve, Myers Easterly, and Cyril Smith Trust), and other lands in the region set aside for resource conservation and held under easement (i.e.: Tier 2 properties – the Robinson, Chance, Carlson, Nelson, and Cunningham properties). Permittee shall permanently preserve ~~6,236~~ ***6,301.5*** acres of Tier 1 HM lands which are currently owned in fee title by the UC, The Nature Conservancy, ***or the Knapp family*** and located in eastern Merced County (Figure 2 ***and Figure 10***).

The Cyril Smith Trust is not included in the acreage of HM Lands because it is not owned in fee title by the Permittee. The Tier 1 lands to be used as HM Lands for the Project include:

8.1.1. The 5,098-acre Virginia Smith Trust Preserve (VST);

8.1.2. The 1,307-acre Campus Natural Reserve (CNR); ~~and~~

8.1.3. The 101-acre Myers Easterly**; and**

8.1.4 The 65.5-acre Knapp Family (LKR)

8.2 The HM lands consist of high quality habitat for the Covered Species as determined through extensive biological resource surveys spanning multiple years. Based upon these surveys, Table 2 contains the acreage of habitat on the HM lands known to be occupied by Covered Species;

Table 2. Acreage of Habitat on HM Lands Known to be Occupied by Covered Species

Species	Habitat Type	Number of Acres			
		VST	CNR	Myers Easterly	**LKR**
1. California tiger salamander	Non-native grassland (upland refugia)	5,098	1,270	94	**55**
2. Swainson's hawk	Non-native grassland (foraging)	5,098	1,270	94	**0**
3. San Joaquin kit fox	Non-native grassland	5,048	1,181	48	**0**
4. Succulent owl's clover	Vernal pool, wetland	194	111	0	**0**
5. SJV orcutt grass	Vernal pool, wetland	0	16	0	**0**
6. Colusa grass	Vernal pool wetland	0	14	0	**0**

8.3 As part of this condition, Permittee shall:

8.3.1 Convey a conservation easement to DFG over the VST, CNR, ***LKR,*** and Meyers Easterly HM lands under terms approved by DFG within 18 months of execution of this ITP. Alternatively, the transfer may be to a DFG-approved non-profit organization qualified pursuant to California Government Code section 65965, with DFG named as a third party easement beneficiary.

8.3.3. Manage the VST, CNR, and Meyers Easterly in accordance with the *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced* (September 2008) and incorporate the plan by reference into the conservation easements. ***Similarly, manage the LKR acreage in accordance with a long term management plan to be prepared by the Permittee and approved by CDFW and incorporate the plan by reference into the conservation easement***. In addition, Permittee shall implement the Take Avoidance and Minimization required in ITP Condition 8 when conducting biological monitoring, infrastructure maintenance or improvement, and management activities.

The corresponding measures in the Mitigation Monitoring and Reporting Program (MMRP) (Attachment 1 of the ITP, as amended) shall be amended to read the same as above.

All terms and conditions of the ITP, as amended and MMRP that are not expressly amended herein, remain in effect and must be implemented and adhered to by the Permittee.

FINDINGS

Issuance of this Major Amendment No. 2 may increase the amount of take of one of the Covered Species compared to the Project as originally approved; however, by implementing the avoidance, minimization, and mitigation measures contained in the ITP, as amended and this Major Amendment No. 2, it is not expected that Major Amendment No. 2 will increase Project impacts on these species (i.e., "impacts of taking" as used in Fish and Game Code Section 2081, subd. (b)(2)).

Discussion: Major Amendment No. 2 makes four specific changes to the ITP, as amended:

(1) documents the location and description of the wetland restoration work which has been required of Permittee by the USACE since issuance of the ITP, as amended;

(2) adds measures to minimize the authorized take and fully mitigate the wetland restoration-related impacts to one of the Covered Species;

(3) removes a remnant reference to the originally-required Small Mammal Burrow Excavation activities which was overlooked during preparation of Amendment No. 1; and

(4) allows the Permittee to use alternative exclusion fence designs with CDFW's written approval

CDFW has determined that the restoration work may increase the amount of take of individuals of one of the Covered Species (California tiger salamander), but through avoidance, minimization, and mitigation, avoids an increase of the impacts to the Covered Species.

Issuance of Major Amendment No. 2 does not affect CDFW's previous determination that issuance of the ITP, as amended, meets and is otherwise consistent with the permitting criteria set forth in Fish and Game Code section 2081, subdivisions (b) and (c).

Discussion: CDFW determined in March 2011 that the Project, as approved, met the standards for issuance of an ITP under CESA. This determination included findings that, among other things, the impacts of the taking would be minimized and fully mitigated and that the Project would not jeopardize the continued existence of the Covered Species. Those findings are unchanged with respect to Major Amendment No. 2 because the Project and ITP, as amended, adds measures to minimize the authorized take and fully mitigate the wetland restoration-related impacts to the Covered Species, increases the compensatory mitigation required of the Permittee, and requires Permittee's continued adherence to and implementation of the avoidance and minimization measures set forth in the ITP's Conditions of Approval and MMRP, effectively minimizing and fully mitigating impacts of the taking on the Covered Species.

None of the factors that would trigger the need for subsequent or supplemental environmental analysis of the Project under Public Resources Code section 21166 or California Code of Regulations, title 14, sections 15162 and 15163, exist as a result of Major Amendment No. 2.

Discussion: CDFW originally issued the ITP, as amended in March 2011 as a responsible agency under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 *et seq.*) after, among other things, considering the Final Environmental Impact Statement/Environmental Impact Report (Final EIS/EIR) certified by the University of California for the Project. However, because the off-Site restoration work at the LKR and YLCA were not contemplated within the scope of the Final EIS/EIR, CDFW herein amends the ITP after, among other things, considering the Final Environmental Impact Report certified by the County of Merced, for the Yosemite Lake Estates General Plan Amendment as it regarded the YLCA property; and the Mitigated Negative Declaration adopted by the University of California for the Lazy K Ranch Permittee-Responsible Off-Site Mitigation Preserve as it regarded the LKR property. As

a result, CDFW finds that no additional subsequent or supplemental environmental review is required under CEQA as part of CDFW's approval of Major Amendment No. 2.

CDFW finds that Major Amendment No. 2 is a Major Amendment, as defined in California Code of Regulations, title 14, section 783.6, subdivision (c)(5).

Discussion: Major Amendment No. 2 extends take coverage over an additional 115.5 acres at the nearby YLCA (50 acres) and LKR (65.5 acres) properties, allowing the Permittee to fulfill a mitigation obligation to the USACE which had not been contemplated as part of the original Project. Therefore, Major Amendment No. 2 will significantly modify the scope and nature of the permitted Project under the ITP, as amended. CDFW has determined that the change to the ITP constitutes a Major Amendment as defined in California Code of Regulations, title 14, section 783.6, subdivision (c)(5).

The authorization provided by Major Amendment No. 2 is not valid until Permittee signs and dates the acknowledgement below, and returns one of the duplicate originals of this Amendment by registered first class mail to CDFW at:

California Department of Fish and Wildlife
Habitat Conservation Planning Branch
Attention: CESA Permitting Program
1416 Ninth Street, Suite 1260
Sacramento, California 95814

Attachments:

ATTACHMENT 1	Figure 10 Lazy K Ranch
ATTACHMENT 2	Figure 11 Yosemite Lake Conservation Area
ATTACHMENT 3	Figure 12 Preliminary Wetland Restoration Area by Responsible Party

APPROVED BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

on 10/30/15 _____

Julie A. Vance
Regional Manager
Central Region

ACKNOWLEDGMENT

The undersigned: (1) warrants that he or she is acting as a duly authorized representative of the Permittee, (2) acknowledges receipt of the original ITP and this Amendment, and (3) agrees on behalf of the Permittee to comply with all terms and conditions of the ITP as amended.

By: _____ Date: Dec 17 2015

Printed Name: MICHAEL REESE Title: VICE CHANCELLOR

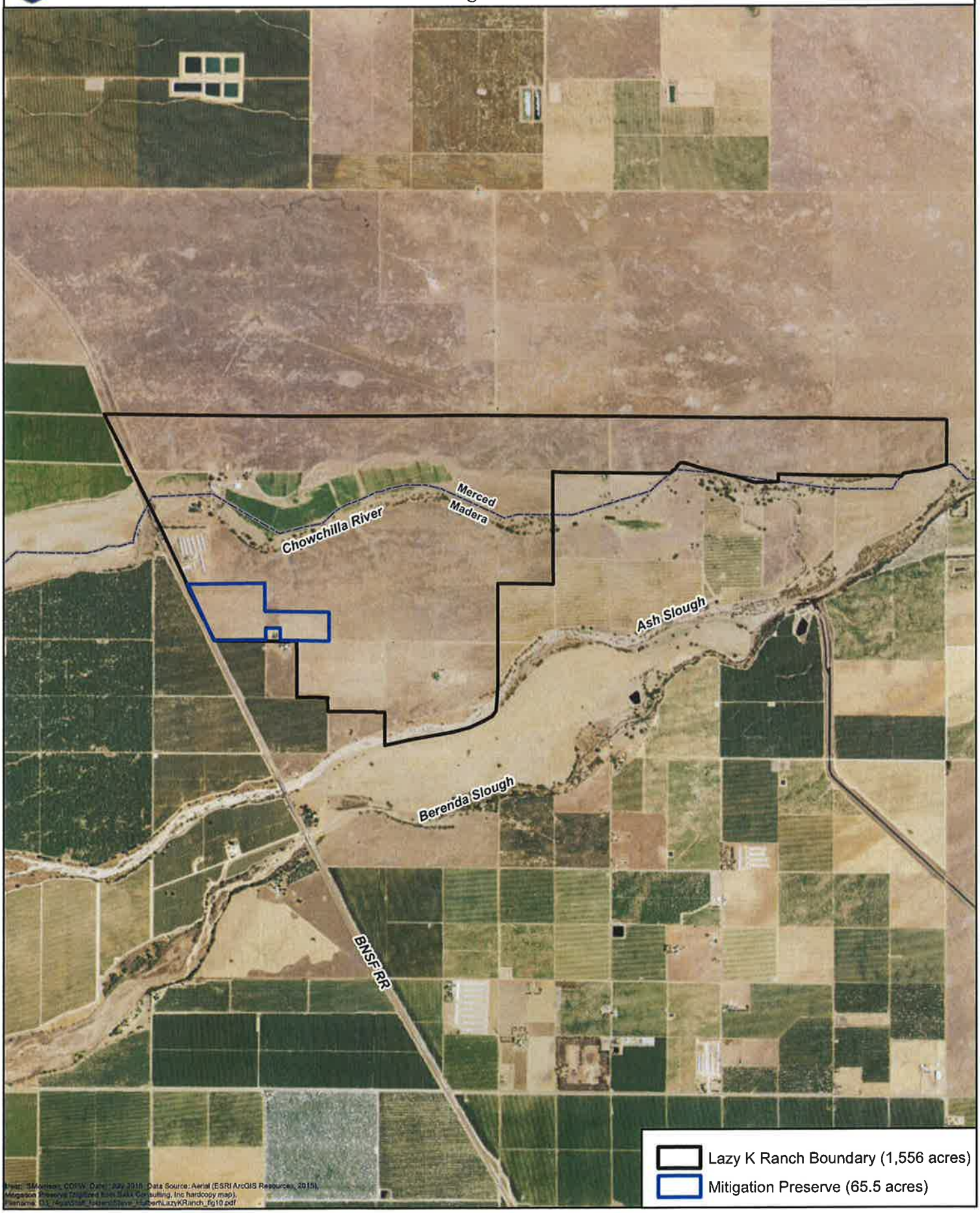
ATTACHMENT 1

Figure 10 Lazy K Ranch

LAZY K RANCH

Figure 10

N

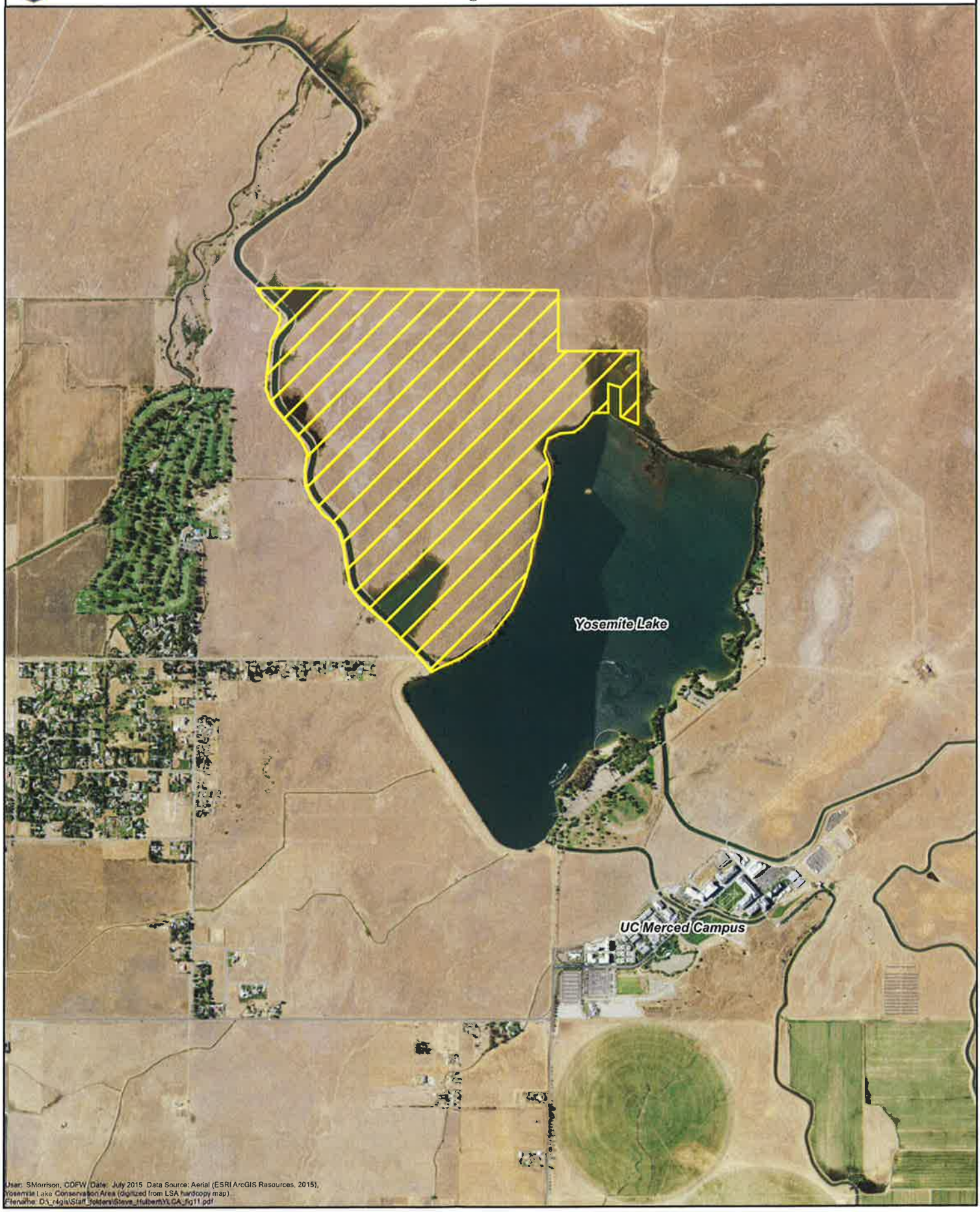


ATTACHMENT 2

Figure 11 Yosemite Lake Conservation Area

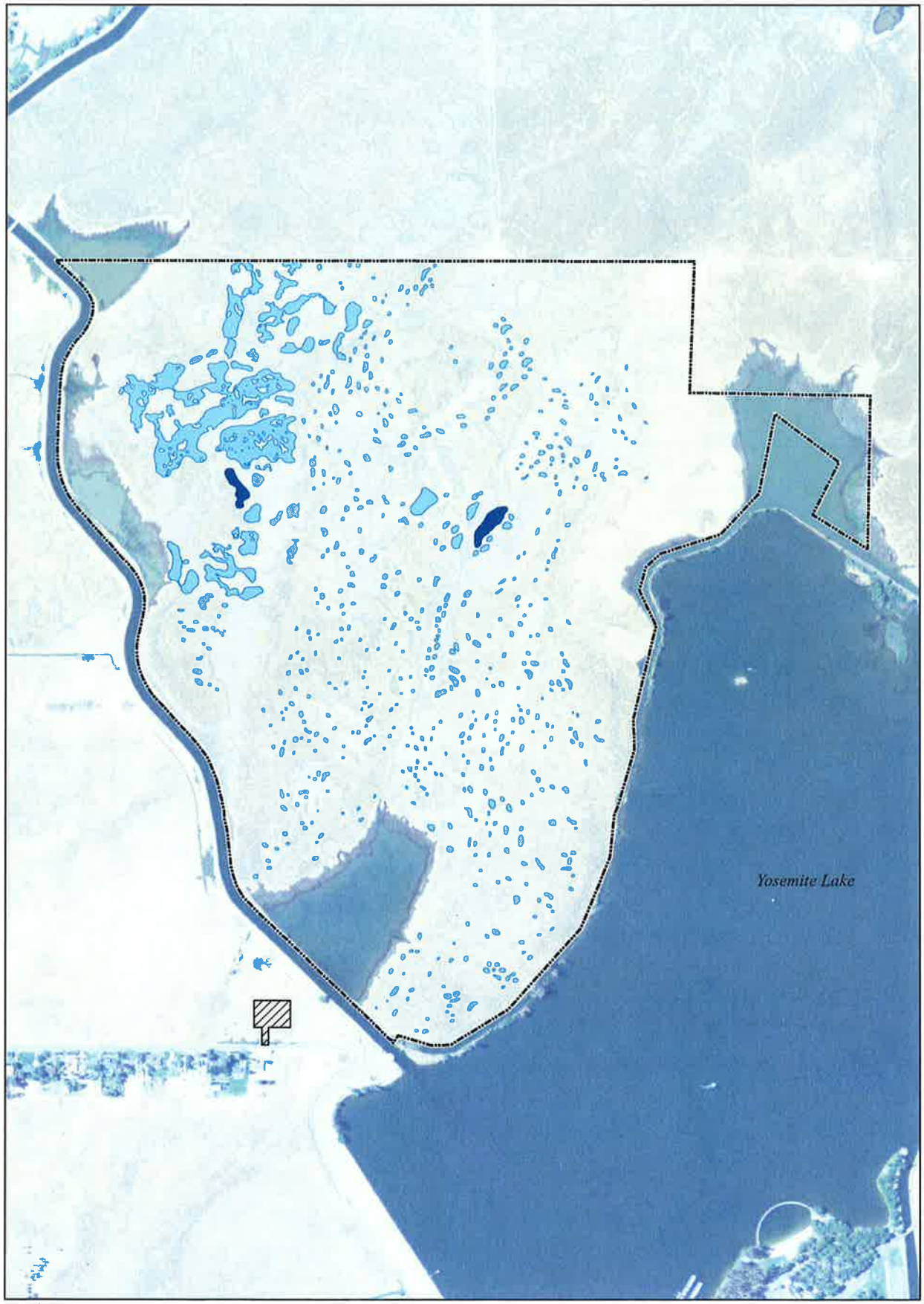
YOSEMITE LAKE CONSERVATION AREA

Figure 11



ATTACHMENT 3

Figure 12 Preliminary Wetland Restoration Area by Responsible Party



LSA

LEGEND

Conservation Area Boundary

Proposed Staging Area

Wetlands

U.C. Merced Mitigation Wetland

U.C. Merced Mitigation Wetland - CTS Breeding

N

0 300 600

FEET

SOURCE: USDA NAIP (2012)

I:\MGL830\GIS\Maps\YLCA Dev Plan\Figure12_Preliminary Wetland Restoration Area by Responsible Party.mxd (10/21/2015)

FIGURE 12

Yosemite Lake Conservation Area

Preliminary Wetland Restoration Area by Responsible Party

TABLE OF CONTENTS

Title	Page
Consultation History	2
BIOLOGICAL OPINION	5
Background Regarding UC Merced	5
Consultation Process	5
Description of the Proposed Action	7
Study Area	7
Phase 1 of UC Merced	8
The Parameters	9
Conservation Measur	11
Adopted Environmental Commitments for the UC Merced Campus	12
The Resource Mitigation Plan for Campus Buildout	12
LRDP Biological Resoruce Policies and Mitigation Measures	13
Adopted Conservation Measures for Consultation Under the Act	14
Presentation of Compensation Measures for Phase I and Subsequent Development	14
Campus Siting Measures	14
Siting Commitments Made for the Currently Proposed Campus Location	15
Restrictions on Campus Siting Imposed by Existing and Pending Conservation Easements	15
Campus Design Measures	16
Construction Measures	17
Campus Operations and Maintenance Measures	18

Compensation Measures for the Proposed Actions 19

Overview of Existing Land Acquisition Program 22

Compensatory Wetland Mitigation Plan 23

Compensation Plan for Protected Species 25

Compensation Strategy for Listed Plants 25

Compensation Strategy for Conservancy Fairy Shrimp 26

Compensation Strategy for Other Protected Vernal Pool Crustaceans 27

Compensation Strategy for San Joaquin Kit Fox 27

Incorporation of Adaptive Management and Monitoring into Management Plans 28

Management Strategies for University-owned Lands 28

*Management Strategies for WCB Preserve Land*s 29

Adopted Conservation Measures for Phase 1 Campus Project 30

Design Measures 30

Construction Measures 31

Operations and Maintenance Measures 35

Measures to Minimize Effects of the Phase 1 Campus on Adjacent Habitats 36

Compensation Measures for Phase 1 38

Conservation Measures for San Joaquin Kit Fox 38

Management of the Campus Natural Reserve and VST Remainder Property for Multiple Species 39

Adopted Environmental Commitments for the Infrastructure Project 39

Habitat Mitigation Plan 39

Avoidance and Minimization Element 39

Construction Measures 39

Compensation Element 39

Monitoring Element and Adaptive Management 40

Adopted Environmental Commitments for the Campus Community 40

Status of the Species 41

Fleshy Owl's-clover *(Castilleja campestris subspecies succulenta)* 41

Life History and Habitat 42

Historical and Current Distribution 43

Hoover Spurge *(Chamaesyce hooveri)* 45

Life History and Habitat 46

Historical and Current Distribution 50

Colusa Grass *(Neostapfia colusana)* 50

Life History and Habitat 52

Historical and Current Distribution 55

San Joaquin Valley Orcutt grass *(Orcuttia inaequalis)* 56

Life History and Habitat 57

Historical and Current Distribution 59

Hairy Orcutt Grass *(Orcuttia pilosa)* 60

Life History and Habitat 61

Historical and Current Distribution 64
Hartweg's Golden Sunburst *(Pseudobahia bahiifolia)* 65

Life History and Habitat 67

Historical and Current Distribution 68

Green's Tuctoria *(Tuctoria greenei)* 69

Life History and Habitat 71

Historical and Current Distribution 74

Vernal Pool Crustaceans-Conservancy Fairy Shrimp *(Branchinecta conservatio)*, Vernal Pool Fairy Shrimp *(Branchinecta lynchi)*, and Vernal Pool Tadpole Shrimp *(Lepidurus packardi)* 74

Life History and Habitat Pool Crustaceans 75

Additional Information for Vernal Pol Fairy Shrimp and Distribution 80

Additional Information for Conservancy Fairy Shrimp and Distribution 81

Additional Information for Vernal Pool Tadpole Shrimp and Distribution 82

Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus)* 84

Life History and Habitat 84

Historical and Current Distribution 85

Bald Eagle *(Haliaeetus leucoephalus)* 85

Life History and Habitat 86

Historival and Current Distribution 88

San Joaquin Kit Fox *(Vulpes macrotis mutica)* 89

Life History and Habitat 90

Historical and Current Distribution 91

Mountain Plover *(Charadrius montanus)* 92

Habitat 92
Historical and Current Distribution 93

Environmental Baseline 94

Fleshy Owl's Clover 94

Reasons for Decline and Threats to Survival 94

Hoover's spurge 95

Reasons for Decline and Threats to Survival 95

Colusa Grass 97

Reasons for Decline and Threats to Survival 97

San Joaquin Valley Orcutt Grass 98

Reasons for Decline and Thrats to Survival 98

Hairy Orcutt Grass 99

Reasons for Decline and Threats to Survival 99

Hartweg's golden sunburst 100

Reasons for Decline and Threats to Survival 100

Greene's tuctoria 102

Reasons for Decline and Threats to Survival 102

Conservancy Fairy Shrimp, Vernal Pool Fairy Shrimp, and Vernal Pool Tadpole Shrimp 103

Reasons for Decline and Threats to Survival 103

Vernal Pool Crustaceans in Merced County 105

Vernal Pool Fairy Shrimp in Merced County 106

Conservancy Fairy Shrimp in Merced County 107

Vernal Pool Tadpole Shrimp in Merced County 108

Valley Elderberry Longhorn Beetle 109
Reasons for Decline and Threats to Survival 109

Valley Elderberry Longhorn Beetles in Merced County 115

Bald Eagle 115

Reasons for Decline and Threats to Survival 116

Bald Eagles in Merced County 117

San Joaquin Kit Fox 118

Reasons for Decline and Threats to Survival 118

Supporting Conclusion 1 118

Supporting Conclusion 2 119

Supporting Conclusion 3 123

Supporting Conclusion 4 125

Competitive Interactions with Other Canids 125

Disease 126

Pesticides and Rodenticides 126

Section 9 Violations and Noncompliance with the Terms and Conditions of Existing Biological Opinions 128

Risk of Chance Extinction Owing to Small Population Size, Isolation, and High Natural Fluctuations in Abuncance 129

Supporting Conclusion 5 129

San Joaquin Kit Fox in Merced County 133

Mountain Plover 134

Reasons for Decline and Threats to Survival 134

Mountain Plovers in Merced County 135

Effects of the Proposed Actions 135

General Effects of the Proposed Actions 135

Construction-Related Effects 136

Altered Hydrology and Nonpoint Source Pollution 136

Pesticides 137

Human Disturbance 137

Introduction of Nonnative Species 138

Fragmentation Habitat 139

Air Pollution 139

Compensation Lands & Management Strategies 140

General Effects Resulting from Phase 1 Construction and Operation 140

Species Specific Effects 140

Phase 1 Effects on Federally Listed Plants 140

Fleshy Owl's-Clover-General Effects of the Proposed Actions 141

Fleshy Owl's-Clover-General Effects of Phase 1 142

Hoover's spurge-General Effects of the Proposed Actions 142

Hoover's Spurge-General Effects of Phase 1 143

Colusa Grass-General Effects of the Proposed Actions 143

Colusa Grass-General Effects of Phase 1 144

San Joaquin Valley Orcutt Grass-General Effects of the Proposed Actions 144

San Joaquin Valley Orcutt Grass-General Effects of Phase 1 145

*Hairy Orcutt Grass-General Effects of the Proposed Action*s 145

Hairy Orcutt Grass-General Effects of Phase 1 146

Hartweg's Golden Sunburst-General Effects of the Proposed Actions 146
Hartweg's Golden Sunburst-General Effects of Phase 1 147

Greene's Tuctoria General Effects of the Proposed Actions 147

Greene's Tuctoria-General Effects of Phase 1 147

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp-General Effects on the Proposed Actions 148

Vernal Pool Fairy Shrimp and vernal Pool Tadpole Shrimp-General Effects of Phase 1 149

Conservancy Fairy Shrimp-General Effects of the Proposed Actions 151

Conservancy Fairy Shrimp-General Effects of Phase 1 152

Valley Elderberry Longhorn Beetle-General Effects of the Proposed Projects 153

Valley Elderberry Longhorn Beetle-General Effects of Phase 1 154

Bald Eagle-General Effects of the Proposed Actions 154

Bald Eagle-General Effects of Phase 1 155

San Joaquin Kit Fox-General Effects of the Proposed Actions 155

Direct Effects 155

Indirect Effects 158

Mountain Plover-General Effects of the Proposed Actions 160

Mountain Plover-Effects of Phase 1 161

Cumulative Effects 161

Conclusion 163

INCIDENTAL TAKE STATEMENT 164

Reporting Requirements 165

CONSERVATION RECOMMENDATIONS 166

REINITIATION–CLOSING STATEMENT 166

Appendix 1

Abbreviation List 169

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-02-I-2926

August 19, 2002

Mike Jewell
Chief, Central Valley/Nevada Section
Regulatory Branch
U. S. Army Corps of Engineers
Sacramento District
Sacramento, California 95814-2922

Subject: Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1 and Campus Buildout (Corps # 199900203) and Infrastructure Project (Corps # 200100570)

Dear Mr. Jewell:

Please find enclosed the Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1 and Campus Buildout. The University proposes to fill 86 acres of waters of the United States in the Campus Buildout portion (approximately 806 acres) and the County of Merced proposes to fill 4.49 acres of waters of the United States with interrelated proposed activities (Infrastructure Project). The Corps has issued two public notices (PN 199900203 and PN 200100570) with these applications and has decided to process both applications jointly. The enclosed Final Biological Opinion addresses both applications as one proposed project.

If you have any questions about this Final Biological Opinion, please contact Susan Jones or Karen Harvey of my staff at (916) 414-6600.

Sincerely,

Cay C. Goude

Cay C. Goude
Assistant Field Supervisor

Enclosure

cc:
University of California, Merced (Attn: Ric Notini)
UC Development Office, Merced County (Attn: Bob Smith)
California Department of Fish and Game (Attn: Pat Brantley)

United States Department of the Interior

Fish and Wildlife Service

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

IN REPLY REFER TO:
1-1-02-F-0107

August 19, 2002

Mr. Michael S. Jewell
Chief, Central California/Nevada Section
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Formal Section 7 Consultation on the University of California, Merced Campus and Infrastructure Project (199900203), Merced County, California

Dear Mr. Jewell:

This is in response to your February 22, 2002, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the University of California, Merced campus and infrastructure project in Merced County, California. Your request was received in our office on February 25, 2002. This document represents the Service's biological opinion on the effects of the action on the fleshy (=succulent) owl's-clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*Orcuttia pilosa*), Hoover's spurge (*Chamaesyce hooveri*), Greene's tuctoria (*Tuctoria greenei*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), vernal pool fairy shrimp (*Branchinecta lynchi*), Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool tadpole shrimp (*Lepidurus packardi*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), bald eagle (*Haliaeetus leucocephalus*), and San Joaquin kit fox (*Vulpes macrotis mutica*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act).

We are providing a conference opinion on the mountain plover (*Charadrius montanus*), a species that has been proposed for listing. We are also providing technical assistance for the California tiger salamander (*Ambystoma californiense*) and midvalley fairy shrimp (*Branchinecta mesovallensis*) in the Conservation Recommendations section of this

biological opinion. The midvalley fairy shrimp is currently under petition to be listed and the California tiger salamander is a candidate for listing.

This biological opinion is based on information provided in the July 2002, *Supplement to Biological Assessment for UC Merced Campus and Infrastructure in Support of UC Merced*, the February 8, 2002, *Biological Assessment, CWA Section 404 Permit Applications for UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project*, the August 2001, *University of California, Merced Long Range Development Plan Draft,* and the January 2002*, Final Environmental Impact Reports*, as well as numerous telephone conversations and regular meetings involving individuals representing the University of California (University), Merced County (County), the U.S. Army Corps of Engineers (Corps), the Environmental Protection Agency (EPA), and the California Department of Fish and Game (CDFG), field investigations, and other sources of information. A complete administrative record of this consultation is on file in this office.

The University is proposing to develop the main campus in phases. Construction of the first phase (Phase 1) of the campus is scheduled to begin in the summer of 2002 on approximately 104 acres of the existing 197-acre Merced Hills Golf Course located outside of any wetlands or other areas under the Corps jurisdiction pursuant to the Clean Water Act. The Phase 1 Campus site does not support suitable habitat for wetland dependent species; therefore, it will not result in direct effects on these species or their habitats. Based on the Conservation Measures as proposed, the Service has determined that effects from Phase 1 are insignificant and are not likely to adversely affect the fleshy owl's-clover, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Hoover's spurge, Greene's tuctoria, Hartweg's golden sunburst, vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, bald eagle, and San Joaquin kit fox. In addition, because the water supply for Phase 1 will be within the confines of the 1995 Operations Criteria and Plan (OCAP) biological opinion, Phase 1 is not likely to adversely affect the delta smelt or the Sacramento splittail. Unless new information indicates that Phase 1 will affect any listed species in a way not considered in this biological opinion, no further consultation for Phase 1 of the Campus under the Act is necessary. If new information comes to light that indicates the action may affect listed species, please contact us immediately.

Consultation History

The proposed University of California Merced (UC Merced) Campus is the product of more than 15 years of public involvement, planning efforts, and extensive analyses. In addition to obtaining direct input from concerned citizens and interested organizations as part of the planning and environmental review processes, the University and Merced County have engaged in discussions with various local, State, and Federal agencies since

the mid-1990s. Correspondence and informal discussions between the University and the Service have included:

- On November 28, 1994, the Service submitted a letter commenting on the Site Selection Draft Environmental Impact Report (EIR). In this letter, the Service raised concerns over project-related effects to fleshy owl's-clover, California tiger salamander, western spadefoot toad (*Scaphiopus hammondii*), vernal pool fairy shrimp, valley elderberry longhorn beetle, bald eagle, ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia hypugea*), and San Joaquin kit fox potentially occurring at the Lake Yosemite Site, in addition to concerns regarding the other two finalist sites. The letter also recommended development of a Habitat Conservation Plan which would encompass most or all habitats of listed species in the county in order to address ongoing loss and fragmentation of habitat in Merced County in light of projected population growth.

- During 1999 and 2000, the University and County engaged in discussions with the Service, Corps, EPA and the CDFG regarding the location of the UC Merced Campus and effects to biological resources. As a result of these discussions, in late 2000, the University proposed to shift the UC Merced Campus site from its original location to the location of the Applicants' Proposed Projects as described above.

- In March 2001, the University and County submitted a Draft Comprehensive Alternatives Analysis (CAA) prior to filing formal 404 permit applications in order to identify potential alternatives that could be evaluated further under the Clean Water Act (CWA) Section 404(b)(1) Guidelines once the formal application process commenced. The Draft CAA is not being used to further analyze alternatives regarding the 404(b)(1) analysis as it did not meet the criteria of the 404(b)(1) Guidelines. Agency comments and subsequent discussions regarding the preliminary CAA resulted in further direction regarding the 404(b)(1) alternatives analysis. This direction will be reflected in the more detailed alternatives analysis to be prepared pursuant to the 404(b)(1) Guidelines. This analysis also will be coordinated with preparation of documents to be prepared under the National Environmental Policy Act.

- The local and State environmental review processes also afforded an opportunity to solicit input from the Service on the Proposed Projects. On March 19, 2001, the Service provided written comments on the Notices of Preparation for the EIRs. This letter included a list of species that may occur in, or be affected by, projects in Merced County, and general guidelines for identification and conservation of project effects.

- During preparation of the Long Range Development Plan (LRDP) Draft Environmental Impact Report (DEIR) and the University Community Plan (UCP) DEIR from March through August, 2001, the County and University engaged in a series of discussions with the Service and CDFG regarding the level of information needed for the agencies to assess project-related effects to listed species. During these discussions, the Service raised a number of concerns related to direct and indirect effects on vernal pool species, potential effects to movement corridors for the San Joaquin kit fox, cumulative and growth inducing effects of the LRDP and UCP, and effects to anadromous fish in Merced River potentially resulting from surface-water diversion.

- On October 9, 2001, the Service and CDFG provided one letter jointly commenting on the Draft EIRs for the UC Merced LRDP and UCP. In the joint letter, the Service and CDFG reiterated concerns over direct, indirect, growth-inducing, and cumulative effects to listed species, including potential effects to anadromous fish that would result from the diversion of surface water from Merced River. Concerns were raised regarding potential effects to a number of listed species. These concerns have been addressed as part of the preparation of the Final EIR for the UC Merced LRDP, and are being addressed in the UCP Final EIR. The University and County will continue to work with the various State and Federal agencies to address the concerns stated in the comments on the Draft EIRs.

- In late 2001 and early 2002, the University and County met regularly with the Service and CDFG staff to discuss content and level of analyses to be included in the Biological Assessment.

- On February 25, 2002, the Service received a letter from the Corps dated February 22, 2002, requesting the initiation of formal consultation for fleshy (succulent) owl's-clover, Colusa grass, San Joaquin Valley Orcutt grass, vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, bald eagle, San Joaquin kit fox, and mountain plover. The *Biological Assessment, CWA Section 404 Permit Applications for UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project*, dated February 8, 2002, was submitted at the same time. As part of this package, the University submitted the Resource Mitigation Plan and the County submitted its Habitat Mitigation Plan for the infrastructure project.

- From April 2002 to June 2002 the Service met regularly with the University, County, Corps, and CDFG to further discuss information needs, the analysis, proposed conservation measures, and compensation plans.

- On July 8, 2002, the Service received a Supplement to the Biological Assessment from the UC containing additional information needed for the section 7 consultation and the Phase 1 water memo.

BIOLOGICAL OPINION

Background Regarding UC Merced

The University of California (University) has proposed the development of a major research university (UC Merced) on approximately 2,000 acres located in Merced County, California. As more fully described in the Biological Assessment (BA), dated February 8, 2002, prepared by the University and the County for Campus Buildout and the Infrastructure Project, UC Merced is proposed to include a 910-acre "Main Campus," a 340-acre "Campus Land Reserve" and a 750-acre "Campus Natural Reserve." As presently proposed, and as reflected in a draft "University Community Plan" and draft environmental impact report circulated by Merced County, a 2,000-acre campus-oriented community (Campus Community) would be developed adjacent to UC Merced to provide housing and commercial and other uses needed to support UC Merced. The proposed location of UC Merced and the Campus Community are shown, in their regional context, on attached Figure 1.

Although the first phase of development of UC Merced (approximately 104 acres within the Main Campus located on an existing golf course) will not result in the fill of waters of the United States (as described below), development of the remaining portions of the Main Campus (Campus Buildout) will result in the fill of approximately 86 acres of waters of the United States under the jurisdiction of the Corps. Accordingly, on November 9, 2001, the University submitted to the Corps an application for a Department of the Army (DA) permit under Section 404 of the Clean Water Act to fill such jurisdictional waters in connection with Campus Buildout. Development of Campus Buildout will require the installation of roadways and other public infrastructure, the development of which infrastructure will also result in the fill of jurisdictional waters. On February 8, 2002, the County submitted to the Corps an application for a DA permit under Section 404 to fill approximately 4.49 acres of jurisdictional waters in connection with the development of that infrastructure (Infrastructure Project). On February 8, 2002, the University submitted supplemental information to the Corps in support of the UC Merced section 404 permit application.

Because of the relationship between Campus Buildout and the Infrastructure Project, the permit applications submitted by the University and the County are being processed jointly, and the Corps has issued two public notices in connection with those applications (PN 199900203 and PN 200100570).

Consultation Process

As described above, prior to the issuance by the Corps of fill permits, Applicants' Proposed Projects will be subject to a variety of analyses, including review under the National Environmental Policy Act (NEPA) and application of the criteria set forth in the 404(b)(1) Guidelines, including a complete Least Environmentally Damaging Practicable Alternative (LEDPA) analysis. These analyses may result in modifications to the Applicants' Proposed Projects, possibly including changes to their sizes, configurations or locations, to the extent those changes are practicable and consistent with the University and the County's stated project purposes. The University's stated purpose is to establish a major research university in Merced County that will ultimately support 25,000 full-time equivalent students, with an associated community needed to support the University. The County's stated project purpose is to support the proposed UC Merced campus with necessary infrastructure adjacent to the proposed campus.

In light of the possibility of such modifications, the Applicants have prepared a BA Supplement to provide a broader analysis of the effects of Applicants' Proposed Projects, i.e., as they may be modified as a result of the NEPA, LEDPA or other analytic processes. This will allow the Service to: (1) complete a comprehensive evaluation of the potential effects of development of Campus Buildout and the Infrastructure Project, together with interrelated and interdependent actions (as described in the BA), and conclude formal consultations; (2) ensure that the Service's analysis contemplates not just the Applicants' preferred proposals for development (as they may be modified by the Corps' regulatory process), but any alternative within the area shown on Figure 1 (Study Area) that may result from application of federal regulatory standards; and (3) provide valuable, up-front biological information that can be used by the Corps to aid in their environmental review under NEPA and the section 404(b)(1) Guidelines.

In order to have a reliable analytic guide to govern the Service's biological analysis, the Applicants have agreed to a set of environmental parameters that will govern the development and operation of the Applicants' Proposed Projects as they may be modified during the Corps' regulatory processes. These Parameters are intended to avoid, minimize or mitigate effects on federally-listed species that may otherwise result from any development activities that ultimately receive Section 404 authorization by the Corps. The Applicants have agreed that these Parameters will apply to the Applicants' Proposed Projects and any alternative within the Study Area that ultimately may be approved by the Corps. The Service has assumed in conducting its biological analysis that the Parameters will be implemented as a part of the Proposed Actions.

Description of the Proposed Action

As described above, the Service's analysis assumes the possibility that the Applicants' Proposed Projects may be modified during the NEPA process or as a result of the Corps' LEDPA analysis. Because the Preferred Alternative may be different (or in a different location) from the Applicants' Proposed Projects, the Service's analysis is sufficiently broad to cover any alternative that is eventually preferred by the Corps and located within the Study Area. As described above, the Service's analysis assumes implementation or satisfaction of the Parameters, which the Applicants have agreed will be implemented in connection with whichever alternative obtains section 404 authorizations.

The actions evaluated by the Service during the present consultation (Proposed Actions) can be defined as: "Campus Buildout and the Infrastructure Project, as proposed or as those projects may be modified or relocated within the Study Area as a result of the Corps' decisionmaking processes, subject to and in light of the Parameters as described in Section III of the BA Supplement." These Proposed Actions, together with the effects of interrelated and interdependent actions, serve as the basis for the Service's biological opinion.

In addition to the Parameters, the Proposed Actions are assumed to incorporate the "Conservation Measures" described in Part IV of the BA Supplement and as stated in the Description of the Proposed Action of this biological opinion. These Conservation Measures were originally proposed and adopted by the University in connection with its environmental review of the LRDP under the California Environmental Quality Act (CEQA). The BA expands upon the conservation measures originally proposed in the University's and County's CEQA documents and applies them specifically to the Proposed Projects. For the purposes of this consultation, the University and the County have further refined these measures to make them applicable to any alternative that may be approved by the Corps within the Study Area. The Service has considered these measures as a part of the Proposed Actions.

Study Area

The Study Area subject to the Service's review as a part of this consultation, as shown in Figure 1, has been expanded to include certain areas located outside of the Study Area described in the BA. The Study Area was configured to allow consideration of potential effects of locating the Proposed Actions in a variety of settings. This configuration allowed analysis of various project designs entailing combinations of lands supporting agricultural and other types of development, as well as undeveloped lands in the vicinity of the Applicants' Proposed Projects. The boundary was delineated along recognizable roads within the Study Area vicinity (with the exception that the VST land boundary was used in the northeast). Highly developed lands near the City of Merced were considered

to be infeasible for Campus and Campus Community development, and were excluded from the Study Area.

Although the Applicants' Proposed Projects would not be expected to result in species-related effects within these additional areas, certain of the Parameters (e.g., development of a regional conservation strategy) are intended to limit the effects of other projects that might occur within this broader area. Moreover, there is some possibility that the Corps' review under NEPA may involve alternatives that could result in such effects. Therefore, this biological opinion is based on a review of the species-related resources within this broader area, and evaluates the potential effects of the Proposed Actions to the extent they would involve these areas.

Phase 1 of UC Merced

The University is proposing to develop the Main Campus in phases. Construction of the first phase of the Main Campus would begin in 2002 at the southern end of the Main Campus, on approximately 104 acres of the existing 197-acre Merced Hills Golf Course located outside of any wetlands or other areas under Corps jurisdiction pursuant to the Clean Water Act (Figure 2). Upon opening, Phase 1 will accommodate approximately 1,000 students and 500 faculty and staff, with increasing enrollment over the next four years to reach a total of approximately 3,600 students and 1,180 faculty and staff.

Phase 1 will consist of approximately 18 acres of academic core uses, 33 acres of student housing, 13 acres of campus logistical support facilities, 15 acres of athletic and recreation fields, and 24 acres of parking. The Phase 1 academic core, upon opening, would consist of a Science and Engineering Building, a Classroom Building, and a Library/Information Technology Center. Initial campus housing and dining facilities would be located to the southwest of the academic facilities. Necessary utilities including a central plant, surface parking and road infrastructure also would be constructed. Additional facilities are planned for construction between 2004 and 2008 and include additional student housing and dining, a Recreation Center, a Campus Logistical Support Facilities Building, a second Science and Engineering Building, and a Social Science and Management Building. All off-site infrastructure required to serve Phase 1 will consist of existing roadways and installation of utilities within existing roadway rights-of-way.

The Phase 1 Campus boundary is located outside the watersheds of existing vernal pools and other wetlands to assure that no significant adverse changes occur in the biological functioning of the vernal pools and swales outside of that boundary. No fill activities are proposed within existing vernal pools and wetlands as part of Phase 1. None of the improvements required as part of Campus Buildout and the Infrastructure Project are required for Phase 1. Although two vernal pools are located adjacent to the northern boundary of the Phase 1 Campus site, these pools are upgradient of the existing golf course access road, which will be used for construction access to the Phase 1 site, and

they are located outside of the footprint of the construction area. Thus, because all Phase 1 construction will occur within the Phase 1 boundary and outside of the watersheds of existing vernal pools, swales, and other wetland resources, Phase 1 will not impact downgradient or upgradient wetlands.

Although Section 404 authorizations are not required for Phase 1, these development activities are an integral part of the Main Campus. Accordingly, this analysis addresses the potential effects of the development of Phase 1.

The Parameters

As described above, the University and the County have agreed that the Parameters will apply to any Preferred Alternative that may be selected by the Corps within the Study Area. These Parameters are not, however, intended to control the Corps' analysis under the laws and regulations applicable to the Corps. Where applicable, these Parameters apply both to the development projects specifically proposed by the University, the County, and to other development occurring within the Study Area. In addition to the Parameters, the University and the County have proposed a number of additional "Conservation Measures" which, in many cases, will serve to implement the Parameters described and are considered part of the Proposed Actions.
The Parameters are as follows:

1. Development of Conservation Strategy

    a. The Applicants will prepare and implement, in coordination with the Service and CDFG, a comprehensive strategy that incorporates the Conservation Measures for the San Joaquin kit fox, vernal pool plant species and branchiopods, and other protected species to guide the development and implementation of specific conservation for the Proposed Actions and as needed to assure that other development within the Study Area is consistent with the Conservation Strategy as described in parameter 1b, below.

    b. The Conservation Strategy will include monitoring and adaptive management measures and be consistent with and intended to implement the Recovery Plan for Upland Species of the San Joaquin Valley, California, and any future federal recovery planning efforts.

2. Parameters for Covered Projects

    a. All conservation actions described below will be developed and implemented by the appropriate party, including the CDFG where appropriate. These conservation actions include, among other things,

completion by the Applicants of the Conservation Strategy; completion of a review by the Service of all preserve lands which have been acquired (i.e., in fee or easement) to date to determine the applicability for conservation for protected species; advance Service review and approval of further fee or easement acquisitions; and completion of a Resource Mitigation Plan (to be prepared for the Main Campus as described below) and Habitat Mitigation Plan (to be prepared for the Infrastructure Project as described below) consistent with the parameters set forth herein. The Resource Mitigation Plan and Habitat Mitigation Plan will include, among other things and in addition to the measures set forth in the BA supplement, management strategies and financial assurances for the monitoring and management of preserve lands and a strategy for addressing indirect effects. All the above, including the terms and conditions of conservation easements and management plans, and the adequacy of funding assurances, will be subject to review and approval by the Corps and the Service.

b. The Applicants will develop, in coordination with the Service, Corps, and CDFG, a plan to address potential effects to the San Joaquin kit fox, which will be consistent with the Conservation Strategy and may be included in the Resource Mitigation Program and/or Habitat Mitigation Plan. This plan, at a minimum, will address a migration corridor to the north and northeast of the Proposed Actions (as presently proposed by the Applicants) to be protected and maintained through acquisitions and other possible actions (e.g., passage over canals). Any such acquisitions will be consistent with the establishment of a connection to the Sandy Mush Road area.

c. The extent and nature of proposed conservation, and any proposed ratios, for grassland and vernal pool species will be at least equivalent to those set forth in the BA and will be approved by the Service and the Corps together with any avoidance and minimization measures.

d. Management plans and adequate financial assurances for long-term monitoring and management of identified preserve lands will be provided to and approved by the Service and the Corps.

e. No direct impact to Conservancy fairy shrimp, including its watershed, will occur. Indirect effects to the Conservancy fairy shrimp will be minimized and avoided to the maximum extent practicable. Any unavoidable indirect effects to occupied Conservancy fairy shrimp habitat will be compensated through the preservation of habitat within areas approved by the Service and the Corps as set forth more specifically below and found in the BA supplement.

f. For San Joaquin Valley Orcutt grass, Colusa grass, fleshy owl's-clover, hairy Orcutt grass, Hoover's spurge, Greene's tuctoria, and Hartweg's golden sunburst, the University will, to the maximum extent practicable, avoid and minimize effects on these federally listed plant species through siting, design, and conservation measures. Any occupied habitat of these seven listed species will be preserved within areas approved by the Service as set forth more specifically below in the Conservation Measures. For effects to vernal pools and associated habitats, as well as any other wetlands, the Applicants will develop and implement a restoration/creation plan focusing on areas where the vernal pool signature or suitable extirpated habitat is still present or other suitable areas. This plan will include appropriate monitoring and adaptive management measures, together with adequate financial assurances, to be reviewed and approved by the Service and the Corps.

3. Parameters Regarding Development and Other Discretionary Projects in the Study Area

a. Merced County will provide written assurance to the Service and the Corps that for all discretionary projects permitted by the County within the Study Area, other than the Proposed Actions, that may result in take of a listed species, Merced County will require compliance with the Endangered Species Act. This provision will include projects served by state or federally-funded roadways or other infrastructure that may be developed to serve the Campus or the Campus Community.

b To ensure no effect on Merced River and delta species (which are not subject to this consultation), withdrawals from the Merced River resulting from the Covered Projects (i.e., for recharge purposes) will be within the parameters of the existing OCAP biological opinion and formal consultation. The Applicants will also provide evidence that groundwater pumping and stormwater discharges will not affect listed species.

Conservation Measures

This section describes conservation measures that the University and the County have agreed to apply in order to avoid, minimize, and compensate for potential effects that the Proposed Actions could have on listed species. Conservation measures for the Proposed Actions are presented first; these are followed by specific conservation measures for the Phase 1 Campus project.

The Conservation Measures include a variety of avoidance, minimization, and compensation measures for effects on wetlands and other biological resources. For the proposed UC Merced Campus, these measures are included within the RMPs' following elements: siting and design, construction mitigation, operations and maintenance, compensation, and adaptive management. For the Infrastructure Project, these measures are included within the HMP's following elements: avoidance and minimization, compensation and monitoring and adaptive management, as describe further below. The Conservation Measures for the Campus Community (an interrelated and interdependent project) are based upon the objectives and policies in the draft UCP.

Adopted Environmental Commitments for the UC Merced Campus

The most important conservation measures that apply to the Proposed Actions are the Parameters, which describe commitments for additional planning, analysis, and actions that will be conducted in response to the final selection of a Preferred Alternative through the NEPA and Section 404(b)(1) processes. The Parameters also identify the requirement for Service approval of specific conservation measures that will be proposed by the University as a part of the Proposed Actions. In many cases, the specific conservation measures described below will implement the Parameters. Conservation measures will be refined in accordance with the Parameters. These measures will be subject to extensive consultation with and approval by the Service, CDFG, and the Corps.

The Resource Mitigation Plan for Campus Buildout

In connection with its environmental review of the UC Merced Campus in compliance with the CEQA, the University committed to develop and implement a Resource Mitigation Program to mitigate the effects of the University's proposed Campus Buildout on a broad variety of biological and wetland resources. As described in the initial BA, one component of this program is a proposed Resource Mitigation Plan for Federally Listed Species that May Be Affected by the Establishment of the University of California, Merced. This initial Resource Mitigation Plan (RMP) accompanied the University's application for a Section 404 permit for the Applicants' Proposed Projects. The initial RMP included avoidance, minimization, and compensation actions (conservation measures) to address the potential effects on listed species of the University's specific Campus Buildout proposal. The RMP remains a record of the University's commitments that are relevant to the Applicants' Proposed Projects, as well as commitments that are applicable to any other site or configuration within the Study Area that may be identified as the Preferred Alternative through the NEPA and Section 404 processes.

The original RMP was programmatic in nature. It described a series of conservation program elements to avoid, minimize, and compensate for effects of the proposed campus configuration on listed species, during its various stages of planning, construction, and operation. Thus, major program elements included Campus siting, design, construction,

operation and maintenance, compensation, and adaptive management. Like the Parameters, the original RMP specifically recognized that additional analysis and planning would be required to develop specific conservation programs and specific measures and that the Service would have involvement in development of these measures as well as authority to approve them.

The shift in focus, for purposes of section 7 consultation, from the Applicants' Proposed Projects to the Proposed Actions, together with application of the Parameters, has necessitated a modification of the conservation measures originally identified in the RMP. Because the Applicants' Proposed Projects are within the Study Area under evaluation in project section 7 consultation, the Conservation Measures remain generally applicable to the Proposed Actions. The conservation measures presented in this section include the measures identified in the original RMP, the Infrastructure Project Habitat Mitigation Plan (HMP), the policies contained in the County's Draft UCP, and the Parameters to ensure that construction of a Campus, Infrastructure Project and University Community elsewhere in the Study Area would not result in jeopardy to listed species.

The conservation measures demonstrate the process and specific commitments that the University is committed to employ, consistent with the Parameters, to avoid, minimize, and compensate for the effects of constructing a UC Merced Campus, Infrastructure project, and associated University Community in the Study Area.

LRDP Biological Resource Policies and Mitigation Measures

As part of the LRDP for the Applicants' Proposed Projects, the University adopted 11 LRDP policies governing the protection of biological resources. These policies required that the University ensure no net loss of wetlands functions and values and avoid and minimize effects on annual grassland habitats and special-status species and their associated habitats. Where direct effects to special-status species cannot be avoided completely, the University is required to compensate through preservation, creation, restoration, or enhancement.

The Final LRDP EIR contains 11 major conservation measures to mitigate effects on biological resources caused by the Applicants' Proposed Projects. These conservation measures require the University to develop and implement a Resource Mitigation Program that will result in the acquisition and preservation of substantial acreages of vernal pool-dominated grassland habitat and other wetland resources throughout eastern Merced County, and in the restoration, enhancement, or creation of wetland resources within these preserved areas. The RMP is a component of the Final LRDP EIR Resource Mitigation Program. Additionally, the Final LRDP EIR conservation measures require the protection of and compensation for direct effects on special-status species (vernal pool crustaceans, San Joaquin kit fox, special-status plants, California tiger salamander, and avian species). The University is also required to implement grassland management

strategies and minimization measures to address indirect and cumulative effects on special-status species and their associated habitats.

In connection with its review of the Infrastructure Project and the Campus Community in compliance with CEQA, the County committed to develop and implement a HMP to mitigate the effects of the Infrastructure Project and the Campus Community on a broad variety of biological and wetland resources. The Infrastructure Project HMP provides specific mitigation to avoid, minimize, and compensate for effects to biological resources caused by implementation of the Infrastructure Project. Similarly, the County has prepared a draft University Community Plan (UCP) which includes objectives and policies intended to offset adverse effects to biological resources. Pursuant to these policies, the County either will expand the Infrastructure Project HMP to address additional resource effects of the Campus Community or it will develop project-specific HMPs for each individual project within the Campus Community.

Compensation Measures for Phase 1

In addition to the summary of Conservation Measures to which the University and County have committed for purposes of section 7 consultation on the Proposed Actions, the University has proposed specific Conservation Measures applicable to the Phase 1 Campus. While listed species issues will be addressed for the remainder of the Proposed Actions through subsequent planning, implementation, and Service approval of conservation measures consistent with the Parameters, a specific location and configuration for the Phase 1 Campus has been determined. Consequently, for purposes of this consultation, the Supplemental BA contains specific conservation measures to address effects of the Phase 1 Campus on listed species. This detailed conservation program is presented in Adopted Conservation Measures for the Phase 1 Campus Project, following the description of conservation measures for the overall campus.

Campus Siting Measures

The University will implement a variety of measures to minimize effects of campus siting in the Study Area. First, the University has avoided certain important areas as part of its proposal to develop the proposed UC Merced Campus. Second, conservation easements have been acquired, or will be acquired, for substantial areas of key habitat for listed species within the Study Area. These measures will be identified, evaluated, and augmented as needed to meet the requirements of the Parameters, and will be subject to review and approval by the Service.

The Parameters and the requirement to select the LEDPA for campus siting ensure that the Campus will not be relocated or reconfigured in a way that leads to more effects than would occur if the Applicants' Proposed Projects were selected as the Preferred Alternative.

Siting Commitments Made for the Currently Proposed Campus Location

The following siting requirements were applied by the University to determine the preferred configuration and location of the Proposed Project for CEQA purposes in order to avoid effects to listed species. These measures include: (1) establishing the northern boundary of the Main Campus to reduce effects to the clay playa east of Lake Yosemite; (2) locating the Main Campus to avoid the watershed of the vernal pool occupied by Conservancy fairy shrimp; (3) locating the Main Campus and Campus Land Reserve to maintain a 250-foot setback from the watershed supporting the Conservancy fairy shrimp; and (4) designing the Campus to minimize fragmentation of habitat in the vernal-pool dominated grassland habitat. These restrictions, in conjunction with the Parameters, will continue to apply to any Campus configuration that may be approved in accordance with this biological opinion.

Restrictions on Campus Siting Imposed by Existing and Pending Conservation Easements

Constraints on siting the Proposed Actions within the Study Area are imposed both by the Parameters and by existing and pending commitments to protect lands through acquisition of conservation easements.

The Parameters specify the development of a conservation strategy for the San Joaquin kit fox, vernal pool species, and other species within the Study Area prior to siting and implementing the Applicants' Proposed Actions. The parameters also call for a Resource Mitigation Plan and Habitat Management Plan for the Campus and Infrastructure projects, respectively, that will: address a movement corridor for San Joaquin kit fox to the north and east of the location of the Applicants' Proposed Projects; avoid any impact on the habitat of Conservancy fairy shrimp and its surrounding watershed; and acquire compensation lands at a ratio equal to or greater than that specified in the project BA. Implementation of these measures will constrain the availability of land available for campus siting to those that would result in equal or fewer effects than those identified in the BA for the Applicants' Proposed Projects.

As part of planning for protection and compensation for effects of the Proposed Actions, the University and the Wildlife Conservation Board (WCB) (in cooperation with CDFG) have initiated cooperative efforts to acquire conservation easements on lands that would protect listed species and their habitats in eastern Merced County. Lands within the Study Area with existing and pending easements are shown in Figure 4 and are summarized in Table 1. Easement lands have been selected for their high value to listed species, as well as for their general ecosystem values. The easement program is discussed in detail below (Overview of Existing Land Acquisition Program). The State has secured these lands under conservation easement because of their high habitat values.

Accordingly, because these lands will be under conservation easement, development of the Proposed Actions will not occur on these easement lands.

Campus Design Measures

At least thirty days prior to issuance of construction contracts for various phases of campus development, the University will incorporate conservation measures into the design phase to avoid and minimize direct and indirect effects on listed species and their habitats within areas adjacent to the Proposed Actions. The adopted measures will be reviewed by the Service within a reasonable time and modified or augmented as necessary to meet the conservation requirements of the Parameters. Specific conservation measures adopted by the University for Campus design are discussed below.

- Control stormwater and irrigation runoff to avoid and minimize effects on natural hydrology and vernal pool ecosystems. A stormwater management system will be designed, constructed, and operated to avoid and minimize alteration of natural hydrologic regimes, increases in sediment and nutrient loading, and introduction of pesticide or other hazardous material in runoff. This system will be established to avoid and minimize indirect effects on aquatic systems in areas outside the Campus that may support listed species. The stormwater management system will be designed to control runoff within the boundaries of the Campus, with temporary storage in detention basins (which will result in some groundwater recharge), and then discharged to surface stream systems to mimic the natural pattern of runoff into these systems. The campus exterior will be carefully designed to ensure that no unnatural runoff is delivered to surrounding lands.

- Construct perimeter fencing to discourage human and pet disturbance of adjacent habitat areas. Prior to start of Phase 1 construction, perimeter fences will be constructed along the Campus boundary (between developed areas and any area that could provide access to adjacent habitat areas for listed species) to discourage trespass by humans and dogs.

- Incorporate measures into lighting design to minimize escape of light into habitat areas. To minimize effects of introducing light from the Campus into adjacent habitat areas, the Campus exterior lighting system will be designed to locate, shield, and direct lighting to minimize stray "trespassing" of light into adjacent habitat areas.

Construction Measures

The University will prepare and implement a Construction Mitigation Plan for each major phase of Campus Buildout Development to avoid and minimize direct and indirect effects of construction activities on listed species and those candidate species that the Service

has requested to be treated as listed species. Many of these construction measures are standard measures typically required by the Service for major construction projects in San Joaquin Valley habitats that support listed species. The measures will be adapted in the construction mitigation plans for each individual construction phase and action, and the plans will be approved by the Service, as specified in the Parameters. The Construction Mitigation Plans will address, at a minimum, the following conservation measures:

- designation of a biological monitor to be onsite whenever new ground disturbance occurs or when any ground disturbance occurs within 250 feet of adjacent habitat areas;
- reporting of biological monitoring results;
- incorporation of species protection obligations into construction contracts;
- training for construction personnel (including multilingual training, if needed);
- incorporation of best management practices (BMPs), including dust-control measures, erosion reduction and sediment control, and restricted equipment refueling and maintenance practices;
- construction staking, flagging, signage, and fencing;
- identification of construction staging areas in the Construction Mitigation Plan and monitoring establishment and operations at these sites by a biological monitor;
- salvage of plants and invertebrates for use in wetland restoration (if approved by the Service);
- construction measures to minimize take of San Joaquin kit foxes, including preconstruction surveys and controls on activities of construction activities and personnel, as described in the Service's Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance (1999);
- prevention and control of undesirable invasive plant species;
- postconstruction monitoring and conservation; and
- application of all relevant construction conservation measures to construction activities associated with habitat restoration and creation on conservation easement lands.

The Construction Mitigation Plan for each phase will be subject to review and approval by the Service, the CDFG, and the Corps prior to ground disturbance.

Campus Operations and Maintenance Measures

The University will adopt and implement measures to protect habitat values and minimize effects of Campus operations and maintenance (O&M) activities on adjacent listed species. The measures to provide this protection will be incorporated into the various elements of the overall Campus facilities management program (e.g., work program descriptions, training programs). These Campus O&M actions will be subject to review and approval by the Service, the Corps, and CDFG. The University Environmental Manager will be responsible for ensuring that these requirements are integrated into the Campus O&M program as each phase of development proceeds.

The O&M conservation measures will include the following measures:

- Implement a continuous public education program. The University will implement a continuous public education program to inform students, staff, and faculty of the sensitive resources within undeveloped areas of the Campus and on lands adjacent to the Campus to promote the need to protect these resources. The program will be implemented through media and direct contact methods, outreach, signage, and interpretive exhibits.

- Establish Campus-wide leash rules and an animal control program. The University will adopt rules requiring that pets be leashed and develop an animal control enforcement program to discourage movement of free ranging dogs onto adjacent lands that are occupied or suitable for listed species.

- Minimize use of herbicides and other pesticides. The University will incorporate procedures into its management of developed ornamental landscapes and undeveloped lands to minimize pesticide use and to avoid and minimize potential for effects on listed species from movement of herbicides and other pesticides (e.g., through drift or runoff). This program will include development of a pesticide use plan as part of an overall Integrated Pest Management (IPM) plan for the Main Campus that specifies restrictions and conditions of pesticide application. Control of runoff was addressed previously in Campus Design Measures.

- Develop an invasive species control program. The University will control invasive weeds that may pose threats to sensitive resources on surrounding lands by restricting landscape use of species that may pose threats, establishing an ongoing IPM program for weed control on developed lands, and controlling weed populations that establish on the Campus during construction activities or on vacant Campus lands prior to development activities.

- Develop a management plan for the management of conservation lands. The University will prepare a Management Plan to establish the management measures and maintenance of preserve lands and to protect listed species on all lands that will be controlled by the University through ownership or acquisition of conservation easements and for lands under Wildlife Conservation Board (WCB) easements. Lands under University ownership include the Campus Natural Reserve and the Virginia Smith Trust Remainder Property that will be placed under conservation easement, and any other lands for which title or easements are acquired by the University itself as part of the UC Merced Project. Under the Management Plan, these lands will be actively managed. Lands which have been or will be acquired by the WCB also will be covered by the Management Plan, although they may be managed differently from University-owned easement lands and their management will not be the University's responsibility. The Management Plan will be prepared in consultation with the Service and CDFG as specified in the Parameters, and will provide an umbrella strategy for the management of the preserve lands as a whole, taking into account the different levels of management and methods of financing that may apply to various properties. The Management Plan will specify management policies and practices to limit and control human access, approve and manage research and educational uses, control pets and nonnative animal and plant species, conduct livestock grazing, prevent and control wildfires, and enhance habitat conditions.

Compensation Measures for the Proposed Actions

In accordance with the Parameters, the University will develop a comprehensive program to compensate for the direct and indirect effects of the Proposed Actions on listed species through acquisition and protective management of existing habitat as well as acquisition and restoration of previously degraded habitats. Substantial accomplishments have been achieved for the acquisition portion of the compensation plan.

The University will complete a Project Compensation Plan to address acquisition and management of lands supporting high-quality habitats and lands that will be restored to provide wetland compensation. The Project Compensation Plan will identify specific preserve lands that will be used to compensate for species take and habitat losses, measures that will be undertaken to implement compensation, resulting habitat benefits derived from compensation, and an adaptive management program to implement compensation actions over time. The plan will be prepared to respond to the specific effects of the Preferred Alternative.

The Project Compensation Plan will describe the site characteristics, proposed activities, and resulting conditions for each proposed compensation area to verify their

appropriateness in offsetting project-related effects. The Compensation Plan will fulfill the requirements listed below.

- Identify Appropriate Ownership of Preserve Lands. For conservation lands currently owned in fee by the University, the University will identify the appropriate conservation entity (e.g., NRS, UC, or other conservation entity) to hold fee title and/or conservation easements to the preserve lands in perpetuity. For WCB acquired conservation lands, the WCB will identify the appropriate conservation entity. All conservation easements for future Preserve Land acquisitions will be reviewed and approved by the Service to ensure that (1) the lands sought for protection are appropriate to serve as mitigation; and (2) the easements themselves contain, among other things, appropriate use restrictions, management requirements and provisions for monitoring by the Service and the Corps.

- Identify Management Budgets and Funding. The University will establish appropriate funding mechanisms and a budget for the perpetual management and monitoring of the CNR and Virginia Smith Trust (VST) Remainder Property lands. Additional funding will be identified for the management of preserve lands acquired after issuance of the BO, depending on the level of management necessary to meet the compensation requirements of the project. As specified in the Parameters, the University will ensure the availability of adequate financing to implement the Management Plans.

- Identify Wetland Habitat Restoration Actions. The Plan will describe all lands and wetland areas to be preserved, enhanced, restored, or created. It will also clearly describe all conservation measures to be implemented. The Project Compensation Plan will define the applicable preserve criteria, habitat restoration protocol, and success criteria for special-status species on the conservation lands.

- Identify Management Programs. The Project Compensation Plan will establish a long-term protocol for management and maintenance of habitats for special-status species occurring in CNR and VST Remainder Property lands and will identify management practices which could be implemented on future WCB preserve lands. Funding assurances to support management on the CNR and VST Remainder Property will be reviewed and approved by the Service, CDFG, and the Corps.

- Prepare a Comprehensive Monitoring Program. A monitoring program will be developed that describes the monitoring requirements for each compensation area. The monitoring program will identify specific methods and performance standards that must be achieved for conservation applied to each species. Monitoring will address basic compliance (e.g., Were required actions performed?), and

effectiveness questions (i.e., Were the actions successful in accomplishing the compensation goals of the plan?).

Surveys will be conducted by qualified specialists to monitor the status of listed species on compensation lands. The surveys will monitor progress over a 10-year period (or as otherwise required in the plan) in meeting the success criteria specified in the Project Compensation Plan for each site. The monitoring plan also will identify needs for adaptive management. Access will be specified for the Service, CDFG, and the Corps to verify management and monitoring results and compliance with the BO and Section 404 permit.

- Identify Adaptive Management Protocols. The Plan will contain an adaptive management component that will describe the process by which monitoring results will be used to evaluate the effectiveness of management activities, how the management program or specific practices may be modified to achieve the compensation objectives of the site, and when and how approvals for such changes will be acquired.

In order to fulfill the above requirements and as specified in the Parameters, the Compensation Plan will incorporate:

- a review by the Service and CDFG of existing and pending easements to evaluate their applicability for conservation of protected species in the Study Area;

- measures to provide funding for management and monitoring of the CNR and VST Remainder and preserve lands secured for wetland creation or restoration;

- establishment of a kit fox movement corridor to the north and east of the Applicants' Proposed Projects;

- other possible actions (e.g., passage over canals) to enhance kit fox movement;

- compensation of any unavoidable effects on Conservancy fairy shrimp by preservation of Service-approved habitats;

- for effects on San Joaquin Orcutt grass, Colusa grass, fleshy owl's-clover, hairy Orcutt grass, Greene's tuctoria, Hoover's spurge, Bogg's Lake hedge-hyssop, or Hartweg's golden sunburst, preservation of habitat occupied by these species;

- preservation of occupied habitat for effects on all special status plant species evaluated in the Supplemental Biological Assessment; and,

- development and implementation of a restoration/creation plan for effects on vernal pools and associated habitats that focuses on areas supporting vernal pool "signatures" or other suitable sites and that includes an appropriate monitoring plan and financial assurances.

The specific scope of compensation activities identified in the Habitat Compensation plans (i.e., acreages, locations, proposed management and enhancement activities) will be determined in part by the effects for which they are intended to compensate. In accordance with the Parameters, the plans will be prepared with Service and CDFG involvement and subject to approval by each agency as well as by the Corps.

The following sections describe current compensation land commitments, the proposed planning processes for future compensation, the management commitments to be applied to compensation areas, and proposed strategies to compensate for various listed species groups.

Overview of Existing Land Acquisition Program

The land and easement acquisition program for UC Merced has been initiated by the University and the WCB as a result of direction and funding provided by the California Legislature and several private foundations. The land acquisition program is designed to compensate for the potential effects of the Proposed Actions and related development on listed species. Because many of the species that may be affected by the Preferred Alternative require vernal pools and associated seasonal wetland habitats, this compensation effort is closely coordinated with the strategy to compensate for effects on wetlands and other waters of the United States.

The University and the WCB have initiated a program to secure large tracts of land supporting concentrations of high-quality vernal pools and related aquatic habitats in the Study Area. Although some of the initial lands acquired for compensation by the University were directly associated with Campus Buildout under the Applicants' Proposed Projects, these lands are committed for protection through acquisition of conservation easements. Additional management and protection measures may vary depending on the final Preferred Alternative and the resulting requirements for project conservation.

The University has acquired title to the 7,030-acre VST property. Of this area, 910 acres was designated for development for the Main Campus in the context of the Applicants' Proposed Projects. The Applicants' Proposed Projects also includes the 750-acre Campus Natural Reserve (CNR) and the 340-acre Campus Land Reserve (CLR). The remaining 5,030-acre portion of the VST property (VST Remainder Property), which is owned by the University but is not formally part of the UC Merced Campus, has been committed to preservation through a conservation easement and will be managed to maintain and enhance its natural environmental functions and values.

The CNR and the VST Remainder Property (which together comprise 5,780 acres, see Figure 4) will remain in an undeveloped state, will be managed under a conservation easement approved by the Service, and will be dedicated entirely to conservation and limited controlled research and educational activities. This management will be subject to an adaptive management plan to be reviewed and approved by the Service and other agencies. Activities and public access on the CNR and the VST Remainder Property are restricted, with recreational activities being entirely prohibited.

The CNR, and possibly the VST Remainder Property, will be managed as part of the University of California Natural Reserve System (NRS) or will be managed by the Campus in a manner consistent with NRS guidelines. Thus, regardless of the outcome of the section 7 and Clean Water Act 404 permit processes, the University will protect a total of 5,780 acres that may be used to compensate for effects of the Campus on wetlands and listed species. The funding ultimately allocated to additional easement acquisition may be influenced by the Preferred Alternative's size and location and the consequent need for compensation.

Compensatory Wetland Mitigation Plan

The University will prepare and submit to the Service, CDFG, and the Corps for review and approval a detailed Compensatory Wetland Mitigation Plan for onsite and offsite wetland preservation, enhancement, and/or restoration and creation conservation efforts. The goal of the Compensatory Wetland Mitigation Plan is to ensure that there will be no net loss of wetland functions resulting from construction and long-term use of the Proposed Actions, and to ensure that take and other effects on listed species dependent on these habitats are fully offset. The Compensatory Wetland Mitigation Plan will identify a combination of wetland preservation, enhancement, restoration and creation efforts that will achieve the no net loss standard. The Compensatory Wetland Mitigation Plan will be based on a holistic watershed-level approach involving a wide range of aquatic habitats and their surrounding upland environments.

As previously discussed, large parcels encompassing intact watersheds have been selected preferentially for acquisition for conservation. The Compensatory Wetland Mitigation Plan will incorporate each of the broad approaches included in the wetland conservation strategy based on requirements specified in the University's "Compensatory Wetland Strategy: Mitigation Design Criteria", as well as direction in this biological opinion and the Section 404 permit.

The Compensatory Wetland Mitigation Plan will incorporate measures to meet the following objectives:

- ensure that the University will preserve a minimum of 10 acres of vernal pool-dominated grasslands for each acre of vernal pool-dominated grasslands developed or filled;

- evaluate and incorporate existing easement protections and other enhancement activities on preserved lands as needed to achieve the requirement for no net loss in wetland functions;

- restore wetlands by reestablishing or enhancing areas where the vernal pool signature is still present, to achieve a minimum acreage ratio of 1:1 replacement for vernal pools and other seasonal wetlands that would be filled by the Proposed Actions; and

- if the 1:1 replacement ratio cannot be met through restoration of degraded seasonal wetland habitats, meet the ratio through creation of such habitats in other suitable areas.

The University will prepare a Wetland Restoration/Creation Site Design Plan for each conservation site identified in accordance with the conservation requirements specified in the Compensatory Wetland Mitigation Plan. The Site Design Plan will focus on sites where the vernal pool signature is still present or other suitable areas identified for restoration/creation potential. Wetland delineations will be performed for any areas proposed for wetland enhancement; any activities that may require a permit under Section 404 of the Clean Water Act will receive permits prior to work initiation. Any proposal for wetland restoration or creation will be designed to meet, at a minimum, the requirements contained in the Resource Mitigation Plan (see Exhibit A in the Supplemental BA).

The Wetland Restoration/Creation Site Design Plan will include appropriate monitoring and adaptive management measures reviewed and approved by the Service, the Corps, and CDFG. Monitoring and evaluation of created or restored wetlands will be conducted for a minimum period of 10 years to ensure conformance with success criteria; monitoring is expected to be conducted in years 1, 2, 3, 5, 7, and 10, or as otherwise determined in the approved plan, and reported to the agencies. Adequate financial assurances will be provided in the plan to conduct management and monitoring.

Compensation Plan for Protected Species

In accordance with the Parameters, the University will prepare and implement a Compensation Plan for Protected Species, which will be subject to review and approval by the Service. This plan will clearly describe all specific conservation measures to be implemented, performance criteria, monitoring protocols, appropriate contingency measures, and a long-term maintenance plan. The Compensation Plan for Protected

Species will outline the compensation strategy to address effects of the Preferred Alternative on all species that may be affected by the Proposed Actions. The Compensation Plan for Protected Species will be developed by the University in coordination with the Service, CDFG, and the Corps. The BA for the Applicants' Proposed Projects (EIP Associates 2002) provides more detail on the measures and standards to be used in compensating for individual species. Table 2 presents a summary of species occurrences for the various lands acquired to date.

Compensation Strategy for Listed Plants

In addition to previously described measures to avoid and minimize effects on listed plant populations through siting, design, and construction conservation, the University will compensate for unavoidable effects on populations of listed plants. This program is consistent with Parameter 2f, which specifies that effects on listed plant species will be mitigated by preservation of occupied habitat in areas approved by the Service.

The objectives of the compensation program for listed plants are:

- preserve two plant occurrences of generally equal or greater size than each occurrence of the same listed species eliminated by campus construction (2:1 ratio); and,

- achieve the preservation objective within a 10-mile radius of the Proposed Actions to the extent feasible.

The compensation program for listed plants will be implemented through land acquisition, protection, and enhancement. The lands for which easements have been acquired or are pending, (including the CNR and VST lands to be owned and protected by the University) will be considered first as the basis for achieving the compensation objective for listed plants.

As described in the BA for the Applicant's proposed project (EIP 2002), lands acquired for listed plant compensation will be preserved in perpetuity and will include sufficient buffers to protect populations from potential perturbations. Funding for management and monitoring of these compensation areas will be assured to the Service and other agencies.

The existing CNR and VST easement lands support vernal pools occupied by fleshy owl's-clover, eight occurrences of Colusa grass, and one occurrence of San Joaquin Valley Orcutt grass. None of the other listed plant species have been detected on these lands.

Compensation Strategy for Conservancy Fairy Shrimp

The only known population of Conservancy fairy shrimp in the Study Area occurs on CNR lands, although some unsurveyed suitable habitat may be present in the Study Area. Effects on Conservancy fairy shrimp have been addressed for the Applicants' Proposed Projects through avoidance of direct effects by means of project siting and design, and through measures to prevent indirect effects from the adjacent campus. The Parameters also specify, as a project commitment, that no effects on Conservancy fairy shrimp, including the watershed of the pool in which it occurs, will result from the Proposed Actions. The University configured the CNR in such a way that it would encompass the entire watershed of the playa pool occupied by Conservancy fairy shrimp; this watershed is protected by a conservation easement and commitments to provide protective management. Accordingly, even if the location or configuration of the Proposed Actions should differ from those of the Applicants' Proposed Projects, the conservation easement and commitments to provide protective management for the CNR will continue to apply.

The Parameters also specify that indirect effects on Conservancy fairy shrimp and its watershed will be avoided and minimized to the maximum extent practicable and that any unavoidable indirect effects on habitat occupied by the species will be compensated through preservation of habitat in areas approved by the Service. The University has committed to monitoring and management of the CNR to minimize and avoid direct effects. If the Proposed Actions occur at the Applicants' Proposed Projects site, all additional protection measures (to address potential effects of the adjacent campus) will be implemented. Siting of the Proposed Actions elsewhere may diminish the need for these protections.

The specific measures identified to protect the CNR from disturbance on adjacent campus lands include ongoing monitoring and management of the CLR and CNR to minimize potential threats from alteration of hydrology, degradation of water quality, establishment of invasive plant species, unauthorized human use, competition or predation from nonnative species, and other threats. Because habitat for Conservancy fairy shrimp will not be disturbed by Campus construction activities and will be protected from indirect effects, no other habitat compensation is proposed for this species.

If the Preferred Alternative for Campus Buildout is relocated from the site of the Applicants' Proposed Projects to a new location within the Study Area, any potential habitat for Conservancy fairy shrimp that might be affected would be identified and surveyed. If surveys indicate the species is present, the occupied pool and its watershed would be avoided, as specified in the Parameters, and any indirect effects would be minimized using appropriate techniques as described above. Because direct effects would be avoided under the Proposed Action, no other habitat compensation may be necessary.

Compensation Strategy for Other Protected Vernal Pool Crustaceans

The previously described avoidance and minimization measures for vernal wetlands and Conservancy fairy shrimp will provide protection for other protected crustaceans (i.e., vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp). Moreover, previously described measures addressing vernal wetland habitat restoration will restore habitat that may by suitable for these species. Nonetheless, some loss of occupied or potential habitat for these species could occur under the Proposed Actions and is expected to occur under the Applicants' Proposed Projects.

The Parameters specify that the nature and extent of proposed compensation, including ratios, will be at least equivalent to those identified in the BA (EIP 2002). Although wetland acreage has not been precisely quantified on the other 20,288 acres acquired by WCB, preliminary estimates indicate that at least 2,100 acres of suitable vernal wetland habitat (i.e., vernal pool, clay playa, pool/swale complex, and mima mound habitat) are present on these lands, see Table 4-3 in the Supplemental BA (Jones & Stokes 2002).

Compensation Strategy for San Joaquin Kit Fox

As specified in Parameter 2b, the Applicants have agreed to prepare and implement, in coordination with the Service and CDFG, a comprehensive strategy for the conservation of the San Joaquin kit fox. The strategy will address a migration corridor east and north of the Applicants' Proposed Projects site; this corridor will be maintained through land acquisitions (fee title or conservation easement) as well as other actions, if feasible, such as enhanced passage over existing MID canals. The Parameters specify that such land acquisitions will be consistent with the establishment of a connection to the Sandy Mush Road area.

The 806-acre Campus Buildout area within the Applicants' Proposed Projects is potential habitat that is suitable for long-distance movement and as potential denning and foraging habitat for the San Joaquin kit fox. The University has agreed to compensate for the removal of this habitat at a ratio at or above the 3:1 standard typically required by the Service. All protected lands for which fee title or easements have been acquired by the University [VST and CNR and WCB) (Figure 4)] are considered suitable kit fox habitat. As described in the RMP for the Project BA (Jones & Stokes 2002), the acquisition and management of VST and CNR lands would protect 5,780 acres.

Potential effects of the Applicants' Proposed Project on kit fox movement have been compensated through acquisition of lands to provide a corridor along the east and north sides of the proposed Campus and University Community [acquisition and management of CNR, VST, and Cyril Smith Trust (CST) lands] and by WCB preservation of other lands within the general movement corridor in eastern Merced County. Construction of additional crossings of the MID canals in the Study Area that have been proposed for Phase 1 would also, if approved by MID, improve potential for kit fox passage in this area. These actions are considered consistent with and supportive of the establishment of

a connection with the Sandy Mush Road area. Figure 3 provides a map of existing and proposed kit fox crossings over the various canals.

Incorporation of Adaptive Management and Monitoring into Management Plans

Management Strategies for University-owned Lands

Pursuant to the overall management plans, the University will include detailed management and monitoring measures for the CNR and VST lands, which will be under conservation easement regardless of the location of the Preferred Alternative. The Management Plan will include:

- compensation goals and measurable objectives;
- maps and descriptions of the management area; compensation habitat within each site; and any areas to be enhanced, restored, or used for habitat creation;
- description of how the compensation habitat meets preserve criteria specified in the RMP;
- descriptions of the mechanisms (e.g., conservation easement, deed restrictions) to protect the compensation habitat in perpetuity, and the appropriate land use restrictions to prevent incompatible activities;
- identification of the parties responsible for implementing the management and monitoring plan;
- description of and restrictions on recreational, educational, and scientific activities that will be permitted in the compensation habitat and protocols for approving specific research and educational uses;
- methods for controlling/eliminating unwanted or illegal uses of the property;
- details regarding planned habitat restoration/enhancement measures;
- monitoring measures, protocols, length of monitoring periods;
- short-term and long-term maintenance and adaptive management measures to adjust management based on monitoring results; and
- funding assurances for restoration/enhancement, long-term monitoring, management, and reporting provided by the University.

The Management Plans also will address active management for the CNR and VST remainder property, and the conservation easements will allow the following management measures:

- grazing management practices;
- control of invasive plant and animal species; and
- fuel management practices.

Management Strategies for WCB Preserve Lands

The Management Plan would also establish the management measures and maintenance of preserve lands under WCB easements. The properties that currently are or will be under WCB conservation easements possess significant conservation values. The intent of the easement program is to support habitats that preserve and maintain these values. Although WCB easement lands may be managed differently from University-controlled preserve lands, under the terms of the easements, habitats will be protected and maintained including unplowed grasslands, vernal pools, swales and other wetlands, natural stream courses and waterways, unfragmented open space, and corridors for the unimpaired passage of wildlife. These natural communities provide habitat for many rare and common native wildlife species including raptors, waterfowl, and vernal pool plants and animals.

Management of WCB preserve lands will be conducted under the terms of the conservation easements in place for each property. Thus, the conservation values would be preserved and maintained subject to the terms and conditions of the conservation easements through ranching and grazing activities that do not diminish or impair the conservation values and that can in some ways support and enhance the conservation value. Conservation easements will allow the easement holder to work with the landowner to preserve, protect, identify, monitor (including the right to access the property to conduct evaluations of wetland quantity and quality, evaluations of habitat quantity and quality, and to survey for threatened and endangered species and monitor their populations), enhance, and restore in perpetuity the conservation values. As described above, any future easement terms will be examined to ensure that they are adequate for lands that are determined to be critical to meeting the Parameters and other compensation and mitigation needs of the Proposed Actions, including the monitoring of and access to preserve lands to assure that management measures are achieved and effective. Management objectives include maintaining cattle ranching as the primary land use through the acquisition of compatible conservation easements, maintaining healthy populations of special status species, and improving the ecological health of the area by encouraging modifications to ranching practices such as fencing riparian areas to allow seasonal grazing, as well as encouraging other practices conducive to the improvement of habitat. Parameter 2 (a) will require close coordination with easement holder(s) and state and local agencies to provide access for management and monitoring activities.

Adopted Conservation Measures for Phase 1 Campus Project

As previously noted, a specific location and design for the Phase 1 Campus have been determined. Its impacts are subject to evaluation based on the described project and the adopted Conservation Measures. Although the Phase 1 Campus project will result in minimal effects on listed species because of the absence of vernal pools and other wetland habitats within the Phase 1 Campus boundaries, detailed conservation measures applicable to Phase 1 have been incorporated into the Phase 1 Campus design to ensure that effects are avoided or minimized (see Figure 3). These conservation measures focus on indirect effects on adjacent wetland-dependent listed species and on the San Joaquin kit fox.

Design Measures

- Control stormwater and irrigation runoff to avoid and minimize effects on natural hydrology and vernal pool ecosystems. The University will control stormwater drainage for the Phase 1 Campus site through design measures to direct runoff to appropriate stormwater detention facilities within the Campus. This runoff will then be discharged to existing drainages at rates that maintain current hydrologic conditions. Facilities at the periphery of the campus will be designed to ensure that runoff does not flow into adjacent habitats, even in substantial rain events. This measure will minimize alteration of natural hydrologic regimes, sediment and nutrient loading, and introduction of pesticides or other hazardous material in runoff, thereby avoiding and minimizing indirect effects on aquatic systems in areas outside the Phase 1 Campus that may support listed species.

- No stormwater runoff from the Phase 1 Campus will be discharged into adjacent vernal pool and seasonal wetland habitat areas. Similarly, design of drainage facilities and systematic use of water conservation measures will prevent irrigation runoff from ornamental landscaping to vernal pool ecosystems. (See Operations and Maintenance Measures for further discussion of management of ornamental landscapes following Phase 1 Campus construction.)

- Construct perimeter fencing to discourage human and pet disturbance of adjacent habitat areas. The University will design and construct perimeter fences along the Phase 1 Campus boundary within 1 mile of habitat areas that are known or have potential to be occupied by listed species prior to campus construction. To discourage entry of dogs into adjacent habitats, fencing will utilize a lower hog-wire mesh panel (i.e., a 2-inch mesh on a 24- to 30-inch lower panel) or other means to discourage dog passage.

- Incorporate measures into lighting design to minimize escape of light into habitat areas. To minimize effects of introducing light from the Phase 1 Campus into

adjacent habitat areas that may be suitable for the San Joaquin kit fox, California tiger salamander, and other species, the Campus exterior lighting system will be designed to locate, shield, and direct lighting to minimize stray "trespassing" of light into occupied and suitable habitats.

Construction Measures

The University will develop and implement a comprehensive Construction Mitigation Plan to avoid and minimize potential for direct disturbance of listed species within and adjacent to the Phase 1 Campus site. The Construction Mitigation Plan will be approved by the Service before the University initiates ground-disturbing activities. The Plan will be implemented during construction. Measures specified in the Plan are further described below.

- Designate an environmental monitor. An environmental monitor will be employed by the University to monitor and/or implement construction conservation measures and to report on compliance of contractors with conservation requirements. The monitor will report directly to the Campus Environmental Manager. The monitors will be qualified and permitted to conduct required conservation activities and to report on compliance issues. Based on reports of noncompliance with environmental requirements, the Campus Environmental Manager will be authorized to stop work to assess noncompliance and prevent further resource damage.

- Report on environmental monitoring results. Monitoring reports will be filed regularly according to schedules established in the Phase 1 Campus Construction Mitigation Plan. Reporting schedules will be determined based on the potential for threats to listed species and other environmental resources. For example, daily reporting may be required during initial ground-disturbing activities when substantial environmental conservation measures are employed, whereas monitoring frequency may be reduced after initial site development to reflect lower potential for effects. Reports will be submitted to the Service and CDFG.

- Incorporate species protection obligations into construction contracts. All contracts between the University and contractors and between construction management firms and subcontractors will include the provisions identified in the BA, this biological opinion, and Service-approved construction plans for protecting listed species and habitats as terms and conditions. Specific penalties for violations will be identified in construction contracts; the penalties could include warnings, removal of individual violators from the project, termination of contacts, and payment of damages.

- Conduct environmental sensitivity training for all construction personnel. Prior to initiating work at the construction sites, all construction personnel will receive training regarding the sensitive nature of the areas adjacent to the Phase 1 Campus and their obligations to protect sensitive resources. The training materials will be submitted to the Service and other agencies for approval prior to initiation of training. Training materials will be prepared in both English and Spanish and will be translated to other languages if necessary. At a minimum, the training will include descriptions of the species at risk and their habitats, the importance of the species and their habitats, the general measures that are being implemented to conserve sensitive areas/species as they relate to the project, and the boundaries within which the project may be accomplished. Specific obligations of construction personnel and consequences of violating work requirements will be provided. Videos, brochures, books, and briefings may be used in the training session.

- Incorporate best management practices. Standard construction BMPs will be incorporated into construction designs and plans and specifications; contractors will be required to employ these BMPs during construction. These practices will include dust-control measures; erosion reduction and sediment control (including use of silt screens, sediment fences, weed-free straw bales, sand bags, and water bars); and restricted equipment refueling and maintenance practices. A spill-response plan will be prepared for the site to ensure prompt capture and clean-up of any accidental releases of fuels or any other hazardous materials in use at the site.

- Fence project boundaries and sensitive resources. Temporary or permanent fencing will be installed by contractors under the direction of environmental monitors prior to initiation of construction activities along the boundaries of the construction areas within the Phase 1 Campus site and adjacent areas of suitable habitat. These fences will be installed to prevent construction vehicles from straying into adjacent habitats suitable for listed species.

- Implement construction measures to minimize take of the San Joaquin kit fox. Preconstruction surveys will be conducted in construction areas in accordance with the kit fox protocol described in the Service's (1999*a*) Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance. These surveys will be conducted in areas of suitable annual grassland habitat to be disturbed on the Phase 1 Campus site and within a 250-foot buffer around such areas. Surveys will be completed prior to any ground disturbance to eliminate or minimize any possibility of injuring or harassing this kit foxes. Preconstruction surveys for kit fox dens will be conducted no more than 30 days prior to any construction-related activities. Dens found to be inactive within the site or buffer will be hand excavated by a biologist to a depth at which the den

becomes fewer than 4 inches in diameter. If an active kit fox den is detected within or immediately adjacent to the area of work (i.e., within 250 feet), construction will stop within 250 feet of the den, and the Service and CDFG will be consulted to determine how to proceed.

The following measures will be imposed on construction personnel to protect kit foxes from harm during construction:

1) all food-related items will be properly stored, trash will be disposed and removed offsite, and signs indicating that the feeding of wildlife is prohibited will be placed at the construction site;

2) construction-related vehicle traffic will occur primarily between dawn and dusk and will be limited to 20 mph on unpaved roads to reduce the potential of road mortality of kit foxes;

3) any trench or pit will be covered or provided with escape ramps at the end of each work day to prevent kit foxes (or other species) from becoming entrapped;

4) pipes, culverts, etc., more than four inches in diameter will be stored in such a way as to prevent foxes or other species from using these areas as temporary refuges, and these structures will be thoroughly inspected each morning for kit foxes or other species prior to being moved;

5) no firearms will be allowed on the construction sites; and

6) no pets will be permitted on construction sites.

- Implement construction measures to minimize effects on California tiger salamander. The golf course is not considered to support suitable breeding habitat for the tiger salamander, and aestivation habitat is limited or absent. Based on previous surveys, breeding ponds are isolated from the project site by MID canals, although a small possibility exists that a small tiger salamander population persists on adjacent lands. The following measures will be coordinated with CDFG and the Service.

  1) Winter surveys will be conducted at vernal pools and ponds on the project site and in areas within 0.6 mile of the project site from which tiger salamanders could access the site.

  2) For construction activities within 0.6 mile of occupied breeding ponds, drift fences (or other effective salamander barriers) will be erected around the

construction area before February 1 in the winter prior to the start of construction to exclude breeding salamanders from the construction site.

- Prevent introduction and establishment of invasive species. To discourage establishment of invasive species within the Phase 1 Campus, construction contracts will include requirements that any plant materials, seeds, or other organic material (e.g., hay) used during project construction for erosion control or revegetation of disturbed areas be free of invasive species. Furthermore, all earthmoving equipment will be washed to remove vegetative material before being brought onsite.

- Conduct post-construction monitoring and conservation. Post-construction monitoring will be conducted to verify completion of conservation requirements for project completion. Subsequent monitoring will be conducted to document the effectiveness of design and conservation measures applied to prevent or reduce effects on listed species' habitats (e.g., erosion control, function of drainage systems) for time periods specified in the site-specific Construction Mitigation Plan. If measures are determined not to meet conservation performance standards, remediation will be performed to correct the problems; these remedial measures will be further monitored.

Monitor vernal pools adjacent to Phase 1. The University will undertake monitoring of vernal pools adjacent to Phase 1 to evaluate whether conservation measures were effective in avoiding and minimizing effects on vernal pools and associated species. The monitoring program will be conducted for 5 years unless and until a subsequent permit is issued that authorizes the loss of the subject vernal pools.

A total of seven vernal pools that are within 250 feet of the Phase 1 boundary (subject pools) will be monitored for effects of Phase 1 development. In addition, a similar number of vernal pools of similar character (i.e., depths and plant communities) located clearly outside of any area of potential effect also will be monitored in a similar manner (reference pools). A comparison of monitoring results from the subject and reference vernal pools will provide a basis for determining whether any observed changes in the character of subject pools are more likely to be a result of normal annual or seasonal variations or an indirect impact from adjacent development.

Monitoring will be conducted to characterize the duration and extent of inundation and turbidity in pools. To conduct monitoring, a staff gage (graduated in inches or 0.1 feet) will be installed in each subject and reference vernal pool. Water depths will be monitored on a biweekly basis throughout the rainy season until the vernal pools desiccate in the spring. Turbidity will be monitored by estimating visibility within pools and recording any other indications of suspended sediment. This type of vernal pool

naturally has relatively low turbidity; higher turbidity would be considered as an indication of erosion or sedimentation upstream in the watershed.

Vegetation in each of the monitored vernal pools will be surveyed each spring during the height of the flowering period after the pools dry out. The relative abundance or cover of each species occurring in the pools will be identified. Each plant species observed in the vernal pools will be classified as a vernal pool endemic, vernal pool associate, other wetland species, or upland species. Vernal pool endemics are those species found almost exclusively in vernal pools. Vernal pool associates are those species that may be commonly found in vernal pools but are also commonly found in other types of seasonal wetlands. Other wetland species are those species that normally occur in wetlands but very rarely, if ever, are found in vernal pools. Subject and reference vernal pools will be compared on the basis of abundance or cover of individual species and by species categories. This monitoring will be conducted by a qualified botanist.

In addition to the monitoring described above, the immediate perimeter of the Phase 1 site will be monitored on a monthly basis to determine if any trash, debris, or other materials have been disposed of outside the perimeter fence. This survey will also include monitoring to evaluate if any surface runoff from within Phase 1 is being released to adjacent lands. If any problems are identified, they will be immediately reported to the Service and the Corps and corrected.

Operations and Maintenance Measures

Management of the Remaining Golf Course Area: The University has agreed that it will not irrigate the portions of the golf course outside the Phase 1 Campus boundary, and vegetation will be managed by mowing or cattle grazing during the period prior to development of Campus Buildout under the Applicants' Proposed Projects. No pesticides (insecticides, herbicides, or rodenticides) will be applied except as necessary to control noxious weeds that may threaten adjacent lands, and then only if such application is consistent with a management plan approved by the Service and CDFG. These measures are expected to improve the habitat values associated with portions of the golf course outside of the Phase 1 boundary. The Service has indicated that these enhancements will not, however, increase the overall level of compensation required by the University in connection with the conversion of the golf course, as a whole, to campus uses.

Fire Protection: To provide for fire protection during operations, a firebreak will be constructed within a 30-foot swath located primarily within the Phase 1 Campus boundary. The firebreak may be located within the remainder of the golf course where it abuts the Phase 1 Campus. Preconstruction den surveys for kit fox (see measures above) will be conducted within suitable habitat to be affected by the construction of the firebreak.

Measures to Minimize Effects of the Phase 1 Campus on Adjacent Habitats

These measures entail the management actions that will be undertaken during management of the Phase 1 Campus and other acquired University lands to protect habitat values for listed species on adjacent lands and to minimize effects of the Campus on these lands.

Measures to be incorporated into the Campus Facilities Management Plan include public education, leash laws and enforcement, restrictions on use of pesticides in Campus landscape management through development of an IPM plan, restrictions on use of invasive plants in landscaping, control of invasive weeds in undeveloped areas of the Campus, and monitoring activities. The University Environmental Manager will be responsible for ensuring that these requirements are integrated into the various elements of the overall Campus facilities management program (e.g., work program descriptions, training programs).

- Implement a continuous public education program. The University will develop and implement a continuous public education program at the Campus to inform students, staff, and faculty of sensitive resources outside the perimeter of the Phase 1 Campus (especially the CNR area occupied by Conservancy fairy shrimp, as well as VST and other easement lands) and the need to protect these resources. The initial public education program will be approved by the Service, but will be designed to be adaptive in response to observed educational needs. This will be an ongoing program in recognition of the need for frequent communication with a transient student population. The education program will also be designed and implemented to ensure communication with non-English-speaking Campus staff.

  Communications will include a variety of media and contact methods. These could include orientation materials for new students, outreach through Campus publications, and curriculum to educate residents about unique biological resources, signage of Campus boundaries near sensitive areas, incorporation of information on sensitive resources into the curriculum, and carefully supervised involvement of students in the management and monitoring of University lands supporting sensitive resources, including the CLR and CNR.

  The University may consider developing an interpretive exhibit and a limited interpretive trail system on existing roads within future Campus lands or the CLR. Such a system would allow students and other residents to learn about and appreciate the unique natural resources of the area and these resources' sensitivity to disturbance. Any such program would be carefully located and managed to minimize effects on biological values of habitats and listed species and be subject to review and approval by the Service.

- Establish Campus-wide leash laws and an animal control program. The University will enact and enforce leash laws for the Campus to discourage movement of free-ranging dogs onto adjacent habitat areas, including the CLR and CNR. The University will likely enter into an MOU with Merced County Animal Control for this service. Enforcement personnel will be educated regarding the importance of control and limits of control actions within the Reserves.

- Prevent damage from herbicides and pesticides. To avoid and minimize potential for effects on listed species from drift of herbicides and other pesticides, a pesticide use plan that outlines accepted conditions for uses of herbicide and other pesticides will be prepared and approved by the Service as a part of the overall IPM plan for the Phase 1 Campus. Potential restrictions may include restrictions of certain compounds, modes of application, conditions of application (e.g., wind speeds, proximity to the CLR), and maintenance activities.

- Discourage establishment of invasive weeds. Invasive weeds will be controlled through management of the Phase 1 Campus. Management practices will include restricting landscape use of species that may pose threats to surrounding lands, establishing an ongoing IPM program for weed control on developed lands, and controlling weed populations that establish on the Campus during construction activities or on vacant lands prior to construction.

Compensation Measures for Phase 1

Phase 1 of the UC Merced project will primarily affect the existing golf course and approximately 12 acres of associated grassland habitat. The grassland habitat was previously graded during golf course construction. No wetland areas suitable for vernal pool species will be affected by Phase 1 Campus construction. Development of the golf course could result in effects on the kit fox through habitat loss that could affect fox movements in the Study Area. Therefore, the University has agreed to commit to implement conservation measures to protect and enhance habitats in the immediate vicinity of the Phase 1 Campus, prior to or simultaneous with actions at the Phase 1 site. These measures include acquiring and managing a wetland compensation site 0.5 mi. southeast of the Phase 1 site to provide additional benefits for kit fox, temporary reversion of the golf course to grassland habitat during the period before commencement of Campus Buildout construction, and initiating protective management to provide temporal benefits attributable to enhancement on the CNR and VST remainder lands. These measures are discussed in the following sections.

Conservation Measures for San Joaquin Kit Fox

The proposed conservation measures would include acquisition and protection of a 96-acre area located east of the Phase 1 Campus. This area has been set aside as a vernal pool conservation area to address prior activities related to construction of the golf course. A conservation easement for the property, subject to review and approval by the Service and the Corps, will be granted to The Nature Conservancy, but the University will retain responsibility for long-term protection and management of the site. This site will be managed to maintain and enhance its capability to support San Joaquin kit fox.

In connection with Phase 1, an additional canal crossing will be situated to encourage kit fox access to the CNR/VST/CST corridor lands that are protected under easement. This crossing is expected to be placed on the east side of the proposed Campus Community and would provide access for construction and monitoring of the Phase 1 wetland compensation site.

In addition, approximately 94 acres of the existing golf course will be allowed to return to its "natural" condition and will no longer be managed as a golf course. This area is expected to become dominated within several years by nonnative annual grasses typical of surrounding lands. The area may receive limited irrigation to encourage transition to natural conditions and to discourage colonization by noxious weeds. The passive restoration of this area to nonnative grassland habitat will afford improved habitat for kit foxes immediately adjacent to the Phase 1 Campus. The enhancement of the golf course remainder is considered to partially offset any potential effects of the loss of golf course and adjacent grassland habitats during construction of Phase 1. As this area is within a later phase of the Applicants' Proposed Projects, this area will not be afforded permanent protection.

Enhancement will be accomplished by allowing xeric vegetation to expand from within the site and to colonize from adjacent lands in response to elimination of golf course maintenance practices (frequent mowing, irrigation, fertilization, and weed control). The modifications will not include any substantial efforts to reestablish natural land forms and vegetative communities. Vegetation will be managed by mowing or cattle grazing during the period prior to development of Campus Buildout. No pesticides (insecticides, herbicides, or rodenticides) will be applied except as necessary to control noxious weeds that may threaten adjacent lands, and then, only if such application is consistent with a management plan approved by the Service, the Corps, and CDFG.

Management of the Campus Natural Reserve and VST Remainder Property for Multiple Species

The University has acquired and will manage the lands identified in the Applicants' Proposed Projects as the CNR and the VST Remainder Property. The advance

acquisition and preservation of these lands prior to Phase 1 construction will provide temporal benefits for San Joaquin kit fox and other species.

Adopted Environmental Commitments for the Infrastructure Project

Habitat Mitigation Plan

Merced County has developed a Habitat Mitigation Plan to avoid, minimize, and compensate for impacts to biological resources resulting from implementation of the Infrastructure Project. In addition, the HMP describes a process for determining mitigation standards to be applied to the Infrastructure Project based upon site-specific habitat evaluation of both the project site and the preserve lands. The HMP includes the following elements: avoidance and minimization element, compensation element, and monitoring and adaptive management element.

Avoidance and Minimization Element: Measures to avoid and minimize effects of the Infrastructure Project will be incorporated into the final infrastructure design plan. These measures include, at a minimum, specific design features such as surface water management (storm drainage and treatment facilities) roadway culverts to maintain watershed integrity, and perimeter landscaping and fencing. the storm drainage system is designed to capture the storm water run-off from impervious roadway surfaces. Several in-channel settling basins will provide passive water quality treatment.

Construction Measures: Merced County Department of Public Works will prepare and implement a construction mitigation plan for the Infrastructure Project containing, at a minimum: incorporation of best management practices, incorporation of conservation measures into construction contracts, training for construction personnel, construction fencing, salvage of plants and invertebrates, construction measures to avoid kit fox take, invasive species control, and environmental compliance monitoring. The construction mitigation plan will be subject to review and approval by the Service.

Compensation Element: The Compensation Element provides for the development of compensation measures based on compensatory mitigation standards which require that all impacts to wetland habitats and species be mitigated fully by achieving no net loss of wetland functions and values within the region over the life of the Infrastructure Project. The mitigation standards will be based upon an evaluation of site-specific habitat functions and values. No fewer than 3 acres of wetlands will be preserved, enhanced, restored and/or created for each acre of wetlands preserved. Associated upland habitats will be preserved at no fewer than 9 acres of upland for each acre of wetland preserved.

Monitoring Element and Adaptive Management: The Monitoring Element and Adaptive Management program are designed to maintain and improve habitat functions and values and to sustain existing populations of sensitive species on the preserve lands. Site

specific monitoring and adaptive management will be subject to Service approval and will include a description of the management actions necessary to meet conservation objectives, monitoring requirements, short-term and long-term maintenance and adaptive management measures to adjust to monitoring, and a description of corrective measures. Adequate funding assurances (i.e., a performance bond) will be provided in an amount sufficient to cover the costs of designing and implementing an adequate mitigation plan.

Adopted Environmental Commitments for the Campus Community

The Conservation Measures for the Campus Community (an interrelated and interdependent project) are based upon on the objectives and policies contained in the draft UCP. The draft UCP includes objectives and policies intended to mitigate adverse effects to biological resources. Pursuant to these policies, the County either will expand the Infrastructure Project HMP (described above) to address additional resource impacts of the Campus Community or it will develop project-specific HMPs for each individual project within the Campus Community.

The draft UCP provides for the protection of wetland resources in eastern Merced County by ensuring no net loss of wetlands functions and values through habitat preservation, restoration, creation, and/or enhancement. To achieve this objective, mitigation standards would be developed based on a habitat function and valuation process. Protected habitat would be monitored and managed to maintain wetland habitat quality. The County would ensure that direct and indirect effects to wetlands habitats are minimized through promotion of environmentally sensitive project siting and design at the specific plan level and in accordance with the Parameters. As described in Chapter V of the original BA for the Applicants' Proposed Projects, additional conservation measures for listed or proposed species would be implemented including, preservation of vernal-pool grassland habitats to support vernal pool species and fleshy owl's-clover, preservation of foraging habitat for mountain plover and Swainson's hawk, and preservation of grassland habitat to compensate for potential effects on the San Joaquin kit fox.

Status of the Species

Fleshy Owl's-clover (*Castilleja campestris* subspecies *succulenta*)

The Service (1997*a*) listed fleshy owl's-clover as federally threatened in 1997. California State Fish and Game Commission listed the same taxon with the common of succulent owl's-clover as endangered in 1979 (California Department of Fish and Game 1991). The California Native Plant Society considered the species to be rare and endangered 5 years earlier (Powell 1974) and still includes fleshy owl's-clover on its List 1B, noting that it is "endangered in a portion of its range" (Skinner and Pavlik 1994) and "fairly endangered

in California" (Tibor 2001). As of 2000, the California Department of Fish and Game regards the status of fleshy-owl's clover to be declining (CDFG 2001).

Robert Hoover (1936*a*) first named fleshy owl's-clover, giving it the scientific name *Orthocarpus campestris* variety *succulentus*. The type specimen had been collected at Ryer, in Merced County. Hoover (1968) raised fleshy owl's-clover to the rank of species and assigned it the name *Orthocarpus succulentus*. Chuang and Heckard (1991) reconsidered the taxonomy of *Orthocarpus* and related genera. Based on floral morphology, seed morphology, and chromosome number, they transferred many species into the genus *Castilleja*. Furthermore, they determined that the appropriate rank for fleshy owl's-clover was as a subspecies of field owl's-clover (*Castilleja campestris*). Thus, the scientific name currently assigned to fleshy owl's-clover is *Castilleja campestris* subspecies *succulenta*, whereas field owl's-clover is *C. campestris* subspecies *campestris* (Chuang and Heckard 1991). Owl's-clovers are members of the figwort or snapdragon family (Scrophulariaceae). Another common name for fleshy owl's-clover is succulent owl's-clover (Skinner and Pavlik 1994).

Life History and Habitat

Fleshy owl's-clover has rather intricate flowers. The corolla consists of two lips. The upper lip is narrow, pointed, and beak-like; whereas the lower lip has three sac-like pouches topped by three tiny upright lobes. Each anther contains two sacs, which differ in size and are offset on the filament. Immediately below the corolla is the calyx, which is the set of sepals. Fleshy owl's-clover has four sepals that are fused at the base, creating the calyx tube. Together, all the flowers plus the bracts comprise the inflorescence.

Fleshy owl's-clover has erect or decumbent stems up to 11.8 inches long. The stems are usually unbranched and without hairs. The leaves at the base of the stem are small and scale-like, whereas those on the upper stem are 0.6 to 1.6 inches long, lance-shaped, not lobed, thick, fleshy, and easily broken. The bracts are green, similar to but shorter than the upper leaves, and longer than the flowers. Overall, the inflorescence may occupy as much as half of the plant's height and be 0.8 to 1.2 inches wide. The flowers are closely spaced within the inflorescence. Within a single flower, the sepals are fused to varying degrees, so the calyx is not symmetrical. The corolla is yellow or orange and 0.4 to 0.6 inch long, with the upper lip slightly longer than the lower. The stigma reaches just to the tip of the upper lip. The lower anther sac is approximately half as long as the upper sac. Seed capsules are 0.20 to 0.28 inch long and contain many dark brown, spindle-shaped seeds (Hoover 1936*a*, Hoover 1937, Hoover 1968, Heckard 1977, Chuang and Heckard 1991, Chuang and Heckard 1993). Fleshy owl's-clover has a diploid chromosome number of 24 (Chuang and Heckard 1993).

The brittle leaves are key characteristics for identification of fleshy owl's-clover. The most similar taxon is field owl's-clover. Field owl's-clover has branched stems; thin, flexible, non-fleshy leaves; larger, lighter-yellow flowers; a stigma that protrudes beyond the upper lip of the flower; a lower anther sac that is no more than one-third the size of the upper; and more rounded seeds. Field owl's-clover occurs farther north than does fleshy owl's-clover (Hoover 1937, Hoover 1968, Heckard 1977). Other *Castilleja* species have lobed leaves and bracts, and the bracts are often colored.

Fleshy owl's-clover is an annual. As with many related species, it is a hemiparasite, meaning that it obtains water and nutrients by forming root grafts with other host plants but manufactures its own food through photosynthesis (Chuang and Heckard 1991). Research on hemiparasitism has focused on related species of *Castilleja*, but not specifically on fleshy owl's-clover. Many different plants can serve as hosts for a single species or even a single individual of *Castilleja*. Seeds do not require the presence of a host to germinate, and form root connections only after reaching the seedling stage. Some seedlings can survive to maturity without attaching to a host's roots, but in general reproduction is enhanced by root connections (Atsatt and Strong 1970).

The conditions necessary for germination of fleshy owl's-clover seeds have not been studied, nor has the timing of seed germination been documented. Flowering occurs in April and May (Skinner and Pavlik 1994). Although many related taxa of *Castilleja* are pollinated by generalist bees (Superfamily Apoidea) (Chuang and Heckard 1991), fleshy owl's-clover is thought to be self-pollinating (Heckard in litt. 1977). Among close relatives that do not require insect pollinators, flower structure and timing of stigma receptivity maximize the chances for self-fertilization and seed set. Even so, insects may transfer some pollen among individual plants and species occurring in the same area. Self-pollinating species of *Castilleja* typically occur as widely scattered individuals, rather than in dense colonies (Atsatt 1970). Fleshy owl's-clover follows this pattern in part, often occurring in many pools within a complex but with fewer than 100 plants per vernal pool. However, fleshy owl's-clover also may occur in large populations within a single vernal pool [California Natural Diversity Data Base (CNDDB) 2000]. Little is known about the demography of fleshy owl's-clover, although occurrence size can fluctuate greatly from year to year. In the few instances where occurrence size was reported for more than 1 year, fluctuations up to two orders of magnitude were noted (CNDDB 2000).

The soil types and series have not been reported for all of the areas and occurrences where fleshy owl's-clover grows. At the proposed University of California-Merced site, 81.4 percent of the individual vernal pools where this taxon was found were in vernal pools on Redding gravelly loam, 9.5 percent were on Corning gravelly sandy loam, 6.4 percent were on Corning gravelly loam, 1.7 percent were on Keyes gravelly loam, 0.7 percent were on Keyes gravelly clay loam, and 0.3 percent were on Pentz loam soil mapping units (EIP Associates 1999*a*).

Occurrences of fleshy owl's-clover have been reported from elevations of 80 feet at the San Joaquin County site to 2,300 feet at Kennedy Table in Madera County (CNDDB 2000). Plants most commonly reported as occurring with fleshy owl's-clover are Fremont's goldfields (*Lasthenia fremontii)* (EIP Associates 1999*a*), downingia, three-colored monkey-flower (*Mimulus tricolor*), vernal pool popcorn flower (*Plagiobothrys stipitatus*), and coyote-thistle (*Eryngium* species) (CNDDB 2000). Other special status plants variously and irregularly grow with fleshy owl's-clover at one to five sites each; these include Colusa grass (*Neostapfia colusana*), San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), hairy Orcutt grass (*Orcuttia pilosa*), Boggs Lake hedge-hyssop (*Gratiola heterosepala*) (EIP Associates 1999*a*, CNDDB 2000), and spiny-sepaled button-celery (*Eryngium spinosepalum*) (EIP Associates 1994).

Historical and Current Distribution

Between 1937 and 1986, fleshy owl's-clover was reported from 33 localities (Hoover 1937, Hoover 1968, CNDDB 2000), all in the Southern Sierra Foothills Vernal Pool Region (Keeler-Wolf *et al.* 1998). Sixteen of those occurrences, including the type locality, were in eastern Merced County. Six occurrences each were in Fresno and Madera counties and five others were in Stanislaus County (CNDDB 2000). Although only 6 of the 33 historical occurrences of fleshy owl's-clover have been visited since they were first reported, the California Natural Diversity Data Base (2000) presumes that 32 of them are extant because no evidence to the contrary has been submitted. One occurrence in Fresno County is considered to be "possibly extirpated" (CNDDB 2000) because the site had been disced when it was last visited in 1981. Since 1990, 18 new localities for fleshy owl's-clover have been discovered; 12 of them have been cataloged as element occurrences by the California Natural Diversity Data Base but the other data have not yet been processed. Among these localities are seven in Fresno County, five in Merced County (one of which is extensive), five in Madera County, and one in northern San Joaquin County (EIP Associates 1994, EIP Associates 1999*a*, CNDDB 2000).

An extensive occurrence of fleshy owl's-clover occurs in the action area of the proposed UC Merced campus and its associated community. Fleshy owl's-clover has been found in 296 vernal pools in the proposed campus and community area, although only 34 percent of the area was surveyed intensively (EIP Associates 1999*a*). Considering the criteria that the California Natural Diversity Data Base uses to define element occurrences, the documented localities in that area are estimated to comprise at least 25 element occurrences (calculated by E. Cypher from maps in EIP Associates 1999*a*). Counting the 44 element occurrences already catalogued (CNDDB 2000), the estimated 25 on the proposed UC Merced site, and assuming that each of the five other uncatalogued localities represent a single element occurrence, 74 occurrences of fleshy owl's-clover are now presumably extant. All but one of these occurrences are in the Southern Sierra Foothills Vernal Pool Region; the San Joaquin County occurrence is in the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al.* 1998).

The primary area of concentration for fleshy owl's-clover is in eastern Merced County, northeast of the city of Merced. In addition to the proposed University of California campus and community, this area includes the Flying M Ranch and adjacent ranch land. At least 45 occurrences (19 catalogued element occurrences, the 25 estimated above, plus 1 additional occurrence that has not been catalogued), or 61 percent of the total known, occur in this area of concentration. A secondary area of concentration is in southern Madera County and northern Fresno County from just west of Highway 41 east to Academy and north to Miller's Corner, with 15 occurrences (20 percent). Two smaller areas of concentration, which include five occurrences (7 percent) each but contain large numbers of plants, are near Cooperstown in Stanislaus County and the "tabletop" mountains near Millerton Lake in Fresno and Madera counties. Scattered occurrences include two (3 percent) at Castle airport northwest of Merced, one (1 percent) near Wildcat Mountain in Fresno County, and the one (1 percent) in San Joaquin County. Large areas of suitable habitat remain unsurveyed, particularly in northern Merced County (EIP Associates 1999*a*) and between the northern Stanislaus County and northern San Joaquin County sites (Stebbins in litt. 2000*b*); thus, additional occurrences are likely to be found if additional targeted botanical surveys are conducted.

Fleshy owl's-clover occurs in Northern Claypan and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995) within annual grassland communities (CNDDB 2000). The species is known from both small and large pools (EIP Associates 1999*a*, Stebbins in litt. 2000*a*). Although not all pools occupied by this taxon have been studied in detail, Stebbins and others (1995) collected data on six occupied pools in Fresno and Madera counties. Some were typical "bowl-like" pools, whereas others were more similar to swales. Approximate pool area ranged from 0.07 to 1.61 acres, depth from 11.8 to 15.0 inches, and pH of the soil underlying the pools from 5.00 to 6.24 (Stebbins *et al.* 1995). This subspecies has been reported from pools with both long and short inundation periods (EIP Associates 1999) and from both shallow and "abnormally deep" vernal pools," but approximate depth of these pools was not given (CNDDB 2000).

Hoover's Spurge (*Chamaesyce hooveri*)

The Service listed Hoover's spurge as a threatened species in 1997 (Service 1997*a*). Hoover's spurge is not listed under the California Endangered Species Act (California Department of Fish and Game 1986). The California Native Plant Society included Hoover's spurge on its first list of rare plants (Powell 1974); currently, Hoover's spurge is on the California Native Plant Society's List 1B and is considered to be "endangered in a portion of its range" and "fairly endangered in California" (Skinner and Pavlik 1994, Tibor 2001).

Hoover's spurge was originally named *Euphorbia hooveri* based on a specimen collected by Hoover in Yettem, Tulare County (Wheeler 1941). At that time, the genus *Euphorbia* was viewed as comprising several subgenera, including *Chamaesyce* and *Euphorbia*.

Webster (1975) subsequently elevated the subgenus *Chamaesyce* to the rank of genus based on growth patterns and physiology. The currently-accepted scientific name, *Chamaesyce hooveri,* was validated when Koutnik (1985) published the new combination. Hoover's spurge is a member of the spurge family (Euphorbiaceae).

Hoover's spurge trails along the ground, forming gray-green mats 2.0 to 39.4 inches in diameter (Broyles 1987, Stone *et al.* 1988). The stems are hairless and contain milky sap. The tiny 0.08-0.20 inch leaves are opposite, rounded to kidney-shaped, with an asymmetric base and a toothed margin. In the genus *Chamaesyce*, the structures that appear to be flowers actually are groups of flowers; each group is referred to as a cyathium. The cyathium in Hoover's spurge consists of a tiny, cup-like structure 0.08 inch in diameter containing five clusters of male flowers and a single female flower. None of the flowers have petals, but white appendages on the edge of the cup resemble petals. Each appendage is divided into three to five finger-like projections approximately 0.04 inch long. The appendages are attached to four reddish glands situated along the margin of the cup. The tiny, white seeds are contained in a spherical capsule 0.08 inch in diameter on a stalk that hangs over the edge of the cup. One cyathium is located between each pair of leaves (Wheeler 1941, Munz and Keck 1959, Koutnik 1993).

Several other species of *Chamaesyce* have similar ranges to Hoover's spurge and may occur in the same habitats. Contura Creek sandmat or Yerba golondrina *(C. ocellata* ssp. *ocellata)* is yellowish-green, has untoothed leaves, and lacks appendages on the glands. Stony Creek spurge or Rattan's sandmat (*C. ocellata* ssp. *rattani*i) has hairy stems and leaves and the gland appendages are entire. Thyme-leaved spurge (*C. serpyllifolia*) also has entire appendages and further differs from Hoover's spurge in microscopic characters of the female flower (Wheeler 1941, Munz and Keck 1959, Koutnik 1993).

Life History and Habitat

Hoover's spurge is a summer annual, but few details of its life history are known. Seeds of Hoover's spurge germinate after water evaporates from the pools; the plants cannot grow in standing water (Alexander and Schlising 1997). The indeterminate growth pattern allows the plants to continue growing as long as sufficient moisture is available. The proportion of seedlings surviving to reproduction has not been documented; in years of below-normal rainfall, seedling survival was characterized as "low" (Stone *et al.* 1988). Phenology varies among years and among sites, even for those populations in close proximity (Stone *et al.* 1988). Populations in Merced and Tulare counties typically flower from late May through July, whereas those in Stanislaus County and the Sacramento Valley flower from mid-June into October (Alexander and Schlising 1997, Silveira in litt. 2000, CNDDB 2001). Seed set apparently begins soon after flowering. Seed production has not been quantified or studied in relation to environmental factors, but Stone *et al.* (1988) reported that large plants may produce several hundred seeds.

Horned larks (*Eremophila alpestris*) have been observed eating seeds of Hoover's spurge and may assist in seed dispersal (Alexander and Schlising 1997).

Demographic data suggest that seeds of Hoover's spurge can remain dormant until the appropriate temperature and moisture conditions occur. This is evident from the fact that plants can be absent from a given pool for up to four years and then reappear in substantial numbers (Table 3). Although certain years appear to be more favorable for Hoover's spurge than others, occurrence trends vary from pool to pool, even within the same year in the same area (Table 3). Moreover, a particular year may be favorable for Hoover's spurge at one site and unfavorable at another. For example, Hoover's spurge was extremely abundant on the Vina Plains Preserve in 1995 (Table 4), but reached a 7-year low at Sacramento National Wildlife Refuge that year (Table 3). Five occurrences of Hoover's spurge have numbered 5,000 or more plants at their maximum size. Four of those five occur on the Vina Plains, and the other occurs in Tulare County (Stone *et al.* 1988, CNDDB 2001). In a 1995 study of occurrence characteristics on the Vina Plains Preserve, Alexander and Schlising (1997) found that among the four pools where Hoover's spurge grew, density ranged from 0.1 to 6 plants per 0.01 to 0.56 per square foot and frequency ranged from 0.6 to 14.1 percent. Patterns of distribution varied among the pools, from scattered plants to clumps to a "ring" of plants (Alexander and Schlising 1997).

Hoover's spurge probably is pollinated by insects. Related species in the spurge family are pollinated by flies (Heywood 1978 cited in Stone *et al.* 1988). Also, the glands on the cyathium produce nectar (Wheeler 1941), which is attractive to insects. Beetles, flies, bees and wasps, and butterflies and moths (order Lepidoptera) have been observed visiting the flowers of Hoover's spurge and may potentially serve as pollinators (Stone *et al.* 1988, Alexander and Schlising 1997). Related species in the genus *Euphorbia* typically are cross-pollinated because the female flowers on each plant mature before the male (Heywood 1978 in Stone *et al.* 1988), which may or may not be the case for Hoover's spurge.

The type of photosynthesis found in *Chamaesyce* species, known as C_4 photosynthesis, differs from that of most plants, including *Euphorbia* species (Welkie and Caldwell 1970). This mechanism for capturing energy from sunlight is an adaptation to growth in hot, sunny, dry environments (Salisbury and Ross 1978).

Hoover's spurge is restricted to vernal pools (Stone *et al.* 1988, Koutnik 1993, Skinner and Pavlik 1994). Natural pools in which it occurs are classified as Northern Hardpan and Northern Claypan vernal pools (Sawyer and Keeler-Wolf 1995). In addition, Hoover's spurge has been reported from several pools that were formed artificially when drainage was blocked in appropriate soil types (CNDDB 2001). The pools supporting this species vary in size from 0.19 ha to 243 hectares (0.47 to 600 acres), with a median area of 1.43 acres (Stone *et al.* 1988). Many occurrences consist of multiple pools that

vary in area and in depth, yet not all pools at a site support Hoover's spurge. Deeper pools apparently provide better habitat for this species because the duration of inundation is longer. This species may occur along the margins or in the deepest portions of the dried pool bed (Stone *et al*. 1988, Alexander and Schlising 1997). A particularly important feature of Hoover's spurge microhabitat, at least in the deeper pools (Stebbins in litt. 2000*a*), is that it is nearly devoid of other vegetation, and thus competition from other plants is reduced (Stone *et al*. 1988).

Vernal pools supporting Hoover's spurge occur mostly on alluvial fans or terraces of ancient rivers or streams, with a few on the rim of the Central Valley basin. Hoover's spurge is found on a wide variety of soils, which range in texture from clay to sandy loam. Soil series from which it has been reported include Anita, Laniger, Lewis, Madera, Meikle, Riz, Tuscan, Whitney, Willows. All of these soils may not be equally suitable for this species, however. For example, in one Vina Plains pool, Hoover's spurge grew primarily in the portion that was underlain by Tuscan loam and was nearly absent from the portion underlain by Anita clay (Alexander and Schlising 1997).

In the Northeastern Sacramento Valley Vernal Pool Region, occupied pools are on acidic soils over iron-silica cemented hardpan. Most pools supporting Hoover's spurge in the San Joaquin Valley, Solano-Colusa, and Southern Sierra Foothills vernal pool regions are on neutral to saline-alkaline soils over lime-silica cemented hardpan or claypan (Broyles 1987, Stone *et al*. 1988, Sawyer and Keeler-Wolf 1995, CNDDB 2001). Occurrences of Hoover's spurge have been reported from elevations ranging from 85 feet in Glenn County to 420 feet in Tehama County (CNDDB 2001).

Table 3. Distribution and abundance of Hoover's spurge at Sacramento National Wildlife Refuge, Glenn and Colusa Counties. Data courtesy of Joseph Silveira, Sacramento National Wildlife Refuge Complex, Willows, CA.

Pool Code	Number of plants							
	1992	1993	1994	1995	1996	1997	1998	1999
TAB – 1	1,000	1,000	900	50	400	100	400	400
TAB – 3	—[1]	110	0	0	0	0	0	0
TAB – 4	—	200	30	0	0	0	0	0
TAB – 5	—	150	0	0	0	0	75	300
TAB – 6	—	—	—	—	100	400	70	0
TC – 1	400	500	0	0	110	25	0	0
TC – 2	25	160	75	50	65	50	125	50
TC – 3	25	100	40	0	30	100	80	150
TC – 4	—	—	—	—	—	—	140	0
P1.1 – 1	500	250	1	0	0	200	300	200
T18 – 2	—	100	40	0	0	0	0	0
Total	≥1,950	≥2,570	≥1,086	≥100	≥705	≥875	1,190	1,100

[1] Occurrence not yet discovered.

Table 4. Distribution and abundance of Hoover's spurge at Vina Plains Preserve, Tehama County. Primary data reproduced from Alexander and Schlising (1997) with permission.

Pool Code	Number of plants					
	1983	1986	1990	1992	1994	1995
1	2,000-3,000	> 10,000[1]	—[2]	—	—	183,400
17	2,000-3,000	>1,000[1]	—	—	—	3,900
22	6	<50[1]	—	—	—	0
34	1,500	>1,000[1]	2,312	16	—	5,600
35	2,000-3,000	>1,000[1]	—	—	—	2,000
36	25	0[1]	—	—	1	1
Total	7,531-10,531	>13,050	≥2,312	≥16	≥1	194,900

[1] Stone *et al*. (1988).
[2] Data not available.

Throughout its range, two of the most frequent associates of Hoover's spurge are the rare vernal pool grasses Greene's tuctoria (*Tuctoria greenei*) and hairy Orcutt grass, at 12 and 10 occurrences, respectively. In four of these cases, all three species grow in the same pool (Alexander and Schlising 1997, CNDDB 2001). However, Hoover's spurge tends to grow in different portions of the pools than these federally listed grasses (Stone *et al*. 1988, Alexander and Schlising 1997). Other plants featured in this recovery plan that grow with Hoover's spurge at one to four sites are (in descending order of frequency) vernal pool smallscale (*Atriplex persistens*), spiny-sepaled button-celery, Colusa grass, San Joaquin Valley Orcutt grass, Ferris' milk-vetch (A*stragalus tener* var. *ferrisiae*), and Boggs lake hedge-hyssop (Oswald and Silveira 1995, Alexander and Schlising 1997, CNDDB 2001). In the Vina Plains, other common associates of Hoover's spurge are hairy pepperwort or water shamrock (*Marsilea vestita*), common coyote-thistle or Great Valley eryngo (*Eryngium castrense*), field bindweed (*Convolvulus arvensis*), and white tumbleweed or prostrate pigweed (*Amaranthus albus*) (Alexander and Schlising 1997). In Glenn, Merced, and Tulare counties, spreading alkaliweed (*Cressa truxillensis*), inland saltgrass (*Distichlis spicata*), alkali seaheath or frankenia (*Frankenia salina*), Great Valley gumweed (*Grindelia camporum*), and other plants tolerant of saline-alkali soils are typical associates of Hoover's spurge (Stone *et al*. 1988, Silveira in litt. 2000, CNDDB 2001).

Historical and Current Distribution

For decades, Hoover's spurge was known from only three localities: near Yettem and Visalia in Tulare County, and near Vina in Tehama County. Collections were made from these three areas in the late 1930's and early 1940's (Wheeler 1941, Munz and Keck 1959, Stone *et al.* 1988). From 1974 through 1987, 21 additional occurrences of Hoover's spurge were reported. The majority of these (15) were in Tehama County. One to three occurrences were discovered during this period in each of Butte, Merced, Stanislaus, and Tulare counties (Stone *et al.* 1988, CNDDB 2001). The historical localities for this species were in the Northeastern Sacramento Valley, San Joaquin Valley, Solano-Colusa, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al.* 1998).

The California Natural Diversity Data Base (2001) now includes 30 occurrences of Hoover's spurge. In addition to those known historically, six occurrences were discovered in 1992 (three each in Glenn and Tulare counties). Of the 30 occurrences, one each in Tehama and Tulare counties are classified as extirpated; two others, in Butte and Tehama counties, are "possibly extirpated" because this species was not observed for 2 consecutive years (Stone *et al.* 1988, CNDDB 2001). Of the 26 occurrences presumed to be extant, only 12 have been observed within the past decade (CNDDB 2001).

The main area of concentration for Hoover's spurge is within the Northeastern Sacramento Valley Vernal Pool Region. The Vina Plains of Tehama and Butte counties contains 14 (53.8 percent) of the 26 extant occurrences for Hoover's spurge (CNDDB 2001) in an area approximately 35 square miles in extent (Stone *et al.* 1988). One other site in the same region is near Chico in Butte County. Seven of the extant occurrences are in Southern Sierra Foothills Vernal Pool Region, including five in the Visalia-Yettem area of Tulare County and two in the Hickman-La Grange area of Stanislaus County. Three other occurrences are on the Sacramento National Wildlife Refuge in Glenn County, which is in the Solano-Colusa Vernal Pool Region. The one other extant occurrence is on the Bert Crane Ranch in Merced County, which is within the San Joaquin Valley Vernal Pool Region (Keeler-Wolf *et al.* 1998, CNDDB 2001).

Colusa Grass (*Neostapfia colusana*)

The Service (1997*a*) listed Colusa grass as a threatened species in 1997. Colusa grass has been state-listed as endangered since 1979 (California Department of Fish and Game 1991) and has been considered to be rare and endangered by the California Native Plant Society since 1974 (Powell 1974). The California Native Plant Society now includes Colusa grass on List 1B and considers it to be "endangered throughout its range" (Skinner and Pavlik 1994) and "seriously endangered in California" (Tibor 2001). The California Department of Fish and Game considers the status of Colusa grass to be declining (CDFG 2001).

Joseph Burtt-Davy (1898) first described Colusa grass, giving it the Latin name *Stapfia colusana.* He had collected the type specimen near the town of Princeton in Colusa County. Davy soon realized that the name *Stapfia* had already been assigned to a genus of green algae and therefore changed the scientific name of Colusa grass to *Neostapfia colusana* (Davy 1899). Two other taxonomists proposed alternate Latin names for the genus in the same year, but for very different reasons neither is accepted today. *Davyella,* the name proposed by Hackel, was rejected under international rules of plant taxonomy because the legitimate name *Neostapfia* had been published one month earlier (Reeder 1982). The name *Anthochloa colusana* was used for decades after Scribner (1899) published the combination in the mistaken belief that Colusa grass was closely related to South American species of that genus. However, Robert Hoover (1940) evaluated the many differences between *Anthochloa* and *Neostapfia* and concluded that the latter should be considered a distinct genus. Since that time, the accepted name for Colusa grass has been *Neostapfia colusana*. No other species of *Neostapfia* are known (Reeder 1982, Reeder 1993).

Colusa grass is member of the subfamily Chloridoideae in the grass family (Poaceae) and is in the Orcuttieae tribe, which also includes *Orcuttia* and *Tuctoria* (Reeder 1965, Keeley 1998*a*). *Neostapfia* is the most primitive member of the tribe (Keeley 1998*a*).

All members of the Orcuttieae share several characteristics that differ from many other grasses. Most grasses have hollow stems, but the Orcuttieae have stems filled with pith. Another difference is that the Orcuttieae produce two or three different types of leaves during their life cycle, whereas most grasses have a single leaf type throughout their life span. The juvenile leaves of the Orcuttieae, which form underwater, are cylindrical and clustered into a basal rosette. After the water dries, terrestrial leaves form in all species of the tribe; these leaves have flattened blades and are distributed along the stem (Keeley 1998*a*). Orcuttia species have a third type of leaf that is not found in *Neostapfia* or *Tuctoria* (Reeder 1982, Keeley 1998*a*). The terrestrial leaves of the Orcuttieae also differ from other grasses in other respects. Whereas grass leaves typically are differentiated into a narrow, tubular sheath that clasps the stem tightly and a broader blade that projects away from the stem, terrestrial leaves of the Orcuttieae are broad throughout and the lower portion enfolds the stem only loosely. The Orcuttieae also lack a ligule, which is a leaf appendage commonly found in other grasses (Reeder 1965, Reeder1982, Keeley 1998*a*). Another characteristic common to all Orcuttieae is the production of an aromatic exudate, which changes from clear to brown during the growing season (Reeder 1965, Reeder 1982). The exudate most likely helps to repel herbivores (Crampton 1976, Griggs 1981).

The Orcuttieae are similar to other grasses in their flower structure. Grasses do not have petals and sepals like most other flowering plants, so their flowers are inconspicuous. Grass flowers are reduced to florets, which include several stamens (three in the Orcuttieae) and one pistil enclosed in two scales known as the lemma and palea. A

spikelet consists of one or more florets and may have one or two glumes at its base. The grass inflorescence typically includes several to many spikelets, which are attached to a central stem known as the rachis. A grass fruit, which is known as a caryopsis or grain, consists of a single seed fused to the fruit wall. Each floret is capable of producing one grain.

Life History and Habitat

Compared to other members of the Orcuttieae, Colusa grass shows fewer adaptations to existence underwater, indicative of its relatively primitive evolutionary position and the shorter duration of underwater growth (Keeley 1998*a*). The aquatic seedlings of Colusa grass have only one or two juvenile leaves (Keeley 1998*a*). The terrestrial stage consists of multiple stems arising in clumps from a common root system. The stems are decumbent and have a characteristic zigzag growth form (Crampton 1976). Overall stem length ranges from 3.9 to 11.8 inches. The entire plant is pale green when young (Davy 1898) but becomes brownish as the exudate darkens (Reeder 1982, Reeder 1993). Leaf length is 2.0 to 3.9 inches (Hitchcock and Chase 1971). Each stem produces one dense, cylindrical inflorescence that is 0.8 to 3.1 inches long and 0.31 to 0.47 inch broad. Within the inflorescence, the spikelets are densely packed in a spiral arrangement; the tip of the rachis projects beyond the spikelets. Each spikelet typically contains five florets but does not have glumes. The fan-shaped lemmas are approximately 0.20 inch long. The pollen grains are 0.10 inch long and are coated with exudate. Colusa grass has a diploid chromosome number of 40 (Reeder 1982, Reeder 1993).

Unlike terrestrial grasses, Colusa grass has pith-filled stems, lacks distinct leaf sheaths and ligules, and produces exudate. Colusa grass differs from other members of the Orcuttieae in that it has zigzag stems, cylindrical inflorescences, and fan-shaped lemmas and lacks glumes, whereas the other genera within the tribe have fairly straight stems and possess glumes. Additionally, *Orcuttia* species have distichous spikelets and narrow, 5-toothed lemmas, and *Tuctoria* species have spikelets arranged in a loose spiral, and narrow, more-or-less entire lemmas. Colusa grass is not likely to be confused with *Anthochloa*, despite their former taxonomic affiliation. The latter does not occur in North America, is perennial, does not have glands, the inflorescence is not cylindrical, and the spikelets have glumes (Hoover 1940).

Many life-history characteristics are common to all members of the Orcuttieae. These characteristics include their annual nature and all exhibit C_4 photosynthesis (Downton 1975, Griggs 1981, Keeley 1998*a*). All are wind-pollinated, but pollen probably is not carried long distances between populations (Griggs 1980, Griggs and Jain 1983). Local seed (i.e., caryopsis) dispersal is by water, which breaks up the inflorescences (Reeder 1965, Crampton 1976, Griggs 1980, Griggs 1981). Long-distance dispersal is unlikely (Service 1985), but seed may have been carried occasionally by waterfowl (family Anatidae), tule elk (*Cervus elaphus nannoides*), or pronghorn (*Antilocapra americana*)

in historical times (Griggs 1980). The seeds can remain dormant for an undetermined length of time, but at least for 3 or 4 years, and germinate underwater after they have been immersed for prolonged periods (Crampton 1976, Griggs 1980, Keeley 1998*a*). Unlike typical terrestrial grasses that grow in the uplands surrounding vernal pools, members of the Orcuttieae flower during the summer months (Keeley 1998*a*).

Among all members of the Oructtiaeae, the soil seed bank may be 50 times or more larger than the occurrence in any given year. In general, years of above-average rainfall promote larger populations of Orcuttieae, but occurrence responses vary by pool and by species (Griggs 1980, Griggs and Jain 1983). Occurrence sizes have been observed to vary by one to four orders of magnitude among successive years and to return to previous levels even after 3 to 5 consecutive years when no mature plants were present (Griggs 1980, Griggs and Jain 1983, Holland 1987). Thus, many years of observation are necessary to determine whether an occurrence is stable or declining.

All members of the Orcuttieae are endemic to vernal pools. Although the various species within the tribe have been found in pools ranging widely in size, the vast majority occur in pools of 0.025 acres to 24.7 acres (Stone *et al.* 1988). Large pools such as these retain water until May or June, creating optimal conditions for Orcuttieae (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983). Within the pools, Orcuttieae occur in patches that are essentially devoid of other plant species (Crampton 1959, Crampton 1976). Typically, plants near the center of a pool grow larger and produce more spikelets than those near the margins, but patterns vary depending on individual pool characteristics and seasonal weather conditions (Griggs 1980).

In an experiment where Colusa grass was grown along with Greene's tuctoria and two species of *Orcuttia* (Keeley 1998*a*), seeds of Colusa grass took approximately 3 months to germinate following inundation, longer than all other species. Unlike *Orcuttia* species, Colusa grass does not produce flattened, floating juvenile leaves (Reeder 1982, Keeley 1998*a*). Germination and seedling development have not been studied in the wild but are assumed to be similar to those of *Tuctoria* species, which have similar seedlings. Thus, Colusa grass seed would be expected to germinate in late spring when little standing water remains in the pool, and flowering would begin approximately 3 to 4 weeks later, as observed for *Tuctoria* (Griggs 1980). Flowering individuals of Colusa grass have been collected as early as May throughout the range of the species (CNDDB 2000). Colusa grass spikelets break between the florets (Reeder 1993), shattering as soon as the inflorescence matures (Crampton 1976).

Reproductive and survival rates have not been reported, but annual monitoring confirms that occurrence sizes of Colusa grass vary widely from year to year. Over a 6-year monitoring period, the occurrence at the Bert Crane Ranch in Merced County dropped from 250 individual plants in 1987 to zero in 1989 and 1990 but rebounded to over 2,000 plants in 1992 (Silveira in litt. 2000). At Olcott Lake in Solano County, the lowest

occurrence of the decade was 1,000 plants in 1994 yet was followed by a high of over 1 million plants the following year (CNDDB 2000).

Colusa grass has the broadest ecological range among the Orcuttieae. The species is often found in vernal pools on the rim of alkaline basins in the Sacramento and San Joaquin valleys, as well as on acidic soils of alluvial fans and stream terraces along the eastern margin of the San Joaquin Valley and into the adjacent grassland foothills (Stone *et al.* 1988). Elevations range from 18 feet to approximately 350 feet at known sites (CNDDB 2000). Colusa grass has been found in Northern Claypan and Northern Hardpan vernal pool types (Sawyer and Keeler-Wolf 1995) within rolling grasslands (Crampton 1959). The species grows in vernal pools ranging from 0.02 to 617.5 acres, with a median size of 0.5 acre, and also occurs in the beds of intermittent streams and in artificial ponds (Stone *et al.* 1988, EIP Associates 1999*a*). This species typically grows in the deepest portion of a vernal pool or stream bed (Crampton 1959, Stone *et al.* 1988) but also may occur on the margins (Hoover 1937, Stone *et al.* 1988). Deeper pools and stock ponds are most likely to provide the long inundation period required for germination (EIP Associates 1999*a*).

Several soil series are represented throughout the range of Colusa grass. Solano and Yolo county sites have soils in the Pescadero series, whereas those in central Merced County have soils in the Landlow and Lewis series (Silveira in litt. 2000). The eastern Merced County and Stanislaus County sites include the Bear Creek, Corning, Greenfield, Keyes, Meikle, Pentz, Peters, Raynor, Redding, and Whitney series (Stone *et al.* 1988, EIP Associates 1999*a*, CNDDB 2000). The type and composition of impermeable layers underlying occupied vernal pools also vary, ranging from claypan in the Sacramento Valley to lime-silica cemented hardpan in the San Joaquin Valley basins, to iron-silica cemented hardpan in the Sierran foothills. Tuffaceous alluvium underlies some eastern San Joaquin Valley pools and intermittent streams where Colusa grass grows (Stone *et al.* 1988).

Colusa grass usually grows in single-species stands within vernal pools, rather than intermixed with other plants. Thus, associated species in this case are plants that occur in different zones of the same pools but are present in the same season. For example, Crampton (1959) observed that Colusa grass dominated pool beds, with hairy Orcutt grass forming a band around the upper edge of the stand. In saline-alkaline sites, common associates of Colusa grass are frankenia and saltgrass, whereas on acidic sites associates include coyote-thistle, turkey mullein (*Eremocarpus setigerus*), and vernal pool popcorn flower (Stone *et al.* 1988, EIP Associates 1999*a*). Other Federally listed plants grow in the same vernal pools as Colusa grass. Among these species, the most frequent associate is San Joaquin Valley Orcutt grass (seven co-occurrences), followed by hairy Orcutt grass (four), Solano grass (three), and Hoover's spurge (Stone *et al.* 1988, EIP Associates 1999*a*, CNDDB 2000, Silveira in litt. 2000). Greene's tuctoria

formerly grew in one vernal pool with Colusa grass, but the former species no longer occurs there (Stone *et al*. 1988, CNDDB 2000).

Historical and Current Distribution

In the 50 years after its initial discovery (Davy 1898), Colusa grass was reported from only three sites other than the type locality; these were in Merced and Stanislaus counties. By the mid-1970's Colusa grass had been reported from a total of 11 sites in Colusa, Merced, Solano, and Stanislaus counties (Hoover 1936*b*, Hoover 1940, Crampton 1959, Medeiros 1976, Reeder 1982). During the 1980's, many new populations of Colusa grass were located during extensive surveys. As of 1989, 40 occurrences were extant and 11 already had been extirpated. Of the 51 occurrences known up to that point, 26 were in Merced County, 22 were in Stanislaus County, 2 were in Solano County, and 1 was in Colusa County (Stone *et al*. 1988, CNDDB 2000). These occurrences were in the San Joaquin Valley, Solano-Colusa, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998).

Although fewer than one-quarter of the historical occurrences have been visited within the past decade, their status is presumed to be the same as on the last visit (CNDDB 2000). Currently, the California Natural Diversity Data Base (2000) considers 44 occurrences of Colusa grass to be "presumed extant" and 11 others as known or possibly extirpated. However, two of the element occurrences in the California Natural Diversity Data Base (numbers 53 and 60) actually represent an identical site, and thus 43 occurrences would be presumed extant. The tally of extant occurrences includes two in Yolo County that were discovered during the 1990's but does not include the six occupied pools in Merced County that were discovered during 1999 (EIP Associates 1999*a*). The Merced latter sites likely will qualify as at least five separate element occurrences when they are processed by the California Natural Diversity Data Base (calculated by E. Cypher from data in EIP Associates 1999*a*). Thus, the following discussion is based on an estimated 48 extant occurrences (43 unique from the California Natural Diversity Data Base plus 5 that have not yet been processed).

The extant occurrences of Colusa grass occur primarily in the Southern Sierra Foothills Vernal Pool Region, where they are concentrated northeast of the city of Merced in Merced County (24 occurrences) and east of Hickman in Stanislaus County (16 occurrences). Of the remaining eight extant occurrences, four are in central Merced County, representing the San Joaquin Valley Vernal Pool Region. The others are in the Solano-Colusa Vernal Pool Region, with two each in southeastern Yolo and central Solano counties (Stone *et al* 1988, Keeler-Wolf *et al*. 1998, CNDDB 2000). This species has been extirpated from Colusa County (CNDDB 2000).

San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)

San Joaquin Valley Orcutt grass was federally listed as a threatened species in 1997 (Service 1997*a*). The California State Fish and Game Commission listed San Joaquin Valley Orcutt grass as endangered in 1979 (California Department of Fish and Game 1991). The California Native Plant Society has considered this species to be rare and endangered for even longer (Powell 1974). Currently, San Joaquin Valley Orcutt grass is on the California Native Plant Society's List 1B and is rated as "endangered throughout its range" (Skinner and Pavlik 1994) and "seriously endangered in California" (Tibor 2001). California Fish and Game views the status of San Joaquin Valley Orcutt grass as declining due to population and habitat losses and ongoing threats to extant populations which include urbanization, agricultural land conversions, discing, hydrological modifications to vernal pools, and late spring grazing (CDFG 2001).

Robert Hoover (1936*b*) first published the scientific name *Orcuttia inaequalis* for San Joaquin Valley Orcutt grass. A 1935 collection from "Montpellier [sic], Stanislaus County" was cited as the type specimen (Hoover 1936*b*). Robert Hoover (1941) subsequently reduced this taxon to a variety of California Orcutt grass (*Orcuttia californica*), using the combination *O. californica* variety *inaequalis*. Based on differences in morphology, seed size, and chromosome number, Reeder (1980) restored the taxon to species status, and the scientific name *Orcuttia inaequalis* is currently in use (Reeder 1993). San Joaquin Valley Orcutt grass is a member of the grass family, subfamily Chloridoideae, and is in the tribe Orcuttieae (Reeder 1965). The genus *Orcuttia* is the most evolutionarily advanced group within the tribe (Keeley 1998*a*, Boykin in litt. 2000). Alternate common names for this species are San Joaquin Valley Orcuttia (Smith *et al*. 1980) and San Joaquin Orcutt grass (Service 1985).

Characteristics common to all members of the Orcuttieae were described in the Colusa grass species account and will not be repeated here. Species in the genus *Orcuttia* are characterized by an inflorescence consisting of narrow, flattened, distichous spikelets, each of which has two glumes at the base. *Orcuttia* species produce three different types of leaves during their life cycle: a submerged basal rosette of five to eight cylindrical, juvenile leaves; intermediate leaves in which the submerged portion is cylindrical but the upper portion has a flat, floating blade; and terrestrial leaves with a flattened blade and loosely sheathing base, which develop after the pools dry (Keeley 1998*a*).

Mature plants of San Joaquin Valley Orcutt grass grow in tufts of several erect stems, each of which ranges from 2.0 to 11.8 inches in length. The entire plant is grayish-green due to the long hairs on the stem and leaves and produces exudate. Terrestrial leaves are 0.08 to 0.16 inch wide. The oval lemmas are 0.16 to 0.20 inch long and their tips are divided into five teeth approximately 0.08 inch long; the central tooth is longer than the others, hence the name *inaequalis* ("unequal"). Each spikelet is flattened and contains 4 to 30 florets. Both rows of spikelets grow toward one side. The spikelets are crowded near the top one-third of the stem, producing a head-like inflorescence 0.8 to 1.4 inches long. Each caryopsis is 0.05 to 0.06 inch long (Hoover 1941, Crampton 1976, Reeder

1982, Reeder 1993). The seeds averaged 1 x 10^{-5} ounce in one population, although seed weight likely varies among sites (Griggs 1980). San Joaquin Valley Orcutt grass has a diploid chromosome number of 24 (Reeder 1980, Reeder1982).

The pith-filled stems, lack of both leaf sheaths and ligules, and presence of exudate distinguish San Joaquin Valley Orcutt grass (and all members of the Orcuttieae) from grasses in other tribes. The elongate, distichous spikelets with oval lemmas and glumes differentiate *Orcuttia* species from *Neostapfia*, which has a cylindrical head with the spikelets arranged in a spiral, fan-shaped spikelets and lemmas, and no glumes. The unequal lemma teeth in San Joaquin Valley Orcutt grass distinguish it from hairy and slender Orcutt grasses. California Orcutt grass (*Orcuttia californica*) is similar to San Joaquin Valley Orcutt grass but the former does not have a head-like inflorescence, has few hairs on the plant, and grows only near the California-Mexico border. San Joaquin Valley Orcutt grass has shorter lemmas, shorter bristles, and smaller seeds than differs from Sacramento Orcutt grass. Furthermore, each species of *Orcuttia* has a unique chromosome number (Reeder 1982).

Life History and Habitat

Many life-history characteristics for San Joaquin Valley Orcutt grass are common to the entire tribe and have been discussed previously (see Status of the Species for Colusa grass). Certain other aspects of the life history are shared by *Orcuttia* and *Tuctoria* species but not by *Neostapfia*. One of these is the pattern of flowering. The first two flowers on a given plant of San Joaquin Valley Orcutt grass open simultaneously and do not produce pollen until the ovaries are no longer receptive. Thus, if an individual plant is fertilized, it must be with pollen from another separate individual plant. Flowers that open subsequently may receive pollen from the same plant or others (Griggs 1980). *Orcuttia* and *Tuctoria* species are believed to be outcrossers based on estimates of genetic diversity (Griggs 1980, Griggs and Jain 1983). Seed production in *Orcuttia* and *Tuctoria* species can vary two- to three-fold among years (Griggs 1980, Griggs and Jain 1983).

Another suite of life-history characteristics is shared among all Orcutt grasses (*Orcuttia* species) but not other genera in the Orcuttieae. Seeds of *Orcuttia* species germinate underwater in January and February (Griggs 1980, Griggs and Jain 1983, Keeley 1998*a*) after being colonized by aquatic fungi Griggs (1980, 1981). This observation was supported by Keeley's (1988) research, which indicated that fungicide inhibited germination of California Orcutt grass seeds but did not affect Greene's tuctoria seeds. Detailed germination studies have not been conducted on all species, but cold treatment and other forms of stratification promoted germination in California (Keeley 1988), hairy, and slender Orcutt grasses (Griggs 1974 cited in Stone *et al*. 1988) and most likely benefit other *Orcuttia* species as well. In an experimental study of California Orcutt grass (Keeley 1988), seeds germinated equally well in light or dark conditions and could

germinate whether exposed to air or in anaerobic conditions; maximum germination was achieved in anaerobic conditions following cold stratification.

Orcuttia plants grow underwater in vernal pools for 3 months or more and have evolved specific adaptations for aquatic growth (Keeley 1998*a*). Among these adaptations is the formation of the three different leaf types. The well-developed rosette of juvenile leaves is more specialized compared to those in *Neostapfia* or *Tuctoria* species (Keeley 1998*a*). The floating-leaf stage is unique to *Orcuttia* species; these leaves form as water in the pool warms and remain as long as the standing water lasts (Hoover 1941, Griggs 1980, Griggs 1981, Reeder 1982, Keeley 1998*a*). The anatomy of the aquatic leaves (both juvenile and floating types) is unusual in that certain structures typically associated with C_4 photosynthesis are not present, even though C_4 photosynthesis does take place. Aquatic leaves of *Orcuttia* species also lack stomata, even though they are present on the juvenile leaves of both *Neostapfia* and *Tuctoria* (Keeley 1998*a*, 1998*b*).

As soon as the pools dry, normally in June or July, Orcutt grasses begin producing their typical terrestrial leaves (Hoover 1941, Griggs 1980, Griggs 1981, Reeder 1982, Keeley 1998*a*). Inflorescences appear within a few days after the water evaporates. June and July are the peak months of flower production for most species, although flowering may continue into August and September in years of above-normal precipitation (Griggs 1980, Griggs 1981). Late-spring rains may prolong the flowering season (Griggs 1981, Griggs and Jain 1983), but inundation is more likely to kill flowering individuals if enough rainfall occurs and the water ponds long enough. Spikelets break apart and scatter their seeds when autumn rains arrive (Reeder 1965, Crampton 1976, Griggs 1980, Griggs 1981).

Another aspect of ecology that is shared among *Orcuttia* species but has not been found in either *Neostapfia* nor *Tuctoria* is that Orcutt grasses accumulate acid on their leaf surfaces as a by-product of photosynthesis (Keeley 1998*b*). The acid, which is not the same as the aromatic exudate, apparently accumulates in glands on the leaves. The acid is thought to repel insect herbivores and apparently is more effective than the exudate because the individual plants that produce only exudate are more likely to be consumed by insects than those that produce and accumulate acid (Keeley 1998*b*)

Griggs (1980) conducted demographic and genetic studies of one Fresno County occurrence of San Joaquin Valley Orcutt grass during spring 1976. In that year, each plant in the occurrence produced an average of approximately 8 stems, 1,783 florets, and 254 seeds. The floret-to-seed ratio indicated a relatively good rate of pollination. Seedling survival rates were not determined. Annual occurrence estimates indicated that 1976 and 1978 were favorable years for the Fresno County population. Genetic diversity was high, even among plants grown from seeds collected from the same plant; among-population diversity was not evaluated for this species. The enzyme systems of San

Joaquin Valley Orcutt grass were most similar to those of slender Orcutt grass (Griggs 1980, Griggs and Jain 1983).

Typical habitat requirements for all members of the Orcuttieae were described under Colusa grass. San Joaquin Valley Orcutt grass occurs in vernal pools on alluvial fans, high and low stream terraces (Stone *et al*. 1988), and tabletop lava flows (Stebbins *et al*. 1995, CNDDB 2000). This species grows in Northern Claypan, Northern Hardpan, and Northern Basalt Flow vernal pools (Sawyer and Keeler-Wolf 1995) within rolling grassland (Crampton 1959). Occupied pools range in verna pool surface area from 0.05 to 12.1 acres, with a median area of 1.54 acres (Stone *et al*. 1988). San Joaquin Valley Orcutt grass has been reported from elevations of 100 to 2,475 feet; the highest elevation sites are those on the tabletops of Fresno and Madera counties (Stebbins *et al*. 1995, CNDDB 2000).

Soils underlying San Joaquin Valley Orcutt grass vernal pools are acidic and vary in texture from clay to sandy loam. Soil series represented include the Hideaway series on Fresno-Madera County tabletops, and Amador, Cometa, Corning, Greenfield, Madera, Peters, Raynor, San Joaquin, and Redding soil series elsewhere in the range. Underlying layers at historical or extant occurrences included iron-silica cemented hardpan, tuffaceous alluvium, and basaltic rock from ancient volcanic flows (Stone *et al*. 1988, Stebbins *et al*. 1995, EIP Associates 1999*a*, CNDDB 2000).

The plants most commonly associated with San Joaquin Valley Orcutt grass are coyote-thistle, vernal pool popcorn flower, Colusa grass, dwarf woolly-heads (*Psilocarphus brevissimus*), and turkey mullein. Currently, other federally listed vernal pool plant species co-occurs or historically co-occurred with San Joaquin Valley Orcutt grass. In descending order by number of co-occurrences, these are Colusa grass (nine), fleshy owl's-clover (five), hairy Orcutt grass (two), and Hoover's spurge (one) (*EIP Associates 1999a*, CNDDB 2000, Witham in litt. 2000).

Historical and Current Distribution

San Joaquin Valley Orcutt grass always has been restricted to the Southern Sierra Foothills Vernal Pool Region (Keeler-Wolf *et al*. 1998). The earliest collection was made in 1927 from the Fresno-Madera County border near Lanes Bridge (CNDDB 2000). Hoover (1941) mentioned collections from eight sites in Fresno, Madera, Merced, Stanislaus, and Tulare counties. A total of 20 occurrences had been reported by the mid-1970's, all in the same five counties (Crampton 1959, CNDDB 2000); but, none remained as of the late 1970's (Griggs 1980, Griggs and Jain 1983). However, 20 new occurrences were discovered within the following decade, including 16 in Merced County, 3 in Madera County, and 1 in Fresno County (Stone *et al*. 1988, CNDDB 2000).

Since 1990, six additional occurrences of San Joaquin Valley Orcutt grass have been found, including one in Tulare County (EIP Associates 1999*a*, CNDDB 2000, Witham in litt. 2000) and another has been established artificially (Stebbins *et al*. 1995). Of the 47 occurrences of San Joaquin Valley Orcutt grass ever reported, 27 are presumed to be extant; 17 are extirpated and 3 others are possibly extirpated because the habitat has been modified (CNDDB 2000). However, only 12 of the 27 presumed extant occurrences have been revisited within the past decade. Therefore, the most recent status information is not current. This species has been completely extirpated from Stanislaus County but remains in Fresno, Madera, Merced, and Tulare counties (Stone *et al*. 1988, Skinner and Pavlik 1994, CNDDB 2000).

San Joaquin Valley Orcutt grass does not occur outside of the Southern Sierra Foothills Vernal Pool Region (Keeler-Wolf *et al*. 1998). The primary area of occurrence concentration for this species is northeast of Merced in Merced County, with 14 occurrences (52 percent) on the Flying M Ranch and adjacent lands (EIP Associates 1999*a*, CNDDB 2000, Witham in litt. 2000). The Lanes Bridge area of Madera and Fresno counties has the second highest concentration of San Joaquin Valley Orcutt grass, with seven occurrences (26 percent), including the introduced population. The remaining six occurrences include three in the Le Grand area of Merced County, two on the tabletops near the San Joaquin River in Madera and Fresno counties, and one in northwestern Tulare County (Stone *et al*. 1988, Stebbins *et al*. 1995, CNDDB 2000).

Hairy Orcutt Grass (*Orcuttia pilosa*)

The Service listed hairy Orcutt grass as an endangered species in 1997 (Service 1997*a*). Hairy Orcutt grass has been state listed as endangered since 1979 (California Department of Fish and Game 1991) and was identified as rare and endangered by the California Native Plant Society 5 years earlier (Powell 1974). The California Native Plant Society still considers this species to be "endangered throughout its range" and "seriously endangered in California" and includes it on List 1B (Skinner and Pavlik 1994, Tibor 2001). California Department of Fish and Game (2001) considers the status of hairy Orcutt grass to be declining due to habitat losses from development and conversion of vernal pool habitat to agricultural uses.

Robert Hoover (1941) published the scientific name *Orcuttia pilosa* for hairy Orcutt grass, and it has remained unchanged since. He collected the type specimen in Stanislaus County, "12 miles east of Waterford" (Hoover 1941) in 1937. Hoover (1937) initially identified that specimen as *O. tenuis* but later recognized that it represented a new species (Hoover 1941). Hairy Orcutt grass is in the tribe Orcuttieae of the grass family (Reeder 1965). This species also has been known by the common names hairy Orcuttia (Smith *et al*. 1980) and pilose Orcutt grass (Service 1985).

Characteristics shared among all members of the tribe or among species in the genus *Orcuttia* were described in the Colusa grass and San Joaquin Valley Orcutt grass accounts. Hairy Orcutt grass grows in tufts consisting of numerous stems. The stems are decumbent or erect and branch from only the lower nodes. Stems are 2.0 to 7.9 inches long and 0.04 to 0.08 inch in diameter (Stone *et al*. 1988). Almost the entire plant is pilose, giving it a grayish appearance. The terrestrial leaves are 0.12 to 0.24 inch wide. The inflorescence is 2.0 to 3.9 inches long and contains between 8 and 18 flattened spikelets. The spikelets near the tip of the inflorescence are crowded together, whereas those near the base are more widely spaced. Each spikelet consists of 10 to 40 florets and two tiny 0.12 inch glumes. The lemmas are 0.16 to 0.20 inch long, with five teeth of equal size. Each caryopsis is 0.07 to 0.08 inch long (Hoover 1941, Reeder 1982, Reeder 1993) and weighs 0.6 to 3.4 x 10^{-5} ounces (Griggs 1980). Hairy Orcutt grass has a diploid chromosome number of 30 (Reeder 1982).

Hairy Orcutt grass is most likely to be confused with slender Orcutt grass. However, hairy Orcutt grass has broader stems and leaves, branches originating from the lower nodes, smaller spikelets that are crowded near the rachis tip, smaller grains, a later flowering period, and a different chromosome number (Reeder 1982). Other *Orcuttia* species typically have unequal lemma teeth and differ in seed size and chromosome number from *O. pilosa* and *O. tenuis* (Reeder 1982).

Life History and Habitat

The life-history characteristics common to all members of the Orcuttieae were presented under Colusa grass, and others shared by all *Orcuttia* species were described under San Joaquin Valley Orcutt grass.

Griggs (1974 cited in Stone *et al*. 1988) found that stratification followed by temperatures of 59 to 90°F was necessary for seed germination in hairy Orcutt grass. Flowering individuals have been observed as early as mid-April in Madera County (Durgarian 1995). Populations in Glenn County began flowering at the beginning of May 1993. However, heavy rains in late May and early June of that year refilled the five pools that were being monitored, causing 80 percent to 100 percent of the plants to die before they set seed (Table 5). Seed production has not been studied extensively in hairy Orcutt grass, but Griggs and Jain (1983) did note that one individual produced more than 10,000 seeds. Although the predominant pollination agent for all Orcutt grasses is wind, native bees (Halictidae) have been observed visiting the inflorescences of hairy Orcutt grass to gather pollen (Griggs 1974 cited in Stone *et al*. 1988).

Like other vernal pool annuals, the size of hairy Orcutt grass populations fluctuates dramatically from year to year (Tables 5 and 6). Occurrence sizes have varied by as much as four orders of magnitude over time (Griggs 1980, Griggs and Jain 1983, Alexander and Schlising 1997). Two populations that had no visible plants for three successive years

exceeded 10,000 individual plants in the fourth year (Griggs 1980, Griggs and Jain 1983). However, populations that number fewer than 100 plants in even the most favorable years are not likely to persist. The small populations may become established and probably begin with chance dispersal events but never build up enough of a soil seed bank to become established. This phenomenon was noted at the Sacramento National Wildlife Refuge (Table 5), the Vina Plains (Table 6), and an unspecified location where the occurrence consisted of six plants in 1973, dropped to zero the following year, and was considered to be extirpated when no plants reappeared by 1978 (Griggs 1980, Griggs and Jain 1983).

Table 5. Distribution and abundance of hairy Orcutt grass at Sacramento National Wildlife Refuge, Glenn and Colusa Counties. Data courtesy of Joseph Silveira, Sacramento National Wildlife Refuge Complex, Willows, CA.

Pool Location	Number of plants						
	1993[1]	1994	1995	1996	1997	1998[2]	1999
TAB–2	1,000 (200)	2,400	4,000	3,000	3,250	0	1,100
TAB–3	20 (0)	0	0	0	0	0	0
TC–1	3,000 (0)	0	500	50	400	0	0
P1.1–1	1,000 (2)	20	50	30	40	0	10
T18–1	1,000 (0)	120	500	400	0	0	100
T18–3	—[3]	—	—	—	300	0	20
Total	≥6,020 (202)	≥2,540	≥5,050	≥3,480	3,990	0	1,130

[1] Plants fully germinated and began flowering by 5 May; the refuge received approximately 4.5 inches of rain during 26-30 May and 4-6 June, refilling pools and killing most plants. Survivors in parentheses; TAB–2 plants "resprouted".
[2] Except for T18–1, pools remained full into June; plants in T18–1 germinated in early May but died when pool refilled with early June rainfall.
[3] Occurrence not yet discovered.

Table 6. Distribution and abundance of hairy Orcutt grass at Vina Plains Preserve, Tehama County. Primary data reproduced from Alexander and Schlising (1997) with permission.

Pool Code	Number of plants			
	1980	1983	1986	1995
1	300	10,000	>10,000[1]	1,355,800
14	—[2]	2	—	0
17	—	<10,000	>1,000[1]	3,987,900
22	—	<100	—	0
34	—	3,000	~5,000[1]	1,913,400
35	—	5,000-10,000	~5,000[1]	4,205,300
36	—	—	"few"[1]	0
Total	≥300	≥28,102	>21,000	11,462,400

[1] Stone *et al*. (1988).
[2] Data not available.

Densities of hairy Orcutt grass were determined at the Vina Plains Preserve in 1995. Among four pools where this species grew, densities ranged from 4.2 to 44.0 plants per square foot (Alexander and Schlising 1997). The high densities illustrate that although the total occurrence size seems large, the individuals grow in close proximity.

This species is found on high or low stream terraces and alluvial fans (Stone *et al*. 1988). Hairy Orcutt grass occurs in Northern Basalt Flow, Northern Claypan, and Northern Hardpan vernal pools (Sawyer and Keeler-Wolf 1995) within annual grassland (CNDDB 2001). The median size of occupied vernal pool complexes measured in the late 1980's was 4.2 acres, with a range of 0.8 to 617.5 acres (Stone *et al*. 1988). At the Vina Plains, hairy Orcutt grass was found growing only in pools that held water until May, June, or July in 1995, not in those that dried in April (Alexander and Schlising 1997). This species is known from elevations of 85 feet in Glenn County to 405 feet in Madera County (CNDDB 2001).

Hairy Orcutt grass is found on both acidic and saline-alkaline soils, in vernal pool complexes with an iron-silica cemented hardpan or claypan. In the Northeastern Sacramento Valley Vernal Pool Region, pools supporting hairy Orcutt grass occur on the Anita and Tuscan soil series (Stone *et al*. 1988, CNDDB 2001). At one vernal pool in the Vina Plains that spans both Anita clay and Tuscan loam soils, hairy Orcutt grass was found growing primarily on the Anita clay (Alexander and Schlising 1997). In the Solano-Colusa Vernal Pool Region, hairy Orcutt grass occurs in vernal pools on the Willows and Riz soil series (Silveira in litt. 2000), whereas in the Southern Sierra

Foothills Vernal Pool Region it occurs in vernal pools on the Cometa, Greenfield, Hanford, Meikle, and Whitney soil series (Stone *et al*. 1988).

Common associates of hairy Orcutt grass throughout its range include coyote-thistle and vernal pool popcorn flower. Hairy Orcutt grass also co-occurs at numerous sites with other rare plants featured in this recovery plan, including Colusa grass in the San Joaquin Valley and Hoover's spurge and Greene's tuctoria in the Sacramento Valley (Stone *et al*. 1988, Alexander and Schlising 1997, CNDDB 2001). Additional associates in the San Joaquin Valley include vinegar weed (*Trichostema lanceolatum*) and mayweed or stinking chamomile (*Anthemis cotula*) (Stone *et al*. 1988). Hairy Orcutt grass formerly occurred in one pool with San Joaquin Valley Orcutt grass (Crampton 1959), but the habitat has since been converted to almond orchards (CNDDB 2001). In the Vina Plains, other common associates of hairy Orcutt grass are water shamrock, bindweed, and white tumbleweed (Alexander and Schlising 1997). Both hairy Orcutt grass and slender Orcutt grass grow on the Vina Plains but do not occur in the same pools (Stone *et al*. 1988, Alexander and Schlising 1997). At least in 1995, the Vina Plains pools where hairy Orcutt grass grew had few spring-flowering annuals (Alexander and Schlising 1997).

Historical and Current Distribution

Prior to the surveys by Stone *et al*. (1988), hairy Orcutt grass had been reported from 25 sites, primarily in the Northeastern Sacramento Valley and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998). These included eight occurrences each in Tehama and Stanislaus counties, six in Madera County, and two in Merced County (Hoover 1941, Crampton 1959, Reeder 1982, Stone *et al*. 1988, CNDDB 2001). Hairy Orcutt grass also was collected in the Solano-Colusa Vernal Pool Region, Glenn County, in 1937 (CNDDB 2001); the specimen has since been lost but may have been misidentified as California Orcutt grass (Oswald and Silveira 1995, Silveira pers. comm. 1997, Silveira in litt. 2000). During the late 1980's, Stone *et al*. (1988) determined that 12 historical occurrences had been extirpated; but, they and others discovered three additional populations in Madera, Stanislaus, and Tehama counties. One other occurrence from Madera County (Element Occurrence #29) was previously considered to be hairy Orcutt grass and is listed as such in the CNDDB (2001); however, this occurrence since has been identified as San Joaquin Valley Orcutt grass.

Within the past decade, hairy Orcutt grass has been discovered at eight new natural occurrences: five in Glenn County, two in Madera County, and one in Tehama County (CNDDB 2001). Hairy Orcutt grass also has been discovered in another pool at the Vina Plains Preserve in Tehama County (Alexander and Schlising 1997); this pool may represent a separate occurrence or it may be an extension of Element Occurrence 25. In addition, this species has been introduced into a created pool in Madera County (Durgarian 1995, Stebbins *et al*. 1995, CNDDB 2001). Of the 38 element occurrences listed by the California Natural Diversity Data Base (2001), not counting the

misidentified occurrence of San Joaquin Valley Orcutt grass, 23 natural occurrences and the introduced occurrence are presumed to be extant. Nineteen of those occurrences have been confirmed as extant within the past decade (CNDDB 2001).

Currently, the main area of concentration for hairy Orcutt grass (nine extant occurrences) is the Vina Plains in Tehama County, which is in the Northeastern Sacramento Valley Vernal Pool Region. An isolated occurrence in southern Butte County is in the same region. Ten occurrences are in the Southern Sierra Foothills Vernal Pool Region, including seven in Madera County between the city of Madera and Millerton Lake and three in eastern Stanislaus County. All four extant occurrences in the Solano-Colusa Vernal Pool Region are on the Sacramento National Wildlife Refuge in Glenn County. Hairy Orcutt grass apparently has been extirpated from Merced County (Stone *et al.* 1988, Keeler-Wolf *et al.* 1998, CNDDB 2001).

Hartweg's Golden Sunburst (*Pseudobahia bahiifolia*)

The Service (1992) originally proposed endangered status for *Pseudobahia peirsonii.* Information provided during the public comment period convinced the agency that endangered status was not appropriate, and thus this species was federally listed as threatened (Service 1997*a*). The California Fish and Game Commission listed *Pseudobahia peirsonii* as an endangered species in 1987 (California Department of Fish and Game 2001). It is on the California Native Plant Society's List 1B and is considered by that organization to be "seriously endangered" (Tibor 2001). The California Department of Fish and Game (2001) considers the 1999 status of Hartweg's golden sunburst to be declining.

This species has undergone numerous name changes over the past 150 years, primarily because taxonomists had differing points of view regarding the relationship of this genus to other genera in its family (Carlquist 1956). The original name published by George Bentham (1849) was *Monolopia bahiaefolia.* Asa Gray (1865) changed the name to *Lasthenia bahiaefolia*, then reconsidered and returned it to *Monolopia* (Gray 1876); in the latter publication, Gray subdivided the genus into sections and noted that this species belonged in the section *Pseudo-Bahia* of the genus *Monolopia.* The next name proposed for this species was *Eriophyllum bahiaefolium* (Greene 1897). Finally, Rydberg (1915) assigned the name *Pseudobahia bahiaefolia*; he changed the genus name to a single word, rather than the hyphenated *Pseudo-Bahia* that Gray (1876) had used as a section name. Dale Johnson (1978) corrected a minor spelling error so the scientific name would conform with accepted rules of botanical nomenclature (Stebbins 1991), but Rydberg remains the accepted author of the name. Thus, the name that is in use today is *Pseudobahia bahiifolia.*

The type locality for *Pseudobahia bahiifolia* is Cordua's farm at the junction of the Yuba and Feather rivers in Yuba County (Bentham 1849), which is near Marysville (McVaugh

1970). Karl Hartweg had collected the type specimen there in 1847 (Hartweg 1848, Johnson 1978). Both common names for this species, Hartweg's golden sunburst and Hartweg's pseudobahia, commemorate the original collector. The common name Hartweg's golden sunburst is currently preferred because it does not incorporate the scientific name of the genus (Stebbins 1991).

Pseudobahia bahiifolia is one of three species in the genus, all of which are restricted to California (Johnson 1993). The others are *P. heermannii* and *P. peirsonii* (San Joaquin adobe sunburst). The genus *Pseudobahia* is in the Asteraceae (aster or sunflower family).

Certain features are common to all species in the genus *Pseudobahia.* All are small annual plants that are covered with woolly hairs and have alternate leaves. They have yellow, daisy-like flower heads that are borne singly at the tip of each branch. Each flower head is approximately 1 inch across. The outer, petal-like flowers in these heads are known as ray flowers; they are up to 0.4 inch long and are pistillate. The center of each flower head contains many tiny disk flowers that are no more than 0.12 inch long and are bisexual. Approximately eight greenish phyllaries are partially joined to form a cup-like structure below the ray flowers. Each of the ray and disk flowers produces a flattened, oblong achene that is sparsely covered with tiny hairs and does not have a pappus (Rydberg 1915, Johnson 1993).

Pseudobahia bahiifolia plants range from 2 to 8 inches tall. Their narrow leaves are 0.3 to 1.0 inch long and are either entire or have three small lobes. Each head has between three and eight phyllaries, which are joined for approximately half their length, and the same number of ray flowers as it does phyllaries. The achenes of this species are black and range from 0.06 to 0.10 inch in length. The diploid chromosome number of *Pseudobahia bahiifolia* is 8 (Rydberg 1915, Johnson 1993).

The most similar species to *Pseudobahia bahiifolia* are its close relatives, *P. heermannii* and *P. peirsonii.* Both *P. heermannii* and *P. peirsonii* have *pinnately lobed* leaves, in contrast to the entire or three-lobed leaves of *P. bahiifolia* (Stebbins 1991, Johnson 1993). *Pseudobahia heermannii* plants also are larger than those of *P. bahiifolia* and have reddish stems (Johnson 1978). *Pseudobahia peirsonii* differs further in that its phyllaries are connected only at their bases, rather than being joined approximately halfway as in *P. bahiifolia* (Stebbins 1991, Johnson 1993).

Other genera that are similar in appearance to *Pseudobahia* and occur within its range include *Eriophyllum* (woolly sunflower), *Lasthenia* (goldfields), and *Monolopia* (hillside daisy). The alternate leaves of *Pseudobahia* species differentiate them from the other three genera, in which at least the lowermost leaves are opposite (Stebbins 1991, Johnson 1993, Keil 1993). The flattened achenes and lack of a pappus in *Pseudobahia* species

further differentiate this genus from *Eriophyllum*, which has angled achenes and a pappus of scales in most species (Carlquist 1956, Stebbins 1991, Keil 1993).

Life History and Habitat

The reproduction of *Pseudobahia bahiifolia* has not been studied but is probably similar to that of other spring annuals in the southern Sierra foothills. The seeds probably germinate during the winter months because small plants have been observed in late January and early February. *Pseudobahia bahiifolia* typically flowers in March and April (Johnson 1978, Stebbins 1991, Tibor 2001), but in years with late rains flowering may continue into early May. The seeds probably begin maturing as the flowers in each wither, so seed-set and flowering are essentially concurrent. The achenes do not have any particular adaptations that would indicate dispersal by either wind or animals, so they are probably dispersed by gravity. However, one possible instance of wind dispersal was noted in Madera County, where *Pseudobahia bahiifolia* plants appeared on a mound of stockpiled soil. Either the seeds were carried in by the wind or they were already present in the soil. Pollination ecology and reproductive biology have not been studied.

Population sizes of *Pseudobahia bahiifolia* vary greatly from year to year (Stebbins 1991). For example, periodic monitoring at Element Occurrence 21 revealed that the number of plants varied from 150 in 1987 to 2,000 in 1989 to 800 in 1990 and 2,500 in 1992 (CNDDB 2001). Other annuals with extremely variable occurrence sizes typically have a persistent seed bank that forms in the soil, and the number of growing plants in a given year is influenced by rainfall and temperature patterns.

Judging by the maximum occurrence size ever reported, many of the extant occurrences of *Pseudobahia bahiifolia* seem to be very small. However, several occurrences have only a single occurrence estimate that was obtained in 1990 during a prolonged drought. At their maximum, four occurrences consisted of fewer than 100 plants (Element Occurrences17, 25, 28, and 29), four consisted of between 100 and 500 plants each (Element Occurrences 3, 15, 22, and 23), three (Element Occurrences 18, 21, and 26) had well over 1,000 plants, and the remaining two had unknown occurrence sizes, although one was characterized as "small" (CNDDB 2001).

Pseudobahia bahiifolia primarily grows in grasslands, but it can also occur in the transition zone between grassland and blue oak woodland (Stebbins 1991, CNDDB 2001). The optimal habitat is north- or northeast-facing slopes of small hills or mima mounds among sparse annual grass cover (Stebbins 1991). In mima mound topography, vernal pools often occur in the depressions between the mounds, but *Pseudobahia bahiifolia* is in the uplands, not in the vernal pools themselves. In Stanislaus County, *Pseudobahia bahiifolia* is found almost exclusively on soils of the Amador series, although one site is on Pentz soils. In Fresno and Madera counties the soils are of the Rocklin series, whereas the Merced County site is on a combination of Amador and

Hornitos soils. Soil types are not known for the historical occurrence in Yuba County. Where the soil texture is known, it is loam or sandy loam; several sites in the vicinity of Friant in Madera county are on soils high in pumice content (Stebbins 1991, CNDDB 2001). The lowest known elevation where *Pseudobahia bahiifolia* grew was 50 feet at the extirpated Yuba County locality. Among the extant sites, the lowest elevation is 220 feet in Stanislaus County, with the highest at 460 feet at several sites in Fresno and Madera counties (CNDDB 2001).

The most commonly reported associate of *Pseudobahia bahiifolia* is the nonnative grass *Bromus madritensis* ssp. *rubens*. Other frequent associates are the nonnative forbs *Erodium botrys* (broad-leaved filaree) and *E. cicutarium* (red-stemmed filaree); the native forbs *Lasthenia fremontii* (Fremont's goldfields), *Lepidium nitidum* (shining peppergrass), and *Lupinus bicolor* (miniature lupine); and the nonnative grass *Bromus hordeaceus* (Stebbins 1991, CNDDB 2001).

Historical and Current Distribution

Pseudobahia bahiifolia occurred historically in the central Sacramento Valley, eastern San Joaquin Valley, and in the low foothills to the east of the latter (Stebbins 1989). During the nineteenth century, *Pseudobahia bahiifolia* was reported from two sites: the type locality in Yuba County and north of the town of Snelling in Stanislaus County, where it was collected in 1894 (Stebbins 1991). By the year 2000, a total of 20 occurrences had been reported, including 11 in Stanislaus County, 4 in Fresno County, 3 in Madera County, 1 in Merced County, and 1 (the type locality) in Yuba County (CNDDB 2001). The approximate extent of the range was 200 miles. *Pseudobahia bahiifolia* probably occurred in the counties between Stanislaus and Yuba historically but was not officially documented before being extirpated (Stebbins 1991). New occurrences were still being discovered as of 2000, when the one in Merced County was found (CNDDB 2001).

Of the 20 *Pseudobahia bahiifolia* occurrences documented historically, 13 are presumed to be extant and 4 are known to be extirpated (CNDDB 2001). Some suitable habitat remains in the vicinity of the other three occurrences but *Pseudobahia bahiifolia* plants have not been found at those sites for many years and probably are extirpated. Of the 13 occurrences that are presumed to be extant, most (6) are in Stanislaus County, followed by Fresno County with 4, Madera County with 2, and Merced County with 1 (CNDDB 2001). The species has been extirpated from Yuba County (Element Occurrence 10). The other occurrences that are known or presumed to be extirpated included five (Element Occurrences 5, 6, 7, 8, and 11) in Stanislaus County and one (Element Occurrence 1) in Madera County (CNDDB 2001). Thus, the current extent of the range is approximately 95 miles, a 52.5 percent reduction from the historical extent, although only 35 percent of the known occurrences may have been extirpated.

The main areas of concentration for *Pseudobahia bahiifolia* are near Friant, where six extant occurrences are clustered on either side of the San Joaquin River in Fresno and Madera counties, and near Cooperstown in Stanislaus County, with six occurrences. These two areas incorporate over 99 percent of the individual plants that have been counted in the past decade (CNDDB 2001). Only 1 of the 13 extant occurrences of *Pseudobahia bahiifolia* is in public or conservation ownership. Element Occurrence 21 near Friant Dam in Fresno County is partially owned by the U.S. Bureau of Reclamation (Faubion pers. comm. 2001), and another part is under a conservation easement held by the Sierra Foothill Conservancy. In 1990, the protected area contained approximately 500 plants of the 800 total in the occurrence (Stebbins 1991).

Eleven of the extant *Pseudobahia bahiifolia* occurrences are in the Great Valley Section of California, including seven in the Camanche Terraces Subsection (Element Occurrences 3, 15, 17, 18, 27, 28, and 29) and four (Element Occurrences 21, 22, 23, and 24) in the Hardpan Terraces Subsection of the Great Valley Section. The other two extant occurrences (Element Occurrences 25 and 26) are in the Lower Granitic Foothills Subsection of the Sierra Nevada Foothills Section. All but one of the occurrences known or presumed to be extirpated was in the Camanche Terraces Subsection of the Great Valley Section; the other (Element Occurrence 1) was in the Hardpan Terraces Subsection of the Great Valley Section (U.S. Department of Agriculture 1994).

Greene's Tuctoria (*Tuctoria greenei*)

The Service listed Greene's tuctoria as federally endangered in 1997 (Service 1997*a*). California listed Greene's tuctoria as rare in 1979 (California Department of Fish and Game 1991), and the California Native Plant Society had recognized it as rare and endangered even earlier (Powell 1974). Currently, the California Native Plant Society includes Greene's tuctoria on List 1B and ranks it as "endangered throughout its range" (Skinner and Pavlik 1994) and "seriously endangered in California" (Tibor 2001). The California Department of Fish and Game considered the status of Greene's Orcutt grass is declining (California Department of Fish and Game 2001).

George Vasey (1891) originally assigned the name *Orcuttia greenei* to this species. Edward Greene had collected the type specimen in 1890 "on moist plains of the upper Sacramento, near Chico, California" (Vasey 1891), presumably in Butte County (Hoover 1941, Crampton 1959). Citing differences in lemma morphology, arrangement of the spikelets, and other differences, John Reeder (1982) segregated the genus *Tuctoria* from *Orcuttia* and created the new scientific name *Tuctoria greenei* for this species. Subsequent research suggests that *Tuctoria* is intermediate in evolutionary position between the primitive genus *Neostapfia* and the advanced genus *Orcuttia* (Keeley 1998*a*, Boykin in litt. 2000). The genus *Tuctoria* is in the grass family, subfamily Chloridoideae, and is a member of the Orcuttieae tribe, which also includes *Neostapfia* and *Orcuttia* (Reeder 1965, Keeley 1998*a*). A wide variety of common names have been used for this

species, including Chico grass (Scribner 1899), awnless Orcutt grass (Abrams 1940), Greene's Orcuttia (Smith *et al*. 1980), and Greene's Orcutt grass (California Department of Fish and Game 1991, Service 1985*)*.

The basic characteristics pertaining to all members of the Orcuttieae were described in the Colusa grass account. The genus *Tuctoria* is characterized by flattened spikelets similar to those of *Orcuttia* species except that the spikelets of *Tuctoria* grow in a spiral, as opposed to a distichous, arrangement. *Tuctoria* species have short-toothed, narrow lemmas. The juvenile and terrestrial leaves of *Tuctoria* are similar to those of *Orcuttia* but *Tuctoria* does not produce the floating type of intermediate leaves (Reeder 1982, Keeley 1998*a*). *Tuctoria* is intermediate in the degree of aquatic specialization between *Neostapfia* and *Orcuttia* (Keeley 1998*a*).

Greene's tuctoria grows in tufts of several stems, which are erect or decumbent and break easily at the base. The entire plant tends to be pilose but is only slightly viscid. The stems are usually 2.0 to 5.9 inches tall and are not branched. Greene's tuctoria has purplish nodes and leaves no wider than 0.20 inch. The inflorescence can be as much 3.1 inches long; it may be partly hidden by the leaves when young but is held above the leaves at maturity. The inflorescence usually consists of 7 to 15 spikelets but may contain as many as 40. The spikelets are arranged in a spiral, with those in the upper half crowded together and those near the base more widely separated. Each spikelet consists of 5 to 15 florets and two glumes. The lemmas are 0.16 to 0.20 inch long and have squarish tips with 5 to 9 very short teeth; the central tooth is tipped by a very small spine. The roughened seeds are approximately 0.08 inch long (Vasey 1891, Hoover 1941, Griggs 1977, Stone *et al*. 1988, Reeder 1982) and weigh approximately 1.8×10^{-5} ounce (Griggs 1980). Greene's tuctoria has a diploid chromosome number of 24 (Reeder 1982).

Greene's tuctoria is differentiated from Orcutt grasses by the spiral arrangement of spikelets and lack of floating juvenile leaves, from Colusa grass by the shape of the spikelets and the inflorescence, and from both by the shape of the lemmas. Greene's tuctoria can be distinguished from Solano grass by the squarish lemma tip; smaller, roughened seeds; and inflorescence held above the leaves in the former. Both can be told from the remaining *Tuctoria* species by stem length, seed shape, and range. The chromosome number of Greene's tuctoria also differs from the other two species in the genus (Reeder 1982).

Life History and Habitat

The basic life history strategy and habitat requirements of *Tuctoria* species were described under Colusa grass and San Joaquin Valley Orcutt grass and will not be repeated here.

Optimum germination of Greene's tuctoria seed occurs when the seed is exposed to light and anaerobic conditions after stratification (Keeley 1988). Germination occurs approximately months following inundation (Keeley 1998*a*). *Tuctoria* seedlings do not develop floating juvenile leaves, as does *Orcuttia* (Griggs 1980, Keeley 1998*a*). The plants apparently do not tolerate inundation; all five Greene's tuctoria plants in a Glenn County pool died when the pool refilled during late spring rains in 1996 (Silveira pers. comm. 1997). Greene's tuctoria flowers from May to July (Skinner and Pavlik 1994), with peak flowering in June and July (Griggs 1981, Broyles 1987).

As with other vernal pool annuals, occurrence size in Greene's tuctoria can vary enormously from year to year, and populations that have no visible plants one year can reappear in large numbers in later years. Occurrence fluctuations may be due to annual variations in weather, particularly rainfall, to changes in management, or to a combination of the two. Such fluctuations were observed at scattered sites in Butte and Tehama counties during the 1970's (Griggs 1980, Griggs and Jain 1983) and at Sacramento National Wildlife Refuge, where the occurrence in the single occupied pool ranged from zero to 60 plants between 1994 and 1999 (Silveira in litt. 2000). Fluctuations of as much as three orders of magnitude were documented on the Vina Plains Preserve during the 1980's and 1990's (Table 7). The high 1995 occurrence estimates followed a winter of favorable rainfall (Alexander and Schlising 1997) and long period without livestock grazing; cattle grazing on the Vina Plains Preserve was discontinued in the growing season of 1987-1988 and did not resume until the growing season of 1995-1996 (Alexander in litt. 1998).

Table 7. Distribution and abundance of Greene's tuctoria at Vina Plains Preserve, Tehama County. Primary data reproduced from Alexander and Schlising (1997) with permission.

Pool Code	Number of plants				
	1983	1986	1987	1988	1995
14	95	—[1]	>1,000	—	96,400
21	<30,000	>1,000[2]	—	2,000	106,300
22	300	<1,000[2]	—	—	173,200
35	"few hundred"	0[2]	—	—	225,600
36	present	<100[2]	—	—	0
37	present	0[2]	—	—	1,319
Total	>30,395	≥2,000	≥1,000	≥2,000	602,819

[1] Data not available.
[2] Stone *et al*. (1988).

However, populations that decline to zero and then do not reappear under favorable conditions may in fact be extirpated. A Stanislaus County occurrence (Element Occurrence 39) numbered fewer than 100 plants in 1973, dropped to 2 the following year, and remained at zero for the next 3 years (Griggs 1980, Griggs and Jain 1983). The occurrence was not monitored for the following decade. The vernal pool was still intact as of 1986, but Greene's tuctoria was not observed during surveys that year; however, the winter had been drier than average. In 1987, following a winter of favorable rainfall, Greene's tuctoria still was not present even though Colusa grass was found in large numbers (Stone *et al*. 1988). The area had been "rather heavily grazed" in 1987 (Stone *et al*. 1988), but livestock grazing intensity during the 1970's was not known.

In a demographic study conducted during 1977 and 1978 on two populations of Greene's tuctoria from Butte and Tehama counties, 0 to 54 percent of seedlings survived to maturity. Plants that reached flowering stage achieved a density of 7.6 to 12.4 per square foot and averaged 111 seeds per plant (Griggs 1980, Griggs and Jain 1983). In 1995, density of Greene's tuctoria on the Vina Plains Preserve ranged from 7 to 133 plants per 0.7 to 12.4 per square foot (Alexander and Schlising 1997).

A study of genetic partitioning in five species of *Orcuttia* and *Tuctoria* (Griggs 1980, Griggs and Jain 1983) revealed that Greene's tuctoria had the lowest genetic diversity (50 percent) of the species studied. As with the other species, plants originating from the same seed parent accounted for about the same degree of genetic diversity (44 percent) as others within the same occurrence (46 percent). Only 10 percent of the total genetic variability observed in the species was due to between-population differences. This

means that just a few of the same alleles dominated in the populations studied. However, Griggs' genetic study included only two populations from adjacent counties (Butte and Tehama) and did not consider geographically distant occurrences.

Greene's tuctoria has been found in three types of vernal pools: Northern Basalt Flow, Northern Claypan, and Northern Hardpan (Sawyer and Keeler-Wolf 1995) on both low and high terraces (Stone *et al*. 1988). Occupied pools are or were underlain by iron-silica cemented hardpan, tuffaceous alluvium, or claypan (Stone *et al*. 1988). Of pools where the species was known to be extant in 1987, the median size was 1.5 acres, with a range of 0.01 to 8.4 acres (Stone *et al*. 1988). Stone *et al*. (1988) noted that Greene's tuctoria grew in shallower pools than other members of the tribe or on the shallow margins of deeper vernal pools; but, they did not quantify pool depth. At the Vina Plains, Greene's tuctoria grew in pools of "intermediate" size, which dried in April or early May of 1995 (Alexander and Schlising 1997). The Central Valley vernal pools containing Greene's tuctoria are (or were) in grasslands; the Shasta County occurrence is surrounded by pine forest (CNDDB 2001). Occupied pools in the Central Valley are (or were) at elevations of 110 to 440 feet (Stone *et al*. 1988), whereas the Shasta County occurrence is at 3,500 feet (CNDDB 2001).

In the Northeastern Sacramento Valley Vernal Pool Region, Greene's tuctoria grows mostly on Anita clay and Tuscan loam soil series, with one occurrence on Tuscan stony clay loam. Soil types and series are not certain for several other occurrences in this region; one is on either the Rocklin or the San Joaquin series, and the others are unknown. The single occurrence in the Solano-Colusa Vernal Pool Region is on strongly saline-alkaline Willows clay (Silveira in litt. 2000). In the Southern Sierra Foothills Vernal Pool Region, Greene's tuctoria is known to grow on a number of different soil series including Archerdale, Bear Creek, Exeter, Meikle, Ramona, Raynor, Redding, and San Joaquin. Soil types and series have not been determined for occurrences in the other regions.

At the Vina Plains Preserve, frequent associates of Greene's tuctoria are common coyote-thistle and water shamrock (Alexander and Schlising 1997). Elsewhere in the Sacramento Valley and in the San Joaquin Valley, Greene's tuctoria often grows in association with Vasey's coyote-thistle, vernal pool popcorn flower, and foxtail (*Alopecurus saccatus*). The rare and federally listed Hoover's spurge co-occurs with Greene's tuctoria at six sites in the Sacramento Valley. Other rare plants that grow in the same vernal pools with Greene's tuctoria at one or two occurrences are hairy Orcutt grass, slender Orcutt grass, and Boggs Lake hedge-hyssop (Broyles 1987, Stone *et al*. 1988, CNDDB 2001).

Historical and Current Distribution

After its discovery in Butte County in 1890, Greene's tuctoria was not seen again for over 40 years. During extensive surveys in the late 1930's, Robert Hoover (1937, 1941) found the species at 12 sites in Fresno, Madera, Merced, San Joaquin, Stanislaus, Tehama, and Tulare counties. Robert Hoover described the taxon as the most common of all *Orcuttia* species, with which it was classified at the time. By the end of the 1980's, Greene's tuctoria had been reported from a total of 36 occurrences in the same 8 counties (Stone *et al*. 1988, CNDDB 2001). Of these, 21 were in the Southern Sierra Foothills Vernal Pool Region and 15 were in the Northeastern Sacramento Valley Vernal Pool Region.

Three additional occurrences of Greene's tuctoria have been discovered during the past decade, bringing the reported total to 39 occurrences (Oswald and Silveira 1995, CNDDB 2001). However, 19 of the historical occurrences apparently have been extirpated. The other 20 occurrences are presumed to be extant, although 6 of those have not been verified for more than a decade (Alexander and Schlising 1997, CNDDB 2001).

Twelve of the extant occurrences (60 percent) are in the Vina Plains area of Tehama and Butte counties, within the Northeastern Sacramento Valley Vernal Pool Region. Eastern Merced County, in the Southern Sierra Foothills Vernal Pool Region, has six extant occurrences (30 percent). The other two extant occurrence are in Glenn (Oswald and Silveira 1995) and Shasta counties (CNDDB 2001); the former is in the Solano-Colusa Vernal Pool Region, and the latter is in the Modoc Plateau Vernal Pool Region (Keeler-Wolf *et al*. 1998). Greene's tuctoria has been extirpated from Fresno, Madera, San Joaquin, Stanislaus, and Tulare counties (Stone *et al*. 1988, Skinner and Pavlik 1994, CNDDB 2001).

Vernal Pool Crustaceans - Conservancy Fairy Shrimp (*Branchinecta conservatio*), Vernal Pool Fairy Shrimp (*Branchinecta lynchi*), and Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

Conservancy fairy shrimp and vernal pool tadpole shrimp were federally listed as endangered, and vernal pool fairy shrimp were federally listed as threatened under the Act, throughout their range in 1994 (59 **FR** 48153). Conservancy fairy shrimp and vernal pool fairy shrimp are members of the aquatic crustacean order Anostraca. The vernal pool tadpole shrimp is a member of the aquatic crustacean order Notostraca.

Vernal pool fairy shrimp are found only in ephemeral freshwater habitats in California and Southern Oregon and the other two species are found only in ephemeral freshwater habitats in California. These species have all evolved similar adaptations to the unique habitat conditions of their vernal pool habitats. The general appearance and life history characteristics of these three species will be described in combination below. Following this description, information pertinent to each species' biology is provided.

Life History and Habitat of Vernal Pool Crustaceans

Vernal pool fairy shrimp and Conservancy fairy shrimp (fairy shrimp) have delicate elongate bodies, large stalked compound eyes, and 11 pairs of phyllopods, or gilllike structures that also serve as legs. They swim or glide gracefully upside down by means of complex beating movements that pass in a wave-like anterior to posterior direction. Fairy shrimp are filter feeders, and consume algae, bacteria, protozoa, rotifers, and bits of detritus as they move through the water. The second pair of antennae in fairy shrimp adult males are greatly enlarged and specialized for clasping the females during copulation. The females carry eggs in an oval or elongate ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. After fertilization, the eggs are coated with a protective protein layer that allows them to withstand heat, cold, and prolonged dehydration. These dormant eggs are also known as cysts, and they can remain viable in the soil for decades after deposition. When the pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch. The cyst bank in the soil may consist of cysts from several years of breeding. The cysts that hatch may do so within days after the vernal pools fill, and rapidly develop into adults. In pools that persist for several weeks to a few months, fairy shrimp may have multiple hatches during a single season (59 **FR** 48136).

Vernal pool tadpole shrimp have dorsal compound eyes, a large shieldlike carapace (shell) that covers most of their body and a pair of long cercopods or appendages at the end of the last abdominal segment. They are primarily benthic (living on the bottoms of the pools) animals that swim with their legs down. Vernal pool tadpole shrimp climb or scramble over objects, and plow along bottom sediments as they forage for food. Their diet consists of organic detritus and living organisms, such as fairy shrimp and other invertebrates (Fryer 1987). The females deposit eggs on vegetation and other objects on the pool bottom. Like fairy shrimp, vernal pool tadpole shrimp pass the summer months as dormant cysts in the soil. Some of the cysts hatch as the vernal pools are filled with rainwater in the fall and winter of subsequent seasons, while other cysts may remain dormant in the soil for many years. When winter rains refill inhabited pools, tadpole shrimp reestablish from dormant cysts and may become sexually mature within three to four weeks after hatching (Ahl 1991, Helm 1998). Mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991, Gallagher 1996).

Vernal pool crustaceans breathe primarily through their phyllopods. When dissolved oxygen concentrations are low, fairy shrimp can be seen at the water's surface, circulating oxygen. In addition to phyllopods, fairy shrimp exchange oxygen through other surfaces of their body, particularly the thorax and abdomen (Ericksen and Belk 1999). Oxygen is more readily available in cooler water, below 68 degrees Fahrenheit (° F), and oxygen requirements may explain why most species endemic to the Central Valley hatch in the winter and live in cooler water habitats.

The hydrology that maintains the pattern of inundation and drying characteristic of vernal pool habitats is complex. Vernal pool habitats form in depressions above an impervious soil layer (duripan) or rock substrate. After winter rains begin, this impervious layer prevents the downward percolation of water and creates a perched water table causing the depression (or pool) to fill. Due to local topography and geology, the depressions are generally part of an undulating landscape, where soil mounds are interspersed with basins, swales, and drainages (Nikiforoff 1941, Holland and Jain 1978). These features form an interconnected hydrological unit known as a vernal pool complex. Although vernal pool hydrology is driven by the input of precipitation, water input to vernal pool basins also occurs from surface and subsurface flow from the swale and upland portions of the complex (Zedler 1987, Hanes *et al.* 1990, Hanes and Stromberg 1998). Surface flow through the swale portion of the complex allows vernal pool species to move directly from one vernal pool to another. Upland areas are a critical component of vernal pool hydrology because they directly influence the rate of vernal pool filling, the length of the inundation period, and the rate of vernal pool drying (Zedler 1987, Hanes and Stromberg 1998).

The Service has used vernal pool complexes as the basis for determining populations of vernal pool crustaceans since the species were first proposed for listing. The final rule to list the four vernal pool crustaceans states that "The genetic characteristics of the three fairy shrimp and vernal pool tadpole shrimp, as well as ecological conditions, such as watershed contiguity, indicate that populations of these animals are defined by pool complexes rather than by individual vernal pools" (Fugate 1992, Fugate 1998, King 1996). Therefore, the most accurate indication of the distribution and abundance of the three vernal pool crustaceans is the number of inhabited vernal pool complexes. Individual vernal pools occupied by the three species listed herein are most appropriately referred to as "subpopulations" (**FR** 59:48137).

All of the vernal pool crustacean species addressed in this biological opinion have evolved unique physical adaptations to survive in vernal pools. Vernal pool environments are characterized by a short inundation phase during the winter, a drying phase during the spring, and a dry phase during the summer (Holland and Jain 1978). The timing and duration of these phases can vary significantly from year to year, and in some years vernal pools may not inundate at all. In order to take advantage of the short inundation phase, vernal pool crustaceans have evolved short reproduction times and high reproductive rates. The listed crustaceans generally hatch within a few days after their habitats fill with water, and can start reproducing within a few weeks (Eng *et al.* 1990, Helm 1998, Eriksen and Belk 1999). Vernal pool crustaceans can complete their entire life cycle in a single season, and some species may complete several life cycles. Vernal pool crustaceans can also produce numerous offspring when environmental conditions are favorable. Some species may produce thousands of cysts during their life spans.

To survive the prolonged heat and dessication of the vernal pool dry phase, vernal pool crustaceans have developed a dormant stage. After vernal pool crustacean eggs are fertilized in the female's brood sac, the embryos develop a thick, usually multi-layered shell. When embryonic development reaches a late stage, further maturation stops, metabolism is drastically slowed, and the egg, now referred to as a cyst, enters a dormant state called diapause. The cyst is then either dropped to the pool bottom or remains in the brood sac until the female dies and sinks. Once the cyst is desiccated, it can withstand temperatures near boiling (Carlisle 1968), fire (Wells *et al.* 1997), freezing, and anoxic conditions without damage to the embryo. The cyst wall cannot be affected by digestive enzymes, and can be transported in the digestive tracts of animals without harm (Horne 1967). Most fairy shrimp cysts can remain viable in the soil for a decade or longer (Belk 1998).

Although the exact signals that cause crustacean cysts to hatch are unknown, factors such as soil moisture, temperature, light, oxygen, and osmotic pressure may trigger the embryo's emergence from the cyst (Brendonck 1996). Because the cyst contains a well developed embryo, the animal can quickly develop into a fully mature adult. This allows vernal pool crustaceans to reproduce before the vernal pool enters the dry phase, sometimes within only a few weeks (Helm 1998, Eriksen and Belk 1999). In some species, cysts may hatch immediately without going through a dormant stage, if they are deposited while the vernal pool still contains water. These cysts are referred to as quiescent, and allow the vernal pool crustacean to produce multiple generations in a single wet season as long as their habitat remains inundated.

Another important adaptation of vernal pool crustaceans to the unpredictable conditions of vernal pools is the fact that not all of the dormant cysts hatch in every season. Hathaway and Simovich (1996) found that only 6 percent of San Diego fairy shrimp cysts hatched after initial hydration, and only 0.18 percent of Riverside fairy shrimp cysts hatched. The cysts that don't hatch remain dormant and viable in the soil. These cysts may hatch in a subsequent year, and form a cyst bank much like the seed bank of annual plants. The cyst bank may be comprised of cysts from several years of breeding, and large cyst banks of viable resting eggs in the soil of vernal pools containing fairy shrimp have been well documented (Belk 1998). Based on a review of other studies (e.g. Belk 1977, Gallagher 1996, Brendonck 1996), Hathaway and Simovich (1996) concluded that species inhabiting more unpredictable environments, such as smaller or shorter lived pools, are more likely to have a smaller percent of their cysts hatch after their vernal pool habitats fill with water. This strategy reduces the probability of complete reproductive failure if a vernal pool dries up prematurely. This kind of "bet-hedging strategy" has been suggested as a mechanism by which rare species may persist in unpredictable environments (Chesson and Huntly 1989, Ellner and Hairston 1994).

Although the vernal pool crustaceans, and particularly the fairy shrimp, addressed in this biological opinion are not often found in the same vernal pool at the same time, when

coexistence does occur, it is generally in deeper, longer lived pools (Eng *et al.* 1990, Thiery 1991, Gallagher 1996, Simovich 1998). In larger pools, closely related species of fairy shrimp may coexist by hatching at different temperatures, and by developing at different rates (Thiery 1991, Hathaway and Simovich 1996). Vernal pool crustacean species may also be able to coexist by utilizing different physical portions of the vernal pool or by eating different food sources (Daborn 1978, Mura 1991, Hamer and Appleton 1991, Thiery1991). Maeda-Martinez (1997) reviewed much of the literature on large branchiopod coexistence and concluded that species distribution patterns likely result from differences in the physical environment of the ephemeral habitat, differences in the life history and habitat requirements of different species, and factors such as colonization, extirpation, and random events. The role of competition in structuring vernal pool crustacean communities is not well understood.

Upland areas associated with vernal pools are also an important source of nutrients to vernal pool organisms (Wetzel 1975). Vernal pool habitats derive most of their nutrients from detritus which is washed into the pool from adjacent uplands, and these nutrients provide the foundation for vernal pool aquatic communities food chain. Detritus is a primary food source for the vernal pool crustaceans (Eriksen and Belk 1999). Vernal pool crustaceans are an important food source for a number of aquatic and terrestrial species. Aquatic predators include insects such as backswimmers (Family Notonectidae) (Woodward and Kiesecker 1994), predaceous diving beetles and their larvae (Family Dystictidae), and dragonflies and damselfly larvae (Order Odonate). Vernal pool tadpole shrimp are another significant predator of fairy shrimp. Vernal pools provide important habitat for resident and migratory birds, particularly waterfowl and shorebirds. Birds are particularly attracted to the pools because they offer foraging habitat at a time of year when resources are limited (Silveira 1998), and vernal pools help link aquatic resources in the California portion of the Pacific Flyway. Vernal pool crustaceans provide important proteins and calcium vital to the energetic needs of migratory bird migration and reproduction (Proctor *et al.* 1967, Silveira 1998). Vernal pool crustaceans are a major food source for a number of terrestrial vertebrate predators including water fowl, wading birds, toads, frogs, and salamanders (Proctor *et al.* 1967, Krapu 1974, Swanson 1974, Morin 1987, Simovich *et al.* 1991, Silveira 1998). Vernal pool crustaceans depend on the absence of water during the summer months to discourage aquatic predator species such as bullfrogs, garter snakes, and fish (Eriksen and Belk 1999). There is evidence that vernal pool crustaceans were used as a food source for Native Americans in California's Central Valley.

The primary historic dispersal mechanisms for the vernal pool crustaceans probably consisted of large scale flooding resulting from winter and spring rains, and dispersal by migratory birds. As a result of widespread flood control and agricultural water diversion projects developed during the twentieth century, large scale flooding is no longer a major form of dispersal for the vernal pool crustaceans. When being dispersed by migratory birds, the eggs of these crustaceans are either ingested (Krapu 1974, Swanson 1974,

Driver 1981, Ahl 1991) and/or adhere to the bird's legs and feathers where they are transported to new habitats. Cysts may also be dispersed by a number of other species, such as salamanders, toads, cattle, and humans (Eriksen and Belk 1999).

Vernal pool crustaceans are often dispersed from one pool to another through surface swales that connect one vernal pool to another. These dispersal events allow for genetic exchange between pools and create a population of animals that extends beyond the boundaries of a single pool. Instead, populations of vernal pool crustaceans are defined by the entire vernal pool complex in which they occur (Simovich *et al.* 1992, King 1996). These dispersal events also allow vernal pool crustaceans to move into pools with a range of sizes and depths. In dry years, animals may only emerge in the largest and deepest pools. In wet years, animals may be present in all pools, or in only the smallest pools. The movement of vernal pool crustaceans into vernal pools of different sizes and depths allows these species to survive the environmental variability that is characteristic of their habitats.

The vernal pool crustaceans addressed in this biological opinion are generally confined to habitats that are low to moderate in alkalinity and dissolved salts, when compared with other aquatic systems (Ericksen and Belk 1999). Although potentially moderated by soil type, vernal pools are generally unbuffered and exhibit wide fluctuations in pH and dissolved oxygen. Vernal pools may change 3 to 4 pH units within a few hours (Keeley and Zedler 1998). Vernal pool water ion concentrations, such as sodium, potassium, calcium, chlorine, and magnesium, also experience large daily and seasonal variations. These variations are due to the concentration of ions as a result of evaporation, and the dilution of ions with additional rainfall throughout the wet season (Barclay and Knight 1981). How vernal pool crustacean species adapt to these fluctuations in water chemistry is unknown. Gonzalez *et al.* (1996) studied ion regulation in several fairy shrimp species in Southern California and found that some species are hyperosmotic regulators, and use active transport to maintain internal ion concentrations above that in the external environment. These species typically inhabit pools with low ion concentrations. Other species can tolerate higher ion concentrations in the external environment by hyporegulating, or maintaining internal levels below that of the water around them. Some species are also able to osmoconform, and allow their internal chemistry to match external ion concentrations. These differences in ion regulation may explain why some species are limited to certain habitats. Although there are numerous observations of the water chemistry of vernal pools where vernal pool crustaceans have been collected, wide variations in vernal pool water chemistry and the anecdotal nature of these observations preclude definitive conclusions about water chemistry habitat preferences.

Additional information specific to each of the three individual vernal pool crustacean species described in this biological opinion is provided below.

Additional Information for Vernal Pool Fairy Shrimp and Distribution

Although most species of fairy shrimp look generally similar, vernal pool fairy shrimp are characterized by the presence and size of several bulges on the male's antenna, and by the female's short, pyriform or pear shaped, brood pouch. They vary in size, ranging from 0.4 to 1.0 inch in length (Eng *et al.* 1990).

Vernal pool fairy shrimp generally will not hatch until water temperatures drop to below 50°F (Gallagher 1996, Helm 1998). This species is capable of hatching multiple times within a single wet season if conditions are appropriate. Helm (1998) observed 6 separate hatches of vernal pool fairy shrimp within a single wet season, and Gallagher (1996) observed 3 separate hatches in vernal pools in Butte County.

Helm (1998) observed vernal pool fairy shrimp living for as long as 147 days. The species can reproduce in as few as 18 days at optimal conditions of 68°F and can complete its life cycle in as little as 9 weeks (Gallagher 1996, Helm 1998). However, maturation and reproduction rates of vernal pool crustaceans are controlled by water temperature and can vary greatly (Eriksen and Brown 1980, Helm 1998). Helm (1998) observed that vernal pool fairy shrimp did not reach maturity until 41 days at water temperatures of 59°F. Vernal pool fairy shrimp has been collected at water temperatures as low as 40°F (Eriksen and Belk 1999), however, the species has not been found in water temperatures above about 73°F (Helm 1998, Eriksen and Belk 1999).

Vernal pool fairy shrimp occupy a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools (Eng *et al*. 1990, Helm 1998, CNDDB 2001). The pool types where the species has been found include Northern Hardpan, Northern Claypan, Northern Volcanic Mud Flow, and Northern Basalt Flow vernal pools formed on a variety of geologic formations and soil types. Although vernal pool fairy shrimp have been collected from large vernal pools, including one exceeding 25 acres in area (Eriksen and Belk 1999), it is most frequently found in pools measuring fewer than 0.05 acre in area (Helm 1998, Gallagher 1996). The species occurs at elevations from 33 feet to 4,003 feet (Eng *et al.* 1990), and is typically found in pools with low to moderate amounts of salinity or total dissolved solids (Keeley 1984, Syrdahl 1993). Vernal pools are mostly rain fed, resulting in low nutrient levels and dramatic daily fluctuations in pH, dissolved oxygen, and carbon dioxide (Keeley and Zedler 1998). Although there are many observations of the environmental conditions where vernal pool fairy shrimp have been found, there have been no experimental studies investigating the specific habitat requirements of this species.

The vernal pool fairy shrimp is known from 32 populations extending from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County, and along the central coast range from northern Solano County to Pinnacles in San Benito County (Eng et al. 1990, Fugate 1992, Sugnet 1993) and a disjunct population on the Agate Desert in Oregon. Five additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County; one in the mountain grasslands of

northern Santa Barbara County; one on the Santa Rosa Plateau in Riverside County, one near Rancho California in Riverside County and one on the Agate Desert near Medford, Oregon. Three of these isolated populations each contain only a single pool known to be occupied by the vernal pool fairy shrimp.

Additional Information for Conservancy Fairy Shrimp and Distribution

Helm (1998) found that the life span and maturation rate of Conservancy fairy shrimp did not differ significantly from other fairy shrimp species under the conditions he observed. Helm (1998) found that Conservancy fairy shrimp reached maturity in an average of 46 days, and lived for as long as 154 days. However, aquatic invertebrate growth rates are largely controlled by water temperature and can vary greatly (Eriksen and Brown 1980, Helm 1998). Eriksen and Belk (1999) observe that the Conservancy fairy shrimp produces large cohorts of offspring, and is an "especially hyperactive swimmer and filter feeder." This species has only been observed to produce one cohort of offspring each wet season (Eriksen and Belk 1999).

Observations suggest this species is generally found in pools that are relatively large and turbid (King *et al.* 1996, Helm 1998, Eriksen and Belk 1999). Helm (1998) found that most Conservancy fairy shrimp occurrences were generally within vernal pools formed on fertile, basin rim soils. These pool types may be over several acres in size, and are often alkaline. Soil types where the species is known to occur include Anita, Pescadero, Riz, Solano, Edminster, San Joaquin, and Peters soil series.

Conservancy fairy shrimp occur with several other vernal pool crustaceans, including vernal pool fairy shrimp, California linderiella (*Linderiella occidentalis*), and vernal pool tadpole shrimp (King *et al.* 1996, Eriksen and Belk 1999, Helm 1998). In general, the Conservancy fairy shrimp has very large populations within a given pool, and is usually the most abundant fairy shrimp when more than one fairy shrimp species is present (Helm 1998, Eriksen and Belk 1999). Conservancy fairy shrimp are eaten by vernal pool tadpole shrimp (Alexander and Schlising 1997), as well as a variety of insect and vertebrate predator species. The species occurs in the same locations as several vernal pool plants, including Colusa grass and the Orcutt grasses.

Conservancy fairy shrimp are known only from eight disjunct areas: the Vina Plains area and vicinity in southern Tehama and northern Butte County; Jepson Prairie and Suisun Slough in southern Solano County; Sacramento National Wildlife Refuge in Glenn and Colusa counties; near Caswell Memorial State Park in Stanislaus County; near Haystack Mountain and vicinity in eastern Merced County; at the San Luis National Wildlife Refuge Complex in western Merced County, and at the Mutau Flat area in the Los Padres National Forest area of northern Ventura County.

Additional Information for Vernal Pool Tadpole Shrimp and Distribution

Vernal pool tadpole shrimp are distinguished by a large, shieldlike carapace, or shell, that covers the anterior half of their body. They resemble horse shoe crabs. Vernal pool tadpole shrimp have 30 to 35 pairs of phyllopods, a segmented abdomen, paired cercopods or taillike appendages, and fused eyes. Vernal pool tadpole shrimp will continue to grow as long as their vernal pool habitats remain inundated, in some cases for six months or longer. They periodically shed their shells, which can often be found along the edges of vernal pools where vernal pool tadpole shrimp occur. Mature vernal pool tadpole shrimp range in size from 0.6 to 3.4 inches in length.

Vernal pool tadpole shrimp have relatively high reproductive rates. Ahl (1991) found that fecundity increases with body size. Large females, greater than .8 inch carapace length, could deposit as many as 6 clutches, averaging 32 to 61 eggs per clutch, in a single wet season. Vernal pool tadpole shrimp sex ratios can vary (Ahl 1991, Sassaman 1991).

After winter rains fill their vernal pool habitats, dormant vernal pool tadpole shrimp cysts may hatch in as little as 4 days (Ahl 1991, Rogers in litt. 2001). Additional cysts produced by adult tadpole shrimp during the wet season may hatch without going through a dormant period (Ahl 1991). Vernal pool tadpole shrimp emerge from their cysts as metanaupliu, a larval stage which lasts for 1.5 to 2 hours. Then they molt into a larval form resembling the adult.

Helm (1998) found that vernal pool tadpole shrimp took a minimum of 25 days to mature and the mean age at first reproduction was 54 days. Other researchers have observed that vernal pool tadpole shrimp generally take between 3 and 4 weeks to mature (Ahl 1991, King 1996). Ahl (1991) found that reproduction did not begin until individuals were larger than 0.39 inch carapace length. Variation in growth and maturation rates may be a result of differences in water temperature, which strongly influences the growth rates of aquatic invertebrates.

Vernal pool tadpole shrimp will survive for as long as their habitats remain inundated, sometimes for 6 months or more (Ahl 1991, Gallagher 1996, Helm 1998). They continue growing throughout their lives, periodically molting their shells. These shells can often be found in vernal pools where the species occurs. Vernal pool tadpole shrimp hatching is temperature dependent. Optimal hatching occurs between 50 and 59° F, while hatching rates become significantly lower at temperatures above 68°F (Ahl 1991).

Vernal pool tadpole shrimp occur in a wide variety of vernal pool habitats including vernal pools, clay flats, ephemeral stock ponds, roadside ditches, and road ruts (Helm 1998, Jones & Stokes 2002). They have been found in pools with water temperatures ranging from 50° F to 84° F and pH ranging from 6.2 to 8.5 (Syrdahl 1993, King 1996). However, vernal pools exhibit daily and seasonal fluctuations in pH, temperature, dissolved oxygen, and other water chemistry characteristics (Syrdahl 1993, Scholnick

1995, Keeley 1998). Determining vernal pool tadpole shrimp habitat requirements is not possible based on anecdotal evidence, and the tolerances of this species to specific environmental conditions have yet to be determined. Although vernal pool tadpole shrimp are found on a variety of geologic formations and soil types, Helm (1998) found that over 50 percent of vernal pool tadpole shrimp occurrences were on High Terrace landforms and Redding and Corning soils. Plantenkamp (1998) found that vernal pool tadpole shrimp presence differed significantly between geomorphic surfaces at Beale Air Force Base and the species was most likely to be found on Riverbank formation.

Vernal pool tadpole shrimp can be difficult to detect because of the animals' habit of dwelling on muddy pool bottoms, where they may burrow through vegetative layers. Also, because eggs may lay dormant for as long as four years, populations may go undetected through one or two years of wet season sampling (Rogers 2001).

King (1996) studied genetic variation among vernal pool tadpole shrimp populations at 20 different sites in the Central Valley. She found that 96 percent of the genetic variation measured was due to differences between sites. This result corresponds with the findings of other researchers that vernal pool crustaceans have low rates of gene flow between separated sites. The low rate of exchange between vernal pool tadpole shrimp populations is probably a result of the spatial isolation of their habitats and their reliance on passive dispersal mechanisms. However, King (1996) also estimated that gene flow between pools within the same vernal pool complex was much higher, and concluded that vernal pool crustacean populations should be defined by vernal pool complex, not by the boundaries of an individual vernal pool.

Based on genetic differences, King (1996) separated vernal pool tadpole shrimp populations into two distinct groups. One group was comprised of animals inhabiting the floor of the Central Valley, near the Sacramento and San Joaquin Rivers. The other group contained vernal pool tadpole shrimp from sites along the eastern margin of the valley. King (1996) concluded that these two groups may have diverged because cyst dispersal by overland flooding historically connected populations on the valley floor, while populations on the eastern margin of the valley were not periodically connected by large scale flooding, and were therefore historically more isolated. When dispersal of these foothill populations occurred, it was probably through different mechanisms such as migratory birds. King (1996) also found that populations in eastern Merced County, in the vicinity of the Flying M Ranch and the proposed University of California (UC) Merced campus, were very different from all other populations studied. She concluded, particularly because it is found on very ancient soils, that this group may have been isolated from other populations very early.

The vernal pool tadpole shrimp is sparsely distributed along the Central Valley from east of Redding in Shasta County south to Fresno County, and in a single vernal pool complex located on the San Francisco Bay National Wildlife Refuge in Alameda County. It

inhabits vernal pools containing clear to highly turbid water, ranging in size from 5 square meters (54 square feet) in the Mather Air Force Base area of Sacramento County, to the 36-hectare (89-acre) Olcott Lake at Jepson Prairie in Solano County.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The valley elderberry longhorn beetle (beetle) was listed as a threatened species under the Act on August 8, 1980 (45 **FR** 52803). Critical habitat for the species was designated and published in 50 CFR §17.95. Two areas along the American River in the Sacramento metropolitan area have been designated as critical habitat for the beetle. Critical habitat for this species has been designated along the lower American River at Goethe and Ancil Hoffman parks (American River Parkway Zone) and at the Sacramento Zone, an area about a half mile from the American River downstream from the American River Parkway Zone. In addition, an area along Putah Creek, Solano County, and the area west of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitats, according to the Valley Elderberry Longhorn Beetle Recovery Plan (Service 1984). These areas support large numbers of mature elderberry shrubs with extensive evidence of use by the beetle.

The valley elderberry longhorn beetle is a large (about one inch long), black and red cerambycid beetle. Males and females exhibit sexual dimorphism with the female.

Life History and Habitat

The beetle is dependent on its host plant, elderberry, which is a locally common component of the remaining riparian forests and savannah areas and, to a lesser extent, the mixed chaparral-foothill woodlands of the Central Valley. Beetles remain within the stems and trunks of elderberry shrubs as larvae and pupae for one to two years. Use of the elderberry shrubs by the animal, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Observations made within elderberry shrubs along the Cosumnes River and in the Folsom Lake area indicate that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. The *Valley Elderberry Longhorn Beetle Recovery Plan* (Service 1984) and Barr (1991) contain further details on the beetle's life history.

Population densities of the beetle are probably naturally low (Service 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle is a poor disperser. Low density and limited dispersal capability cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Historical and Current Distribution

When the beetle was listed, the species was known from fewer than 10 localities along the American River, the Merced River, and Putah Creek. By the time the *Valley Elderberry Longhorn Beetle Recovery Plan* was issued, additional species localities had been found along the American River and Putah Creek. As of 1998, the California Natural Diversity Database (CNDDB) included 181 occurrences for this species in 44 drainages throughout the Central Valley, from a location along the Sacramento River in Shasta County, southward to an area along Caliente Creek in Kern County (CNDDB 1998). The beetle continues to be threatened by habitat loss and fragmentation, predation by Argentine ants (*Linepithema humile*), and possibly other factors such as pesticide drift, nonnative plant invasion, and grazing.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was first listed as endangered in 1967, under the Endangered Species Preservation Act of 1966. On February 14, 1978, the bald eagle was designated under the Endangered Species Act of 1973, as amended, as endangered throughout the lower 48 states except in Michigan, Minnesota, Wisconsin, Washington, and Oregon, where it was designated as threatened (43 **FR** 6230). A recovery plan was released in 1986 for the recovery and maintenance of bald eagle populations in the 7-state Pacific recovery region (Idaho, Nevada, California, Oregon, Washington, Montana, and Wyoming) (Service 1986). In recent years, the status of bald eagle populations has improved throughout the United States. It was downlisted from endangered to threatened on July 12, 1995, throughout the lower 48 states (60 **FR** 36000). A proposed rule to remove the species from the list of endangered and threatened wildlife was made on July 6, 1999 (64 **FR** 36454) but this rule has not been finalized.

Critical habitat has not been designated for this species. In addition to the Act, the bald eagle is protected under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§703-712) and the Bald Eagle Protection Act of 1940, as amended (16 U.S.C. §§668-668d). The bald eagle is listed as endangered under the California Endangered Species Act and designated as a California fully protected species.

The adult bald eagle is recognized by its white head and tail contrasting against its dark brown body as well as its wingspan which can be greater than 6.5 feet.

Life History and Habitat

The bald eagle is a generalist and opportunistic predator and scavenger adapted to aquatic ecosystems. It frequents estuaries, large lakes, reservoirs, major rivers, and some coastal habitats. Its primary foods, in descending order of importance are: fish (taken both alive and as carrion), waterfowl, mammalian carrion, and small birds and mammals.

Bald eagles are highly maneuverable in flight and frequently perch-hunt. Diurnal perches are used during foraging; these usually have a good view of the surrounding area and are often the highest perch sites available (Service 1986). They are also known to hunt by coursing low over the ground or water. In general, foraging habitat consists of large bodies of water or free-flowing rivers with abundant fish and adjacent snags and other perches (Zeiner *et al.* 1990).

The CDFG's fish stocking program throughout California's lakes, reservoirs and rivers has provided an abundant prey base of fish for the bald eagle. In the northern California lakes, 4,000 pounds of salmonids are stocked in approximately 57 bodies of water each year. That includes approximately 200 to 350 pounds of fish 10 to 12 inches in length. For recreational fishing, 70,000 pounds of fish averaging approximately 0.5 pound each are annually stocked in approximately 62 different bodies of water in the southern Sierra Nevada. In stocking programs in northern California, up to 20 percent of the released hatchery trout may die soon after release and many initially inhabit the top of the water column because of increased oxygen levels there. In one study, bald eagles were observed taking fish carrion at the stocking location at the Shasta Reservoir (Detrich 1978).

Though the construction of dams has limited the range of anadromous fish, an important historic bald eagle prey base, reservoir construction and the stocking of fish in reservoirs in the west have provided bald eagles with habitat for population expansion following their mid-century decline which resulted from DDT poisoning, degradation of historical nesting habitat, and persecution by humans (Detrich 1986, Service 1986). Food habitat studies of reservoir-nesting bald eagles in the west have focused on populations in northern California and Arizona (Hunt *et al*. 1992, Jackman *et al*. 1999).

The bald eagle is long-lived, and individuals do not reach sexual maturity until four or five years of age. Breeding generally occurs February to July (Zeiner *et al*. 1990) but breeding can be initiated as early as January 1 via courtship, pair bonding, and territory establishment. The breeding season normally ends approximately August 31 when the fledglings have begun to disperse from the immediate nest site. One to three eggs are laid in a stick platform nest 50 to 200 feet above the ground and usually below the tree crown (Zeiner *et al*. 1990). Incubation may begin in late February to mid-March, with the nestling period extending to as late as the end of June. From June thru August, the chicks remain restricted to the nest until they are able to move around within their environment. Bald eagles are susceptible to disturbance by human activity during the breeding season, especially during egg laying and incubation, and such disturbances can lead to nest desertion or disruption of breeding attempts (Service 1986).

Nesting territories are normally associated with lakes, reservoirs, rivers, or large streams and are usually within 2 miles from water bodies that support an adequate food supply (Lehman 1979, Service 1986). Some of California's breeding birds winter near their

nesting territories. Most nesting territories in California occur from 1,000 to 6,000 feet elevation, but nesting can occur from near sea level to over 7,000 feet (Jurek 1988).

In the Pacific Northwest, bald eagle nests are usually located in uneven-aged (multi-storied) stands with large, old trees (Anthony *et al*. 1982). Most nests in California are located in ponderosa pine and mixed-conifer stands and nest trees are most often ponderosa pine (*Pinus ponderosa*) (Jurek 1988). Other site characteristics, such as relative tree height, tree diameter, species, position on the surrounding topography, distance from water, and distance from disturbance, also appear to influence nest site selection (Lehman *et al*. 1980, Anthony and Isaacs 1981). Bald eagles often construct up to five nests within a territory and alternate between them from year to year (Service 1986). Nests are often reused and eagles will add new material to a nest each year (DeGraaf *et al*. 1991).

Trees selected for nesting are characteristically one of the largest in the stand or at least co-dominant with the over-story, and usually have stout upper branches and large openings in the canopy that permit nest access (Service 1986). Nest trees usually provide an unobstructed view of the associated water body and are often prominently located on the topography. A survey of nest trees used in California found that about 71 percent were ponderosa pine, 16 percent were sugar pine (*Pinus lambertiana*), and 5 percent were incense-cedar (*Librocedrus decurrens)*, with the remaining 8 percent distributed among five other coniferous species (Lehman 1979).

Lehman (1979) found that 70 percent of the nest trees surveyed were classified as highly susceptible to beetle infestation, probably a function of eagle's using mature and over mature trees. Ninety-three percent of the nest trees were 21-60 inches in diameter (mean diameter was 43.1 inches) and 92 percent were greater than 76 feet tall (mean height was 111.9 feet). Seventy-three percent of the nest sites were within 0.5 mile of a body of water, 87 percent within 1 mile, and none were over 2 miles from water. Other trees, such as snags, trees with exposed lateral limbs, or trees with dead tops, are often also present in nesting territories and are used for perching or as points of access to and from the nest. Such trees also provide vantage points from which territories can be guarded and defended. Nearby trees may also screen the nest from human disturbances or provide protection from wind damage (Jurek 1988).

Two habitat characteristics appear to play a significant role in habitat selection during the winter: diurnal feeding perches, as described above, and communal night roost areas. Communal roosts are usually near a rich food resource (Service 1986), although Keister and Anthony (1983) found that bald eagles used forest stands with older trees as far as 9.6 miles from the food source in the Klamath Basin. The areas used as communal roosts in the Klamath Basin were the forest stands with old (mean age of roost trees was 236 years), open-structured trees that were close to the feeding areas. In stands where ponderosa pine was dominant, the pine was used almost exclusively for roosting. In

forest stands that are uneven-aged in the Pacific Northwest, communal roosts have at least a remnant of large, old trees (Anthony *et al*. 1982).

Most communal winter roosts used by bald eagles throughout the recovery areas offer considerably more protection from the weather than diurnal habitat (Service 1986). Isolation from disturbances is an important feature of bald eagle wintering habitat. Excessive human activity may be the reason why some suitable wintering habitat is not used by bald eagles (Service 1986). Human activity near wintering eagles can adversely affect eagle distribution and behavior (Stalmaster and Newman 1978).

Historical and Current Distribution

The bald eagle was historically abundant throughout North America except extreme northern Alaska and Canada and central and southern Mexico (60 **FR** 36000). After World War II, the use of dichlorodiphenyltrichloroethane (DDT) and other organochlorine compounds became widespread, and bald eagle populations plummeted. The bald eagle population has increased in number and expanded in range as a result of the banning of pesticides, habitat protection, and other recovery efforts. Between 1974 and 1995, the number of occupied breeding areas in the lower 48 states increased by 462 percent. The species has been doubling its breeding population every six to seven years since the late 1970s (60 **FR** 36000).

In California, bald eagles breed almost exclusively within Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties. This species formerly nested along the Big Sur coast, and into the 1950s at a few scattered locations from San Luis Obispo County south to San Diego County. They also formerly nested on all the Channel Islands. Due primarily to eggshell thinning effects of DDT, the breeding population in California was reduced from thousands to about 20 breeding pairs, located in remote mountainous area in the far northern portion of the State (Small 1994).

As a result of recovery efforts including captive breeding and relocation, the California breeding population has increased. By 1994, the California breeding population was estimated at 70 breeding pairs, at scattered areas in north-central California, northeastern California, and the Sierra foothills (Small 1994). The California bald eagle nesting population has increased in recent years from fewer than 30 occupied territories in 1977 to 151 occupied territories in 1999 (Jurek, 2000). Wintering activity occurs throughout the state except for the desert regions east of the Los Angeles Basin (Gertsch *et. al* 1994). Wintering habitat is associated with open bodies of water, with some of the largest wintering bald eagle populations occurring in the Klamath Basin (Detrich 1981, 1982). Smaller concentrations of wintering birds are found at most of the larger lakes and man-made reservoirs in the mountainous interior of the north half of the state and at scattered reservoirs in central and southwestern California. California's breeding population is resident year-long in most areas as the climate is relatively mild (Jurek

1988). Between mid-October and December, migratory bald eagles arrive in California from areas north and northeast of the state. The wintering populations remain in California through March or early April.

San Joaquin Kit Fox (*Vulpes macrotis mutica*)

The San Joaquin kit fox was federally listed as endangered on March 11, 1967 (32 **FR** 4001) and listed by the State as threatened on June 27, 1971. The Service wrote a recovery plan in 1983 and revised it in 1998. The plan is called the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (*Upland Species Recovery Plan*). There has been no critical habitat designated for the kit fox.

The kit fox is the smallest canid species in North America with the males averaging 5 pounds and the females averaging 4.6 pounds (Morrell 1972). The kit fox has relatively large ears set close together and a long, bushy, distinctly black-tipped tail that is typically carried low and straight. Fur color varies geographically and seasonally, but is most commonly described as buff or tan in the summer, and yellowish gray or silver gray in the winter (McGrew 1979, Morrell 1972).

Life History and Habitat

Kit foxes occur in a wide variety of habitats, including grasslands and scrub lands in the southern part of their range, and grasslands and oak woodlands in the northern part of their range. Kit foxes survive in habitats that have been modified by humans, including an agricultural matrix of row crops, irrigated pasture, orchards, vineyards, and grazed annual grasslands. Kit foxes are active at dusk and during the night, and sleep in underground dens during the day. They often change dens and numerous dens may be used throughout the year. Home ranges of from fewer than 1 square mile up to approximately 12 square miles have been reported (Morrell 1972, Knapp 1978, Zoellick *et al.* 1987, Paveglio and Clifton 1988, Spiegel and Bradbury 1992, White and Ralls 1993).

The kit fox is an opportunistic feeder, and its diet varies geographically, seasonally, and annually with variation and abundances of prey. Kit foxes in the northern part of their range have been found to primarily feed on ground squirrels (Orloff *et al.*, 1986), while in the southern portion of the range kangaroo rats have been found to be the main prey source. Kit foxes have been found to prey on ground nesting birds (Scrivner *et al.* 1987a) and to supplement their diets with vegetation, mainly grasses (Morrell 1971).

Kit foxes can breed when 1 year old, but may not breed their first year of adulthood (Morrell 1972). Adult pairs remain together all year, sharing the home range but not necessarily the same den (Ralls pers. comm. 2000). During September and October, adult females begin to clean and enlarge natal dens. Mating and conception take place between

late December and March. Litters of from two to six pups are born sometime between February and late March (Egoscue 1962). Pups emerge above ground at about one month of age. After 4 or 5 months, usually in August or September, the family bonds begin to dissolve and the young begin dispersing.

During a 6-year study at the Elk Hills Naval Petroleum Reserves in Kern County pups dispersed an average of 5.0 miles, plus or minus 0.9 mile (Scrivner *et al*. 1987b). The study was conducted in an area in which there is little agricultural or urban development; therefore, foxes were probably not forced to disperse long distances due to lack of suitable habitat in the vicinity of their natal range. Maximum reported distances include 25 miles (Getz pers. comm. 2000) and approximately 45 miles (White pers. comm. 1996). Adult and juvenile kit foxes radiocollared at the Elk Hills Naval Petroleum Reserves dispersed through disturbed habitats, including agricultural fields, oil fields, rangelands, and across highways and aqueducts (Service 1998).

A study of kit fox movement on the Elk Hills Naval Petroleum Reserves, California, found that 99 percent of all kit fox movements occurred in terrain with slopes fewer than 6 degrees or 10.5 percent (Koopman 1995). Most kit fox home ranges were bordered on at least one side by low hills, yet kit fox movements into these areas were rare. A 1998 study found that topographic ruggedness was the only variable consistently affecting the spatial distribution of kit foxes at the Naval Petroleum Reserves, California, being that there was a negative association between capture rates of kit foxes and ruggedness (Warrick *et al*. 1998). Kit fox populations in the northwestern extreme of the species' range, as well as western San Joaquin County, occur in habitat with steep terrain with up to 30 percent slopes (Orloff *et al*. 1986; Jones and Stokes 1992). Consequently, the evidence suggests uncertainties regarding the effect of slopes on kit fox dispersal.

Historical and Current Distribution

The San Joaquin kit fox historically was distributed within an 8,700-square mile range in central California from the vicinity of Tracy in the upper San Joaquin Valley south to the Tehachapi Mountains in Kern County. San Joaquin kit foxes are currently limited to remaining grassland, saltbush, open woodland, alkali sink valley floor habitats, and other similar habitats located along bordering foothills and adjacent valleys and plains of the San Joaquin Valley. There has never been a comprehensive survey of San Joaquin kit foxes or their habitat. What little is known comes from incidental sightings, local surveys, and research projects.

Kit foxes are known to be in the vicinity of the Study Area due to recent cursory spotlighting surveys for the UC Merced project, and chance encounters between Caltrans biologists and kit foxes. Reliable sightings were made in April and May of 2001, 8 miles and 12 miles south of the Study Area (Johnson 2001, Nunes and Johnson 2001). Chambers Group reported a kit fox 9 miles west of the Study Area on the outskirts of

Atwater (Chambers Group 2001). One kit fox was seen in broad daylight with the help of a scent dog on the Ichord Ranch, in the Study Area in 2002 (Clark and Smith 2001). Studies done in the 1980s in western Merced County showed there to be a population of foxes there (Briden *et al* 1987); no similar studies have been conducted in eastern Merced County in the vicinity of the Study Area. Reported sightings are rare in the hills bordering the east side of the San Joaquin Valley due to a lack of public roads in the hills, a lack of kit fox surveys, and undulating topography that makes kit fox hard to see. Even if spot light surveys had been done, we now know that spot light surveys only detect about 20 percent of the foxes that are in an area (Bell pers. comm. 2001).

The *Upland Species Recovery Plan* identifies a movement corridor on the east side of the San Joaquin Valley from Madera County through Merced and Stanislaus Counties to San Joaquin County. Three kit fox sightings are recorded near La Grange north of the Study Area (CDFG 1994, Clifton 1998) in the eastside corridor. In addition, the *Upland Species Recovery Plan* describes an east-west linkage corridor along Sandy Mush Road that connects the corridor in eastern Merced County to a subpopulation in the Kesterson National Wildlife Refuge where a number of sightings have been recorded (ESRP 2000).

Recovery Needs

The *Upland Species Recovery Plan* identifies numerous recovery actions and tasks for this species, including the following tasks, which are pertinent to this analysis:

- Maintain and enhance kit fox movement between the Mendota area, Fresno County, natural lands in western Madera County, and natural lands along Sandy Mush Road and in the wildlife refuges and easement lands of Merced County.

- Link natural lands in the Sandy Mush Road area of Merced County with the northeastern edge of the Valley (Recovery Task 5.1.8, Priority 2).

- Protect existing kit fox habitat in the northern, northeastern, and northwestern segments of their geographic range and existing connections between habitat in those areas and habitat further south.

- Determine current geographic distribution and population status of kit foxes, with special emphasis on potential habitat in eastern Madera, Merced, Stanislaus and San Joaquin Counties, and the Salinas-Pajaro Region.

Mountain Plover *(Charadrius montanus)*

The mountain plover was proposed for Federal listing as threatened on February 16, 1999 (64 **FR** 7587). The mountain plover is about 9 inches in length, and is slightly smaller than the killdeer, both of which are in the Plover Family (Charadriidae). The mountain

plover is drab and brownish in winter, the season that it can be found in California's Central Valley. Summer breeding grounds are in the Western Plains states. The mountain plover is a State Species of Special Concern.

Habitat

The mountain plover is associated with shortgrass and shrub-steppe landscapes throughout its breeding and wintering range. Mountain plovers evolved on grasslands that were inhabited by large numbers of nomadic grazing ungulates such as bison, elk, pronghorn, and burrowing mammals such as kangaroo rats, prairie dogs, and badgers (Knopf 1996*a*). The herbivores dominated the grassland landscape at both breeding and wintering sites, and their grazing, wallowing, and burrowing activities created and maintained a mosaic of vegetation and bare ground to which mountain plovers became adapted (Dobkin 1994, Knopf 1996*a*). Unlike most other plovers, mountain plovers are rarely found near water. Habitat in its wintering grounds includes open fields, "bare" ground of burned or heavily grazed grasslands, and other open areas. Mountain plovers forage for insects, and can be seen running rapidly along the ground and then stopping. Although cultivated land is used by mountain plovers, Knopf and Rupert (1995) found that wintering mountain plovers preferred alkali flats, burned grasslands, and grazed annual grasslands to cultivated sites. Mountain plovers spend about 5 months in wintering habitat (Knopf and Rupert 1996), and begin leaving wintering areas by mid-March (Knopf and Rupert 1995).

Historical and Current Distribution

Mountain plovers spend the summer in the Great Plains, and migrate across the Rocky Mountains in both spring and fall. Historically, mountain plovers have been observed during the winter in California, Arizona, Texas, and Nevada; the California coastal islands of San Clemente Island, Santa Rosa Island; and, the Farallon Islands (Strecker 1912; Swarth 1914; Alcorn 1946; Jurek 1973; Jorgensen and Ferguson 1984; Garrett and Dunn 1981; Deuel in litt. 1992). In Mexico, wintering mountain plovers have been sighted in Baja, California, as well as north-central and northeastern Mexico, specifically in Chihuahua, Coahuila, Sonora, Nuevo Leon, and San Luis Potosi (Russell and Lamm 1978, Garza de Leon in litt. 1990, Stenzel in litt. 1992, Estelle pers. comm. 1998).

Between 1966 and 1991, the continental population of the mountain plover declined an estimated 63 percent. Currently, the majority of mountain plovers appear to winter in California, with fewer reported from Texas, Arizona, and Mexico. The only published scientific study of mountain plovers on their wintering habitat documented movement patterns, habitat preferences, and winter survival rates in the San Joaquin Valley and Carrizo Plain Natural Area of California (Knopf and Rupert 1995). Due to the lack of published information on wintering birds, the Service examined Christmas Bird Count data, notes of California sightings compiled from *American Birds*, National Wildlife

Refuge records, BLM surveys, and other information, in compiling information to support listing the mountain plover (Lowe in litt. 1989, Deuel in litt. 1992).

In California, mountain plovers are most frequently reported and found in the greatest numbers in two general locations--(1) in the Central Valley south of Sacramento and west of U.S. Highway 99, and (2) the Imperial Valley in southern California. Throughout these areas, sightings occur on agricultural fields and uncultivated sites; uncultivated sites are preferred habitat (Knopf and Rupert 1995).

Within the Central Valley, flocks of up to 1,100 birds have been seen recently in Tulare County (Knopf and Rupert 1995). The Carrizo Plain Natural Area in San Luis Obispo County also is recognized as an important wintering site, with wintering birds reliably reported from the west side of the Carrizo Plain Natural Area since 1971 (Fitton in litt. 1992). The Sacramento Valley portion of the Central Valley also provides wintering habitat for flocks of mountain plovers within Solano and Yolo Counties. During the 1998 census, 230 and 187 mountain plovers were observed within each of these counties, respectively (Hunting in litt., 1998).

About 2,000 mountain plovers were counted on agricultural fields in the Imperial Valley in 1994 (Barnes, in litt. 1994). At other locations in southern California, birds have been seen at Harper Dry Lake, Antelope Valley, San Jacinto Lake Wildlife Area, and the Tijuana River Valley (Garrett pers. comm. 1989, Cardiff pers. comm. 1992, Paulek pers. comm. 1992, Copper in litt. 1992). Mountain plovers are considered extirpated (extinct) from Orange County (Harper in litt. 1990).

Environmental Baseline

Fleshy Owl's-Clover

Reasons for Decline and Threats to Survival

The status of most fleshy owl's-clover populations is unknown because many occurrence sites have not been visited for decades. Inappropriate cattle grazing and trampling degraded three occurrences of fleshy owl's-clover. One of the same sites plus three others were degraded by discing (CNDDB 2000). One of the latter occurrences is listed as "possibly extirpated" due to discing. However, fleshy owl's-clover persisted at another site that had been disced, although the population size was reduced by an order of magnitude (CNDDB 2000). One Fresno County occurrence that was disced most likely has been extirpated because oats have been planted on the site (Stebbins in litt. 2000*a*).

A wide variety of factors threaten the continued existence of fleshy owl's-clover, including urban development, year-round or summer livestock grazing, changes in hydrology, agricultural conversion, gravel mining, and small occurrence size (CNDDB 2000). Construction of the proposed new University of California campus in Merced County, plus the associated residential community and access roads, threatens the extensive occurrence in that area. Of the 25 occurrences estimated on the proposed campus and associated community, 10 occurrences of fleshy owl's-clover occur in the area that is expected to be developed within the next 15 years (calculated by E. Cypher from maps and information in EIP Associates 1999). Different types of urban development that threaten numerous known occurrences include planned housing subdivisions in Fresno, Madera, and San Joaquin counties; a freeway expansion in Madera County; and a proposed landfill in Fresno County (Service 1997a, CNDDB 2000, Stebbins in litt. 2000*b*).

Approximately two-thirds of the reported occurrences, including those at the proposed University of California Merced site, were subject to cattle grazing when they were discovered (EIP Associates 1999, CNDDB 2000). However, cattle grazing is not necessarily detrimental to fleshy owl's-clover. Winter and spring grazing may assist in the growth of individual plants in controlling nonnative grass invasions (Stebbins in litt. 2000*a*). Stebbins *et al.* (1995, p. 30) noted that among the sites they studied, those that were grazed "did not appear to suffer long term damage due to grazing." Damage from livestock would be harmful when pools are dry and during the time that the water is evaporating; thus, summer or year-round grazing poses a threat (Stebbins in litt. 2000*a*).

Hydrological alterations can create conditions unsuitable for fleshy owl's-clover and other vernal pool plants by increasing or decreasing the depth and/or duration of inundation. Threats due to alterations in natural hydrology include the Merced County Stream Channel Project proposed by the U.S. Army Corps of Engineers (Service 1997*a*) and proposed enlargement of Burns Reservoir in Merced County (CNDDB 2000), which collectively threaten seven occurrences of fleshy owl's-clover. Expansion of agricultural operations threatens three occurrences in Fresno and Madera counties that are surrounded by orchards, vineyards, or citrus groves (CNDDB 2000). Also, populations in grain fields already have been subject to discing, as mentioned above. A proposed gravel mine threatens one occurrence in Fresno County (Service 1997*a*).

Lastly, threats posed by small occurrence size are less immediate but also potentially significant. Random genetic, environmental, or other processes can lead to the extirpation of small populations; adequate populations would be in the range of thousands to millions (Shaffer 1981, Thomas 1990, Menges 1991). Species that are subject to extreme fluctuations in occurrence size from year to year are particularly vulnerable to chance events (Thomas 1990). Among the 24 occurrences of fleshy owl's-clover for which size estimates were given, 10 occurrences consisted of fewer than 100 plants at their peak size (CNDDB 2000, Stebbins in litt. 2000*b*).

The little information that is known regarding fleshy owl's-clover has been obtained incidental to other proposed projects. Several occurrences were discovered during surveys related to the extension of State Highway 41 (Stone in litt. 1992, CNDDB 2000). Data on characteristics of selected pools were obtained through the vernal pool characterization study funded by the California Department of Fish and Game and the Service (Stebbins *et al.* 1995). In a study funded by the California Department of Transportation to evaluate the success of vernal pool creation, fleshy owl's-clover was seeded into one created pool but did not become established (Durgarian 1995).

Hoover's spurge

Reasons for Decline and Threats to Survival

One occurrence of Hoover's spurge in Tulare County and another in Tehama County were destroyed when the areas were converted for agricultural use (CNDDB 2001). Hoover's spurge has not been seen in several years at two of the Vina Plains occurrences where natural vegetation remains. Conditions at those sites changed so that the barren areas required by Hoover's spurge no longer were available, probably because cattle were removed from the Vina Plains for a period of eight years (Silveira in litt. 2000).

Agricultural conversion continues to threaten Hoover's spurge, particularly in Stanislaus County (Stone *et al.* 1988). However, more subtle factors such as changes in hydrology, invasion by aggressive plants, and inappropriate livestock grazing regimes constitute a greater threat to survival of the species at this time. Five of the remaining occurrences of Hoover's spurge are subject to obvious hydrologic threats; four of the five are in the San Joaquin Valley and the fifth is in the Vina Plains. Hydrology has been altered by construction of levees and other water barriers and by runoff from adjacent agricultural operations, roads, and culverts. Due to these hydrological changes, some vernal pools receive insufficient water and others remain flooded for too long to allow growth of Hoover's spurge. Although no occurrences have been completely extirpated due to hydrologic changes, the species has been eliminated from one or more individual pools at several sites and a number of the remaining populations seem to be declining (Stone *et al.* 1988, Stebbins *et al.* 1995, CNDDB 2001).

Competition from invasive native or nonnative plant species threatens nine of the extant occurrences, including eight in the Vina Plains and one on the Sacramento National Wildlife Refuge in Glenn County (CNDDB 2001). Native competitors of Hoover's spurge include coyote-thistle, alkali-mallow (*Malvella leprosa*), lippia or tangle frogfruit (*Phyla nodiflora*), hard-stemmed bulrush (*Scirpus acutus* var. *occidentalis*), alkali or saltmarsh bulrush (*Scirpus maritimus*), and rough cocklebur (*Xanthium strumarium*). Nonnative competitors include bindweed (a noxious weed according to Dempster 1993) and swamp pricklegrass (*Crypsis schoenoides*) (Silveira in litt. 2000, CNDDB 2001). On the Vina Plains Preserve, the pools with Hoover's spurge also had the highest frequency

of bindweed, at least in 1995 (Alexander and Schlising 1997). Increasing dominance by these competitors may be associated with changes in hydrology and livestock grazing practices (Stone *et al*. 1988, Alexander and Schlising 1997, CNDDB 2001).

The issue of livestock grazing effects on Hoover's spurge is complex and much data are lacking to support incidental accounts. In general, "moderate" levels of grazing appear to be compatible with Hoover's spurge and presumably benefit the species by reducing competition from other plants (Stone *et al*. 1988). Livestock do not eat Hoover's spurge because it grows so close to the ground and possibly because the milky sap is toxic (Wheeler 1941, Stone *et al*. 1988). During 1986 and 1987, Stone *et al*. (1988) deemed the intensity of cattle grazing at most Hoover's spurge sites to be appropriate. Several species experts (Stone *et al*.1988, Silveira in litt. 2000, Stebbins in litt. 2000*a*) have cautioned that decreases in grazing intensity could be detrimental to Hoover's spurge. On the other hand, cattle trampling has seriously reduced Hoover's spurge populations at one site each in Butte and Stanislaus counties (Stone *et al*. 1988), and increased summer stocking rates at other sites could similarly damage those populations.

Small occurrence size is a serious threat for at least four of the known occurrences, which total fewer than 100 individuals even in favorable years (CNDDB 2001). Such small populations are subject to extirpation from random events (Shaffer 1981, Menges 1991).

Colusa Grass

Reasons for Decline and Threats to Survival

Colusa grass declined primarily because pools in which it occurred were destroyed by conversion to irrigated agriculture, primarily to orchards and vineyards (Crampton 1976, Medeiros 1976, CNDDB 2000). Other factors that extirpated populations of Colusa grass included altered hydrology, surface disturbance, and excessive livestock grazing. At least 9, and possibly 11, occurrences have been extirpated, although several others most likely were eliminated before being reported (Stone *et al*. 1988). The Yolo County occurrences have been damaged by herbicide application (Witham in litt. 2000).

The same factors that contributed to the decline of Colusa grass continue to pose threats to the species. Agricultural conversion is most likely to occur in eastern Stanislaus County and threatens the 16 occurrences (33 percent) there. Dry-land farming there is gradually being replaced by irrigated agriculture; the former apparently is compatible with the persistence of Colusa grass, but the latter is not (Crampton 1959, Crampton 1976). Changes in natural hydrology, such as draining pools or creating reservoirs, could create unsuitable conditions for Colusa grass by decreasing or increasing inundation periods. Increased grazing intensity or summer grazing would threaten Colusa grass, even though moderate cattle grazing in spring in some instances has not posed a problem (Stone *et al*. 1988). Sheep grazing is compatible if the flock is removed before Colusa grass begins

growth for the year. However, sheep trampling and bedding during the seedling and flowering stages are detrimental (Witham in litt. 2000).

Another threat to the survival of Colusa grass comes from indirect effects related to the construction of the proposed UC Merced campus and associated community in Merced County. Six occurrences of Colusa grass were observed in the Study Area in special-status plant surveys conducted in 1999-2001. All six of these occurrences are on VST Remainder Property land, which the University has committed to preserve. The documented occurrences should not be viewed as an exhaustive inventory because not all pools were surveyed in the 1999-2001 surveys. Therefore, it is possible that there are additional occurrences on VST lands and on lands proposed for development of the Applicants' Proposed Projects, which may be directly effected. The CNDDB also lists an historic occurrence in the western portion of the Study Area; however, this occurrence has not been observed since 1943 and is described as possibly extirpated. The species was not found on lands for which WCB has acquired or will acquire title or conservation easements.

Additional factors threaten the survival of Colusa grass, particularly the problem of small occurrence size. Although populations may drop to only a few visible plants in certain years, seven consisted of fewer than 100 plants even at their peak (CNDDB 2000) and thus are likely to represent small populations. Nonnative plants such as swamp grass and alkali mallow, and invasive native species such as cocklebur and lippia could out-compete Colusa grass and may be particular problems in combination with other factors such as decreased inundation and inappropriate livestock grazing (Stone *et al*. 1988, Witham in litt. 2000). Grasshopper foraging has been observed on Colusa grass (Stone *et al*. 1988), but the extent of this threat is unknown. The two Yolo County occurrences are threatened by herbicide run-off from adjacent agricultural operations (CNDDB 2000).

San Joaquin Valley Orcutt Grass

Reasons for Decline and Threats to Survival

All of the habitat of San Joaquin Valley Orcutt grass in Stanislaus County and much of that in Madera and Fresno counties has been converted to irrigated agriculture, especially to almond orchards and vineyards (Stone *et al*. 1988, CNDDB 2000). The majority of sites were converted by the late 1970's (Griggs 1980, Griggs and Jain 1983). Altered hydrology and development (residential, commercial, and recreational) eliminated several other populations (Stone *et al*. 1988, CNDDB 2000). Dryland grain farming has modified vernal pool habitats supporting San Joaquin Valley Orcutt grass in Madera and Merced counties, and occurrences are presumed to be extirpated from these areas (CNDDB 2000). However, Crampton (1959, 1976) indicated that San Joaquin Valley Orcutt grass could persist despite dryland farming, and the species was rediscovered at one such site after having been absent for several years (CNDDB 2000). Summer livestock grazing or

heavy use by cattle damaged two populations each in Madera and Merced counties (Stone *et al*. 1988, CNDDB 2000); their current status is not known.

The primary threats facing the remaining extant occurrences of San Joaquin Valley Orcutt grass are altered livestock grazing regimes, agricultural conversion, and small occurrence size (Stone *et al*. 1988, CNDDB 2000). Most extant populations are currently grazed. According to Stone *et al*. (1988) and Stebbins (in litt. 2000*a*), moderate cattle grazing in spring is compatible with persistence of San Joaquin Valley Orcutt grass, and possibly beneficial, but increased stocking rates or summer or year-round grazing would be detrimental. Conversion to irrigated agriculture is most likely at sites that currently are dry-farmed. Small populations are at risk of extirpation due to chance events (Menges 1991), particularly those that fluctuate greatly from year to year (Thomas 1990). Omitting those described only as "abundant," occurrence size has been estimated for 14 of 23 occurrences of San Joaquin Valley Orcutt grass. Three occurrences numbered fewer than 10 plants each, even in favorable years (Stone in litt. 1992, Stebbins *et al*. 1995, CNDDB 2000).

Additional threats to San Joaquin Valley Orcutt grass are varied. Four of the extant occurrences in Madera County are in the path of the proposed extension of state Highway 41 (Stone in litt. 1992). Three other occurrences in Madera and Fresno counties are threatened by a proposed residential development (Stone *et al*. 1988, Stebbins *et al*. 1995, CNDDB 2000). Altered hydrology, competition from other plants, and off-road vehicles are potential threats at a few sites (Stone *et al*. 1988). Foraging by grasshoppers (family Acrididae) and mice (order Rodentia) occasionally poses problems (Stebbins *et al*. 1995, CNDDB 2000). In some years, grasshoppers (family Acrididae) consumed entire populations of San Joaquin Valley Orcutt grass before they set seed (Griggs and Jain 1983, Stone *et al*. 1988).

Hairy Orcutt Grass

Reasons for Decline and Threats to Survival

Historically, habitat loss was the primary factor responsible for the decline of hairy Orcutt grass. Of the 11 element occurrences considered by the California Natural Diversity Data Base (2001) to be extirpated, 4 in Stanislaus County were converted to almond orchards or vineyards (Stone *et al*. 1988, CNDDB 2001). Most of the conversion occurred prior to 1976 (Crampton 1959, Crampton 1976, Medeiros 1976, Reeder 1982). Two other occurrences in Madera County were lost by development for residences and orchards. The other five occurrences, which were in Madera, Merced, and Stanislaus counties, are listed as extirpated because the habitat was being used for irrigated pasture or dry farming or had been disced when they were last visited in 1986 and 1987 (Stone *et al*. 1988). However, continued field visits are advisable because another occurrence reappeared several years after discing (CNDDB 2001).

Hairy Orcutt grass no longer occurs in the Glenn County pool where it was found in 1937 because the area is now a permanent pond (Silveira pers. comm. 1997). Inappropriate hydrology also may be responsible for the loss of one other occurrence (Table 5) in a vernal pool at the Sacramento National Wildlife Refuge (Silveira in litt. 2000). The occurrence consisted of 20 plants when it was first discovered in 1993, but those plants died before setting seed due to flooding from a summer rainstorm, and none have been seen since that time (Silveira in litt. 2000). The occurrence could reappear in future years if a substantial soil seed bank exists, and thus it is presumed to be extant.

Two occurrences on the Vina Plains Preserve apparently have died out because the populations were too small to be viable. The two Vina Plains occurrences consisted of 2 plants and fewer than 100, respectively, in 1983 and no plants have been observed since that time (Alexander and Schlising 1997). The California Natural Diversity Data Base (2001) considers the former to be "possibly extirpated" but lists the latter as "presumed extant." Even taking into consideration the capacity for wide variations in occurrence size from year to year, the small initial occurrence size and the absence of plants for over 20 years lead to the conclusion that these populations have been extirpated. Trampling by cattle and competition from invasive plants may have contributed to their disappearance (CNDDB 2001). However, the few plants observed at these occurrences may have been the result of random dispersal events and may never have represented established populations, as described by Alexander and Schlising (1997) for the Vina Plains Preserve.

Habitat loss continues to pose a threat to the survival of hairy Orcutt grass. Agricultural and residential development are proceeding in the vicinity of the remaining Stanislaus and Madera county occurrences and may lead to the destruction of additional populations in the foreseeable future (Stone *et al*. 1988). Cattle grazing was an ongoing land use at 20 occurrences when they were last visited, including 6 where this species may already be extirpated (CNDDB 2001). Three occurrences are believed to have been eliminated by "excessive" livestock grazing, and seven others were damaged by summer grazing or overuse. However, "moderate" grazing in spring likely is compatible (Stone *et al*. 1988) and may be beneficial (Stebbins in litt. 2000*a*). Competition from invasive plants is an increasing problem throughout the range of hairy Orcutt grass (Stone *et al*. 1988). Several researchers (Stone *et al*. 1988, Alexander and Schlising 1997) have suggested that cattle may have carried in seeds of nonnative plants, and disturbance from trampling may have facilitated their establishment. Bindweed has increased in frequency in the Vina Plains since 1984, and cocklebur is still present. Pools where hairy Orcutt grass grows had higher frequencies of these invasive species than did other pools on the Vina Plains Preserve in 1995 (Alexander and Schlising 1997). Altered hydrology may have contributed to the presence of invasive plants in the pools (Stebbins in litt. 2000*a*).

Survey efforts for vernal pools, such as those by Crampton (1959) and Medeiros (1976) documented the occurrence and extirpation of hairy Orcutt grass populations. The most

recent, most comprehensive effort was that by Stone and others (1988) in conjunction with the status survey for the Orcuttieae. A 1995 ecological study of hairy Orcutt grass and other rare vernal pool plants and animals at the Vina Plains Preserve (Alexander and Schlising 1997) was funded by the Service and the California Department of Fish and Game using section 6 funds.

Hartweg's golden sunburst

Reasons for Decline and Threats to Survival

Residential development, agricultural conversion, and possibly cattle grazing and mining have contributed to the decline of *Pseudobahia bahiifolia*. Residential development has extirpated two occurrences (Element Occurrences 6 and 7) near La Grange in Stanislaus County and possibly a third (Element Occurrence 5). The site of Element Occurrence 1 in Madera County was converted to a pistachio orchard. Element Occurrence 8 in Stanislaus County apparently has been eliminated by inappropriate cattle grazing and trampling. The exact locations of the type locality in Yuba County (Element Occurrence 10) and Element Occurrence 11 in Stanislaus County are not certain so the specific cause of extirpation cannot be pinpointed. However, residential and industrial development and agriculture have eliminated all suitable habitat from the vicinity of Element Occurrence 10. Similarly, a quarry and agricultural operations have destroyed virtually all of the suitable habitat in the area of Element Occurrence 11 (Stebbins 1991, CNDDB 2001).

Several occurrences that remain extant have declined due to habitat fragmentation or degradation. Element Occurrences 25 and 26 most likely are remnants of an occurrence that was once continuous in the area but has been impacted by a quarry that mines pumice (CNDDB 2001). The number of *Pseudobahia bahiifolia* plants has declined at Element Occurrence 21 in Fresno County due to competition with the nonnative grass *Avena* species (Faubion pers. comm. 2001). Inappropriately heavy livestock grazing and trampling during a prolonged drought also degraded many of the occurrences (Stebbins 1991).

The primary threat to *Pseudobahia bahiifolia* is habitat loss through development. All six occurrences in the Friant area of Fresno and Madera counties are threatened by development. Proposed housing developments threaten Element Occurrences 22 and 23. Residential development also is a possibility at the privately-owned portion of Element Occurrence 21 and Element Occurrence 24, especially if Fresno extends its city limits out to Millerton Lake, which is under consideration. The land that includes Element Occurrences 25 and 26 has been bought by a developer, but his particular plans are unknown (Hartesveldt pers. comm. 2001); Element Occurrence 26 comprises the largest known occurrence of *Pseudobahia bahiifolia* (CNDDB 2001). The quarry near Friant is not a current threat because the operators are merely processing already excavated pumice and do not anticipate additional quarrying for many years. However, the second-

largest occurrence of *Pseudobahia bahiifolia* (Element Occurrence 18 in Stanislaus County) is threatened by potential expansion of a quarry (Stebbins 1991, CNDDB 2001).

Eleven occurrences of *Pseudobahia bahiifolia* are accessible to livestock and could be threatened by inappropriate grazing practices. Grazing levels are inappropriate if they result in trampling of *Pseudobahia bahiifolia* plants, consumption of flower heads before the seeds disperse, or excessive soil erosion. However, "moderate" grazing early in the growing season may be beneficial to reduce competition from aggressive plants (Stebbins 1991). Among the 11 extant occurrences subject to grazing, four are threatened directly by excessive use. In addition, an inappropriate grazing regime is contributing to soil erosion at Element Occurrence 18, where the second-largest occurrence of *Pseudobahia bahiifolia* grows on the bank above a creek (Stebbins 1991, CNDDB 2001). Competition remains a threat at a site near the Friant dam (Faubion pers. comm. 2001) and another near the frianite quarry. Miscellaneous threats to *Pseudobahia bahiifolia* include road widening at Element Occurrence 25, and off-highway vehicle use at Element Occurrences 21 and 26 (CNDDB 2001).

The four occurrences with fewer than 100 plants and another with fewer than 200 plants may be in danger of extirpation from random events. When this species was listed as endangered (Service 1997*a*), 11 of 16 extant populations were reported to consist of fewer than 200 plants and thus were in danger of extirpation from random events. The current count differs from that reported in the final rule due to updated information on several of the populations. The counts in the final rule were based on data as of 1990. Since that time, two of the small occurrences have been extirpated by development and two others probably have been extirpated by habitat degradation in combination with their small occurrence size; two others have increased in size to more than 200 plants; one that is described as "small" does not have an occurrence figure so cannot be categorized reliably; and one new occurrence of 65 plants has been discovered (CNDDB 2001).

Greene's tuctoria

Reasons for Decline and Threats to Survival

One of the primary causes of extirpation for Greene's tuctoria was conversion to irrigated agriculture; 11 of 19 (57.9 percent) extirpated occurrences were due at least in part to agricultural conversions. Stanislaus and Fresno counties experienced the greatest loss to agricultural conversion, with four and three such extirpations, respectively. Excessive livestock grazing was the sole or partial cause of extirpation for six populations (31.6 percent) (Stone *et al* 1988, CNDDB 2001).

Greene's tuctoria is less tolerant of livestock grazing and competition from other plants than most of the other Orcuttieae, probably because it occurs in portions of pools that dry

early in the spring. Anecdotal evidence of its lower tolerance to grazing is that Greene's tuctoria has disappeared from one grazed site where Hoover's spurge still occurs and from another site where Colusa grass remains (CNDDB 2001). Fifteen of the 20 remaining populations are subject to cattle grazing and associated trampling, and at least 4 of those are declining (Stone *et al*. 1988, CNDDB 2001). Four other occurrences on the Vina Plains Preserve had been declining (Stone *et al.* 1988, CNDDB 2001) but these occurrences improved after grazing was discontinued. Competition from weedy plants, such as the native cocklebur and the nonnative swamp grass, apparently is reducing occurrence vigor at six localities in the Sacramento and San Joaquin valleys (Stone *et al*. 1988, CNDDB 2001). Agricultural conversion remains a threat to the Merced County populations, which are the only ones remaining in the San Joaquin Valley. Grasshoppers can consume entire populations of Greene's tuctoria before they set seed (Griggs 1980, Griggs and Jain 1983, Stone *et al.* 1988).

Small occurrence size (fewer than 100 plants) poses a possible threat to the persistence of several occurrences. One occurrence in Merced County consisted of only a single plant in 1987, and one in Butte County contained 75 plants (Stone *et al*. 1988, CNDDB 2001). The Shasta County occurrence of Greene's tuctoria also may have declined to the point where it could be extirpated by random causes. Although this occurrence of Greene's tuctoria consisted of 2,500 plants in 1993 and 1994, the occurrence declined to 120 in 1996 and 35 in 1998 despite favorable hydrological conditions. However, additional investigation of all four populations is necessary to determine whether or not larger soil seed banks exist.

Surveys by Hoover (1937, 1941) documented the historic range of Greene's tuctoria. Later surveys by Crampton (1959) and Medeiros (1976) revealed the destruction of various occurrences. The most recent comprehensive survey (Stone *et al*. 1988) was funded by the Service to determine the status of Greene's tuctoria and related species. During the course of their surveys and related projects, Stone and others (1988) discovered four populations that were previously unknown. Research conducted by Griggs (1980) provided insights into the demography, ecology, and genetics of Greene's tuctoria, among other species. As part of his research, Griggs attempted to introduce Greene's tuctoria to two pools in Butte County, but the species never became established. Keeley (1988) conducted research on the conditions necessary for germination. The Service and California Department of Fish and Game supported an ecological study of Greene's tuctoria and other rare species on the Vina Plains Preserve in 1995 (Alexander and Schlising 1997).

Conservancy Fairy Shrimp, Vernal Pool Fairy Shrimp, and Vernal Pool Tadpole Shrimp

Reasons for Decline and Threats to Survival

Holland (1978) estimated that about two thirds of the grasslands that once supported vernal pools in the Central Valley had been destroyed by 1973 with an associated loss of nearly 90 percent of vernal pool habitat. In subsequent years, a substantial amount of the remaining habitat for vernal pool crustaceans has been destroyed with estimates of habitat loss ranging from two to three percent per year (Holland 1988). State and local laws and regulations have not been passed to protect these species, and other regulatory mechanisms necessary for the conservation of the habitat of these species have proven ineffective. This includes the substantial amount of vernal pool habitat being converted for human uses in spite of Federal regulations implemented to protect wetlands.

The habitat of the three vernal pool crustaceans is imperiled by a variety of activities, primarily by urban development, water supply and flood control activities, and conversion of land to agricultural use. Habitat loss occurs from direct destruction and modification of pools due to filling, grading, discing, leveling, and other activities, as well as modification of surrounding uplands. Vernal pool crustaceans and their habitat also are threatened by altered flood regimes, degraded water quality, siltation, erosion, grazing, improper burning, military operations, off-road vehicles, pollution, certain mosquito abatement measures, pesticide/herbicide use, vandalism, road and trail maintenance, introduction of nonnative predators, alterations of vernal pool hydrology, fertilizer and pesticide contamination, invasions of aggressive nonnative plants, gravel mining, and contaminated stormwater runoff.

In addition to direct habitat loss, the vernal pool habitat for listed vernal pool crustaceans is also highly fragmented throughout their ranges due to the nature of vernal pool landscapes and the conversion of natural habitat by human activities. Such fragmentation results in small, isolated populations of listed crustaceans which may be more susceptible to extinction due to random demographic, genetic, and environmental events (Gilpin and Soule 1988, Goodman 1987 *a, b*). Should an extirpation event occur in an occurrence that has been fragmented, the opportunities for recolonization would be greatly reduced due to physical (geographical) isolation from other (source) populations.

In areas where vernal pool crustacean habitats have been protected, the species may still be threatened if adequate monitoring and management is not conducted. Management and monitoring are necessary to recognize and protect populations from indirect effects, such as changes in hydrology, contamination, siltation, erosion, competition with nonnative species, and human-related disturbance, such as off road vehicle use. Vernal pool fairy shrimp, Conservancy fairy shrimp, and vernal pool tadpole shrimp continue to be threatened by all of the factors which led to the original listing of this species, primarily habitat loss through agricultural conversion and urbanization (CNDDB 2002).

Helm (1998) found that most Conservancy fairy shrimp occurrences were on Anita, Pescadero or Peters Clay soils. These fertile basin rim soils were among the first areas converted to agriculture in the 19th century, suggesting that a disproportionate amount of

Conservancy fairy shrimp habitat may have been lost early in California's history (Helm 1998). In addition to direct habitat loss, almost one third of the known occurrences of Conservancy fairy shrimp are threatened by alterations of hydrology, including the construction of drainage channels, diking, and inappropriate water diversion within managed wetland areas in Merced and Solano counties (CNDDB 2002). Other threats include possible introduction of predators (e.g., bullfrogs, crayfish, fish) either directly or through alteration of drainage patterns (CNDDB 2002). Off-road vehicles also represent a threat to the continued survival of Conservancy fairy shrimp populations (Hathaway *et al.* 1996). In some cases, special management actions may be necessary to prevent these threats from extirpating occurrences of Conservancy fairy shrimp.

Vernal pool tadpole shrimp occurrences have been extirpated as a result of urban development, primarily in Sacramento and Tehama counties. CNDDB (2001) estimates that 32 percent of the remaining occurrences of this species are threatened by development and agricultural conversion. Other vernal pool tadpole shrimp occurrences are threatened by off road vehicle use, road construction and maintenance, mining, and landfill construction (CNDDB 2001). Several occurrences are threatened by intentional discing and altered hydrology of their habitats (CNDDB 2001). In some cases vernal pool tadpole shrimp occurrences have been altered so that they contain water year round, allowing predators such as bullfrogs and fish to colonize vernal pool habitats (CNDDB 2001). In other cases artificial run off has resulted in the delivery of materials that destroy vernal pool water quality, including pesticides from vineyards and other irrigated agricultural lands, pesticides from golf courses, and sediment from surrounding developments (CNDDB 2001). Several vernal pool tadpole shrimp occurrences are threatened by wetland management activities that are designed to transform their vernal pool habitats into permanent marshes for the benefit of other species (CNDDB 2001). Several other occurrences are threatened by the construction of drainage ditches, which artificially drain vernal pool tadpole shrimp habitats (CNDDB 2001).

Vernal Pool Crustaceans in Merced County

Eastern Merced encompasses the largest block of pristine, high density vernal pool grasslands remaining in California (Holland 1998, Vollmar 1999). The vernal pool grasslands in eastern Merced are located midway in a chain of vernal pool complexes that straddles the valley floor and the southern Sierra Nevada foothills. Habitat in the Study Area helps to maintain connectivity between remaining vernal pool habitat on the valley floor and habitats to the north and south. The relatively undisturbed, hydrologically intact condition of the area increases the likelihood that it will continue to support natural vernal pool ecosystem processes and maintain suitable habitat conditions for vernal pool fairy shrimp, Conservancy fairy shrimp, and vernal pool tadpole shrimp.

Genetic analyses of vernal pool tadpole shrimp revealed that occurrences in this unit were genetically different from other occurrences in California, and that this area had likely

been isolated from other vernal pool habitats for a significant period of time (King 1996). Given that vernal pool crustaceans are dispersed in similar ways, it is reasonable to assume that Conservancy fairy shrimp and vernal pool fairy shrimp occurrences in this area are also isolated from other occurrences throughout their range. Such isolated populations may have genetic characteristics essential to overall long-term conservation of the species (i.e. they may be genetically different than more central populations) (Lesica and Allendorf 1995).

According to the 1997 National Resources Inventory, released by the Natural Resources Conservation Service (1997), California ranked sixth in the nation in number of acres of private land developed between 1992 and 1997, at nearly 695,000 acres. State and local laws and regulations do not protect listed vernal pool crustaceans, while other laws and regulations, including the Clean Water Act, have not effectively maintained habitat necessary to conserve and recover these species. Although developmental pressures continue, only a small fraction of vernal pool habitat is protected from the threat of destruction.

According to Holland (1998), approximately 30,317 acres of vernal pool grasslands were lost in Merced County over a period of ten years from 1987 to 1997, thus resulting in a cumulative loss of 10.72 percent and an annual loss of 1.13 percent. Vernal pool grasslands in Merced County typically support numerous pools of various sizes. Many of these pools and surrounding upland habitats are essential for the conservation and recovery of listed species. Because of the limited and disjunct distribution of vernal pools, coupled with the even more limited distribution of special-status vernal pool crustaceans, any reduction in vernal pool habitat quantity could adversely affect these species. The integrity of the vernal pool complexes in eastern Merced is seriously threatened by irrigated agriculture and urban development.

Vernal Pool Fairy Shrimp in Merced County

While most of the vernal pool fairy shrimp populations in California have been affected by habitat fragmentation, eastern Merced County populations are currently among the least fragmented in the State (Holland 1998). There are more documented occurrences of vernal pool fairy shrimp in eastern Merced than any other area throughout the species range (CNDDB 2001). Almost 15 percent of all remaining vernal pool habitats in the Central Valley are located within eastern Merced (Holland 1998). There are a total of 301 vernal pool fairy shrimp occurrences identified in 26 counties in California. Fifty-seven (19 percent) of the occurrences are located in Merced County, a large majority of which are within the Study Area (CNDDB 2002). The Study Area represents a small portion of the entire species-wide range for vernal pool fairy shrimp. However, because of the limited and disjunct distribution of this species within its range, any reduction in vernal pool habitat quantity could adversely affect this species. The Study Area contains multiple large vernal pool fairy shrimp occurrences that are capable of

producing large numbers of cysts in good years, which is important for this species to survive through a variety of natural and environmental changes, as well as stochastic (random) events.

The vernal pool fairy shrimp was found widely distributed throughout the Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) survey area covering 45,000 acres of ranchland throughout eastern Merced County. Vollmar Consulting (2002) conducted surveys on three properties where easements have been or will be acquired by WCB; these surveys located vernal pool fairy shrimp in 19-59 percent of pools surveyed. This species was seldom found in the large pools targeted for Conservancy fairy shrimp surveys, and percent occupancy rate was significantly higher in areas with flat to low-gradient terrain (Vollmar 2001).

The vernal pool fairy shrimp is the most widely distributed of the three vernal pool crustacean species in the Study Area. It has been found in every vernal pool complex surveyed in the Study Area in a wide variety of pool sizes and topographic conditions. The species was identified in more than 60 percent of the pools that were sampled for the LRDP and UCP surveys within the Study Area. Based on the documented presence of more than 10,500 pools within the VST and CNR, the species could be expected to occur in more than 5,700 pools in these two areas. Although some portions of the Study Area have not been surveyed, this species is presumed to be present in all suitable habitat.

Conservancy Fairy Shrimp in Merced County

Only 18 populations of Conservancy fairy shrimp are known, distributed in disjunct occurrences in Tehama, Butte, Glenn, Solano, Stanislaus, Merced, and Ventura counties. The CNDDB (2002) lists 6 occurrences in Merced County. Because of the limited distribution of this species, every occurrence is considered significant in terms of species survival and recovery.

The Study Area and surrounding habitat contain occurrences of the species within large, playa vernal pools found on Raynor Cobbly clay soils on the Merhten Formation (CNDDB 2001, EIP Associates 1999*b*). These pool types provide the necessary length and timing of inundation essential for the conservation of Conservancy fairy shrimp. There are three large playa pools in the central rangeland portion of eastern Merced; one occurrence each on Flying M Ranch, Ichord Ranch and VST/University land (Vollmar 2002).

The Conservancy fairy shrimp was found in two large pools during NCCP/HCP surveys of eastern Merced County. One of these two pools was a previously known location for the species on the Flying M Ranch east of the Study Area, originally recorded by Eng *et al.* (1990). The second is a newly discovered occurrence on a ranch just east of the Study Area. Dr. Brent Helm who participated in these surveys identified three other pools, in

addition to the three known occurrences, in eastern Merced County with high potential to support the species. These three pools were dry when the surveys were conducted and therefore could not be sampled. The Conservancy fairy shrimp occurrence at the Flying M Ranch, just outside of the eastern boundary of the Study Area, is already being managed through a conservation easement with TNC that conserves over 5,000 acres of vernal pool and upland habitat.

A single occurrence has been documented in the Study Area; this occurrence occupies a large (509,000 ft^2) playa-type vernal pool on Raynor Clay in the southern portion of the CNR, which was established to protect the occupied pool and its watershed from development effects. Conservancy fairy shrimp were not found in other playa-type pools in the survey area, although vernal pool fairy shrimp were found in some of these pools.

Helm (1998) states that pools where this species is found are generally turbid because of the large wind-exposed surface and fine substrate. The aerial photographs of the Study Area, and vernal pool grassland habitat east of it, show that the pools where the Conservancy fairy shrimp were found exhibit a much higher level of turbidity than the pools where this species was not found. Sampling was specially designed for the detection of this species, focusing on large pools and pools with appropriate soils. The pool where this species was found within the CNR exhibited special habitat characteristics not found in other pools within the Study Area (the largest pool with milky turbidity). Therefore, in view of the specialized habitat requirements of this species, it is unlikely that populations of Conservancy fairy shrimp occur in any pools where they have not already been documented within the Study Area.

Vernal Pool Tadpole Shrimp in Merced County

There are a total of 157 known occurrences of vernal pool tadpole shrimp in 17 counties. Approximately 11 percent of the CNDDB occurrences are located in Merced County (CNDDB 2002). Vernal pool grasslands in eastern Merced County contain more documented occurrences of the species than any other area throughout the species range (CNDDB 2001). Eastern Merced County contains almost 15 percent of all remaining vernal pool habitats in the Central Valley, and 40 percent of vernal pool habitats along the eastern margin of the San Joaquin Valley are found within this area (Holland 1998). Genetic analyses of vernal pool tadpole shrimp revealed that occurrences in this area are genetically different from other occurrences (King 1996). Of all occurrences studied, King (1996) found these to be the most highly divergent.

Vernal pool tadpole shrimp were found concentrated in the central and southern regions of the NCCP/HCP survey area in eastern Merced County. This species was found in only 6.1 percent of the pools sampled during random stratified surveys (86 out of 1,408 pools). Of the five ranches where it was recorded during surveys for the NCCP/HCP, it was most abundant on two ranches (60.7 percent and 47.5 percent occupancy rates).

Vollmar Consulting attributed this to the fact that these ranches support a high density of larger pools and deeper pools (Vollmar 2001).

Vernal pool tadpole shrimp were found in four pools in the eastern portion of the Study Area, on VST lands east of the proposed Phase 1 development on the golf course in pools surrounding Black Rascal Creek during the 1999 and 2000 surveys for the LRDP. During surveys for the Campus Parkway, vernal pool tadpole shrimp were found in approximately 47 percent (146 out of 313) of the pools sampled in the Black Rascal Creek Complex and approximately 26 percent (33 out of 128) of the pools in the Upper Terrace Complex (URS 2000).

The vernal pool tadpole shrimp was found within the Study Area in a clumped distribution, primarily in the eastern portion within the Black Rascal Creek watershed. However, the species potentially occurs in other pools within the Study Area because representative sampling was conducted in the LRDP survey area, and not all pools were sampled. Also, this species may have gone undetected during sampling, because it can burrow into pool bottoms. In addition, one or two years of surveys may not adequately assess the presence or absence of vernal pool tadpole shrimp, because the cysts of this species have been known to lie dormant for as long as four years. The local distribution of vernal pool tadpole shrimp can fluctuate from year to year due to extirpations within pools and recolonization through water flow or via waterfowl. Because of this species' occurrence dynamics, the survey limitations, and the lack of specific known habitat conditions that would explain why this species would not occupy particular pools, it should be assumed that vernal pool tadpole shrimp may potentially occur in all vernal pools within the Study Area.

Valley Elderberry Longhorn Beetle

Reasons for Decline and Threats to Survival

The following paragraphs analyze the effects of past and ongoing factors leading to the current status of the species, its habitat and ecosystem throughout its range. They include an analysis of effects from projects that have received incidental take authorization for the beetle since the species was listed, and an evaluation of conservation efforts aimed at minimizing these effects, based on the best available information.

Habitat loss has been ranked as the single greatest threat to biodiversity in the United States (Wilcove *et al*. 1998). In the 1980 final rule to list the beetle as threatened, habitat destruction was cited as the primary factor contributing to the need to federally list the species. As stated in the final rule, by the time the species was listed its habitat had largely disappeared throughout much of its former range due to agricultural conversion, levee construction, and stream channelization. The 1984 recovery plan reiterated that the primary threat to the beetle was loss and alteration of habitat by agricultural conversion,

grazing, levee construction, stream and river channelization, removal of riparian vegetation, riprapping of shoreline, plus recreational, industrial and urban development (Service 1984).

Riparian forests, the primary habitat for the beetle, have been severely depleted throughout the Central Valley over the last two centuries as a result of expansive agricultural and urban development (Katibah 1984, Thompson 1961, Roberts *et al.* 1977). Since colonization, these forests have been "...modified with a rapidity and completeness matched in few parts of the United States" (Thompson 1961). As of 1849, the rivers and larger streams of the Central Valley were largely undisturbed. They supported continuous bands of riparian woodland four to five miles in width along some major drainages such as the lower Sacramento River, and generally about two miles wide along the lesser streams (Thompson 1961). Most of the riverine floodplains supported riparian vegetation to about the 100-year flood line (Katibah 1984). A large human population influx occurred after 1849, however, and much of the Central Valley riparian habitat was rapidly converted to agriculture and used as a source of wood for fuel and construction to serve a wide area (Thompson 1961). By as early as 1868, riparian woodland had been severely impacted in the Central Valley, as evidenced by the following excerpt:

> This fine growth of timber which once graced our river [Sacramento], tempered the atmosphere, and gave protection to the adjoining plains from the sweeping winds, has entirely disappeared - the woodchopper's axe has stripped the river farms of nearly all the hard wood timber, and the owners are now obliged to rely upon the growth of willows for firewood. (Cronise 1868, *in* Thompson 1961).

The clearing of riparian forests for fuel and construction made this land available for agriculture (Thompson 1977). Natural levees bordering the rivers, once supporting vast tracts of riparian habitat, became prime agricultural land (Thompson 1961, 1977). As agriculture expanded in the Central Valley, needs for increased water supply and flood protection spurred water development and reclamation projects. Artificial levees, river channelization, dam building, water diversion, and heavy groundwater pumping further reduced riparian habitat to small, isolated fragments (Katibah 1984). In recent decades, these riparian areas have continued to decline as a result of ongoing agricultural conversion as well and urban development and stream channelization. As of 1989, there were over 100 dams within the Central Valley drainage basin, as well as thousands of miles of water delivery canals and streambank flood control projects for irrigation, municipal and industrial water supplies, hydroelectic power, flood control, navigation, and recreation (Frayer *et al.* 1989). Riparian forests in the Central Valley have dwindled to discontinuous strips of widths currently measurable in yards rather than miles.

Some accounts state that the Sacramento Valley supported approximately 775,000 to 800,000 acres of riparian forest as of approximately 1848, just prior to statehood (Smith

1977, Katibah 1984). No comparable estimates are available for the San Joaquin Valley. Based on early soil maps, however, more than 921,000 acres of riparian habitat are believed to have been present throughout the Central Valley under pre-settlement conditions (Katibah 1984). Another source estimates that of approximately 5,000,000 acres of wetlands in the Central Valley in the 1850s, approximately 1,600,000 acres were riparian wetlands (Warner and Hendrix 1985, Frayer *et al.* 1989).

California Department of Fish and Game (CDFG) riparian vegetation distribution map illustrates that by 1979, about 102,000 acres of riparian vegetation was remaining in the Central Valley. This represents a decline in acreage of approximately 89 percent as of 1979 (Katibah 1984). More extreme figures were given by Frayer *et al.* (1989), who reported that woody riparian forests in the Central Valley had declined to 34,600 acres by the mid-1980s (from 65,400 acres in 1939). Although these studies have differing findings in terms of the number of acres lost (most likely explained by differing methodologies), they attest to a dramatic historic loss of riparian habitat in the Central Valley. As there is no reason to believe that riparian habitat suitable to the beetle (occupied by elderberry shrubs) would be destroyed at a different rate than other riparian habitat, we can assume that the rate of loss for beetle habitat in riparian areas has been equally dramatic.

A number of studies have focused on riparian loss along the Sacramento River, which supports some of the densest known populations of the beetle. Approximately 98 percent of the middle Sacramento River's historic riparian vegetation was believed to have been extirpated by 1977 (McGill 1979). The State Department of Water Resources estimated that native riparian habitat along the Sacramento River from Redding to Colusa decreased from 27,720 acres to 18,360 acres (34 percent) between 1952 and 1972 (McGill 1979, Conrad *et al.* 1977). The average rate of riparian loss on the middle Sacramento River was 430 acres per year from 1952 to 1972, and 410 acres per year from 1972 to 1977. In 1987, riparian areas as large as 180 acres were observed converted to orchards along this river (McCarten and Patterson 1987).

Barr (1991) examined 79 sites in the Central Valley supporting beetle habitat. When 72 of these sites were re-examined by researchers in 1997 (Collinge *et al.* 2001), seven no longer supported beetle habitat. This represents a decrease in the number of sites with beetle habitat by approximately nine percent in six years. There is no comparable information on the historic loss of non-riparian beetle habitat such as elderberry savanna and other vegetation communities where elderberry occurs (oak or mixed chaparral-woodland, or grasslands adjacent to riparian habitat). However, all natural habitats throughout the Central Valley have been heavily impacted within the last 200 years (Thompson 1961), and we can therefore assume that non-riparian beetle habitat also has suffered a widespread decline. This analysis focuses on loss of riparian habitat because the beetle is primarily dependent upon riparian habitat. Adjacent upland areas are also likely to be important for the species, but this upland habitat typically consists of oak

woodland or elderberry savanna bordering willow riparian habitat (Barr 1991). The riparian acreage figures given by Frayer *et al.* (1989) and Katibah (1984) included the oak woodlands concentrated along major drainages in the Central Valley, and therefore probably included lands we would classify as upland habitat for the beetle adjacent to riparian drainages.

Between 1980 and 1995, the human population in the Central Valley grew by 50 percent, while the rest of California grew by 37 percent. The Central Valley's population was 4.7 million by 1999, and it is expected to more than double by 2040. The American Farmland Trust estimates that by 2040 more than 1 million cultivated acres will be lost and 2.5 million more put at risk (Ritter 2000). With this growing population in the Central Valley, increased development pressure is likely to result in continuing loss of riparian habitat.

While habitat loss is clearly a large factor leading to the species' decline, other factors are likely to pose significant threats to the long term survival of the beetle. Only approximately 20 percent of riparian sites with elderberry observed by Barr (1991) and Collinge *et al.* (2001) support beetle populations (Barr 1991, Collinge *et al.* 2001). Jones and Stokes (1988) found 65 percent of 4,800 riparian acres on the Sacramento River to have evidence of beetle presence. The fact that a large percentage of apparently suitable habitat is unoccupied suggests that the valley elderberry longhorn beetle is limited by factors other than habitat availability, such as habitat quality or limited dispersal ability.

Destruction of riparian habitat in central California has resulted not only in a loss of acreage, but also in habitat fragmentation. Fahrig (1997) states that habitat fragmentation is only important for habitats that have suffered greater than 80 percent loss. Riparian habitat in the Central Valley, which has experienced greater than 90 percent loss by most estimates, would meet this criterion as habitat vulnerable to effects of fragmentation. Existing data suggests that beetle populations, specifically, are affected by habitat fragmentation. Barr (1991) found that small, isolated habitat remnants were less likely to be occupied by beetles than larger patches, indicating that beetle subpopulations are extirpated from small habitat fragments. Barr (1991) and Collinge *et al.* (2001) consistently found beetle exit holes occurring in clumps of elderberry bushes rather than isolated bushes, suggesting that isolated shrubs do not typically provide long-term viable habitat for this species. Local populations of organisms often undergo periodic colonization and extinction, while the metapopulation (set of spatially separated groups of a species) may persist (Collinge 1996).

Habitat fragmentation can be an important factor contributing to species declines because: (1) it divides a large population into two or more small populations that become more vulnerable to direct loss, inbreeding depression, genetic drift, and other problems associated with small populations; (2) it limits a species' potential for dispersal and colonization; and (3) it makes habitat more vulnerable to outside influences by increasing

the edge to interior ratio (Primack 1998). These factors, as they relate to the beetle, are discussed below.

Small, isolated subpopulations are susceptible to extirpation from random demographic, environmental, and/or genetic events (Shaffer 1981, Lande 1988, Primack 1998). While a large area may support a single large population, the smaller subpopulations that result from habitat fragmentation may not be large enough to persist over a long time period. As a population becomes smaller, it tends to lose genetic variability through genetic drift, leading to inbreeding depression and a lack of adaptive flexibility. Smaller populations also become more vulnerable to random fluctuations in reproductive and mortality rates, and are more likely to be extirpated by random environmental factors.

Species that characteristically have small population sizes, such as large predators or habitat specialists, are more likely to become extinct than species that typically have large populations (Primack 1998). Also, a species with low population density (few individuals per unit area) tends to have only small populations remaining if its habitat is fragmented. Populations of species that naturally occur at lower density become extinct more rapidly than do those of more abundant species (Bolger *et al.* 1991). The species may be unable to persist within each fragment, and gradually die out across the landscape.

The beetle, a specialist on elderberry plants, tends to have small population sizes, and to occur in low densities (Barr 1991, Collinge *et al.* 2001). Collinge *et al.* (2001) compared resource use and density of exit holes between the beetle and a related subspecies, the California elderberry longhorn beetle (*Desmocerus californicus californicus*). The beetle tended to occur in areas with higher elderberry densities, but had lower exit hole densities than the California elderberry longhorn beetle. With extensive riparian habitat loss and fragmentation, these naturally small populations are broken into even smaller, isolated populations. Once a small population has been extirpated from an isolated habitat patch, the species may be unable to re-colonize this patch if it is unable to disperse from nearby occupied habitat.

Insects with limited dispersal and colonization abilities may persist better in large habitat patches than small patches because small fragments may be insufficient to maintain viable populations and the insects may be unable to disperse to more suitable habitat (Collinge 1996). Studies suggest that the beetle is unable to re-colonize drainages where the species has been extirpated, because of its limited dispersal ability (Barr 1991, Collinge *et al.* 2001). Huxel and Hastings (1999) used computer simulations of colonization and extinction patterns for the beetle based on differing dispersal distances, and found that the short dispersal simulations best matched the 1997 census data in terms of site occupancy. This data suggests that in the natural system dispersal and, thus, colonization is limited to nearby sites. At spatial scales greater than 0.62 mile, such as across drainages, beetle occupancy appears to be strongly influenced by regional extinction and colonization processes, and colonization is constrained by limited dispersal (Collinge *et*

al. 2001). Except for one occasion, drainages examined by Barr that were occupied in 1991 remained occupied in 1997 (Collinge *et al.* in 2001). The one exception was Stoney Creek, which was occupied in 1991 but not in 1997. All drainages found by Barr (1991) to be unoccupied in 1991 were also unoccupied in 1997. This data suggests that drainages unoccupied by the beetle remain so.

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of nonnative species (Huxel 2000, Soule 1990) and pesticide contamination (Barr 1991). There are several edge effect-related factors that may be related to the decline of the beetle.

Recent evidence indicates that the invasive Argentine ant poses a risk to the long-term survival of the beetle. Surveys along Putah Creek found beetle presence where Argentine ants were not present or had recently colonized, and beetle absence from otherwise suitable sites where Argentine ants had become established (Huxel 2000). The Argentine ant has negatively impacted populations of other native arthropod species (Holway 1995, Ward 1987). Predation on eggs, larvae, and pupae are the most likely effects these ants have on the beetle. In Portugal, Argentine ants have been found to be significant egg predators on the eucalyptus borer (*Phorocantha semipunctata*), a cerambycid like the beetle. Egg predation on the beetle could lead to local extirpations, as indicated by a population viability study suggesting that egg and juvenile mortality are significant factors affecting probability of extinction for the beetle (Huxel 2000, Collinge, 2001). The Argentine ant has been expanding its range throughout California since its introduction around 1907, especially in riparian woodlands associated with perennial streams (Holway 1995, Ward 1987). Huxel (2000) states that, given the potential for Argentine ants to spread with the aid of human activities such as movement of plant nursery stock and agricultural products, this species may come to infest most drainages in the Central Valley along the valley floor, where the beetle is found.

Direct spraying and drift of pesticide, including herbicides and/or insecticides, in or near riparian areas (which is done to control mosquitos, crop diseases, invasive and/or undesirable plants, or other pests) is likely to adversely affect the beetle and its habitat. Although there have been no studies specifically focusing on the effects of pesticides on the beetle, the beetle is likely to be adversely affected by pesticides because pesticides often affect numerous non target invertebrate species. As of 1980, the prevalent land use adjacent to riparian habitat in the Sacramento Valley was agriculture, even in regions where agriculture was not generally the most common land use (Katibah *et al.* 1984), therefore, the species is likely vulnerable to pesticide contamination from adjacent agricultural practices. Recent studies of major rivers and streams documented that 96 percent of all fish, 100 percent of all surface water samples and 33 percent of major aquifers contained one or more pesticides at detectable levels (Gilliom 1999). Pesticides were identified as one of the 15 leading causes of impairment for streams included on the

Federal Water Pollution Control Act, as amended (Clean Water Act), section 303(d) lists of impaired waters. As the beetle occurs primarily in riparian habitat, the contamination of rivers and streams affects this species and its habitat. Pesticides have been identified as one of a number of potential causes of pollinator species' declines and declines of other insects beneficial to agriculture (Ingraham *et al.* 1996); therefore, it is likely that the beetle, typically occurring adjacent to agricultural lands, has suffered a decline due to pesticides.

Competition from invasive nonnative plants such as giant reed (*Arundo donax*) negatively affects riparian habitat supporting the beetle. Giant reed, a native of Asia, has become a serious problem in California riparian habitats, forming dense, homogenous stands essentially devoid of wildlife. The giant reed has an extensive root system allowing it to resprout rapidly after any disturbance and out-compete native riparian vegetation. Giant reed also introduces a frequent fire cycle into the riparian ecosystem, disrupting natural riparian dynamics and eventually forming homogenous climax communities. The extent to which giant reed has affected elderberry specifically, however, has not been studied.

Grazing by livestock damages or destroys elderberry plants and inhibits regeneration of seedlings. Cattle readily forage on new growth of elderberry, which may explain the absence of beetles at manicured elderberry stands (Service 1984). Habitat fragmentation exacerbates problems related to nonnative species invasion and cattle grazing by increasing the edge-to-interior ratio of habitat patches, facilitating the penetration of these influences.

Valley Elderberry Longhorn Beetles in Merced County

As of 1998, the California Natural Diversity Database included 194 extant occurrences for this species. Four of these occurrences are from Merced County. The four occurrences are located west of the city of Merced. The nearest documented occurrences of the valley elderberry longhorn beetle to the project Study Area are from locations on the Merced River (CNDDB 2000). No elderberry beetles have been reported within the Study Area or surrounding areas. The closest known occurrence is more than 10 miles from the Study Area. This lack of records, however, does not indicate lack of suitable habitat in the Study Area. Vollmar Associates (2002) reported finding elderberry shrubs on 8 of 12 ranches surveyed in eastern Merced County, including several within the Study Area. While much of the Study Area consists of agricultural lands that are too disturbed by farming activities or upland areas that are too dry to support elderberries, the shrubs are expected to occur along larger streams (e.g., Bear Creek, Black Rascal Creek, Fahrens Creek), along smaller drainages (Owens Creek, and Duck Creek), and locally in uplands. Numerous elderberry shrubs with and without exit holes are present along Bear Creek and surrounding drainages. These habitat sites are close in proximity to facilitate beetle dispersal into the proposed Study Area.

Bald Eagle

Reasons for Decline and Threats to Survival

The bald eagle once nested throughout much of North America near coasts, rivers, lakes, and wetlands. The species experienced population declines throughout most of its range, including California, due primarily to environmental contamination from the use of DDT and other persistent organochlorine compounds, habitat loss and degradation, shooting, and other disturbances (Detrich 1986, Stalmaster *et al.* 1985, Service 1986). A recovery plan was released in 1986 for the recovery and maintenance of bald eagle populations in the 7-state Pacific recovery region (Idaho, Nevada, California, Oregon, Washington, Montana, and Wyoming) (Service 1986). In recent years, the status of bald eagle populations has improved throughout the United States. The observed increase in population is believed to be the result of a number of protective measures enacted throughout the range of the species since the early 1970s including listing of the species. These measures include the banning of the pesticide DDT, stringent protection of nest sites, and protection from shooting, however, bald eagles are still susceptible to a number of threats.

Bald eagles are susceptible to disturbance by human activity during the breeding season, especially during egg laying and incubation. This includes recreational activities, fluctuating fish populations and availability of roost trees as a result of reservoir level fluctuations, risk of wild fire, fire suppression activities, fragmentation of habitat, home sites, campgrounds, mines, timber harvest, and roads. Such disturbances can lead to nest desertion or disruption of breeding attempts. Human activities are more likely to disturb bald eagles when located near roosting, foraging, and nesting areas (Stalmaster and Kaiser 1998, Stalmaster *et al.* 1985, Service 1986). Human interference, such as recreational activity, has also been shown to disrupt the feeding behavior of bald eagles (Stalmaster and Newman 1978, Knight and Knight 1984). Such disturbance can result in increased energy expenditures due to avoidance flights and decreased energy intake due to interference with feeding activity (Stalmaster and Newman 1978).

Many studies have documented a threshold at which human activities elicit response for eagles (Stalmaster and Newman 1978, Knight and Knight 1984), though other studies show little direct effect of human activities on bald eagle nesting attempts (Mathisen 1968, Fraser *et al.*1985). Human induced failures are likely one-time catastrophic events (i.e., firearm target practice) occurring near nests early in the nesting season, which often escape detection (Jackman and Hunt 2000). Several authors have demonstrated that nesting and foraging eagles avoid areas of human use or development (Buehler *et al.* 1991, McGarigal *et al.* 1991, Brown and Steven 1997). Individual pairs of nesting bald eagles exhibit varying level of tolerance to disturbance throughout the breeding season and during periods of foraging.

Bald eagles are vulnerable to electrocution from and collision with transmission lines and towers. Orlendorff and Lehman (1986) collected reports dated from 1965-1985 of bald eagles colliding with transmission lines around the world. The reported mortality rate for bald eagles was 87 percent. They suggested that the heavy weight of eagles could be a factor in the higher mortalities for eagles than for other small buteos. They also observed eagle flight patterns in wintering areas in the vicinity of proposed transmission line routes in California. Eagles were observed flying through drainages, canyons, and saddles, across low ridges, over valleys, and were concentrated above high ridges. Eagles usually flew above 100 feet from the ground.

Bald Eagles in Merced County

Bald eagles winter regularly in eastern Merced County (Vollmar Consulting 2002). During NCCP/HCP surveys for eastern Merced, bald eagles were observed a minimum of seven times, soaring over vernal pool/grassland habitat, perching in trees adjacent to reservoirs and riparian areas, and "perching" on mima mounds adjacent to vernal pools. Until the NCCP/HCP surveys were conducted, there were no reported occurrences of bald eagles breeding in eastern Merced County. One bald eagle nest was found in 2001, along the south bank of the Chowchilla River. At least one bald eagle young fledged from this nest. This nest site is approximately 8 miles from the original Study Area.

Bald eagles were observed on several occasions during surveys for the LRDP. Up to 12 individuals have been observed soaring over grasslands in the Study Area. During winter 2000 vernal pool fairy shrimp surveys for the Campus Parkway, an adult bald eagle was observed flying east to west near the intersection of Lake and Bellevue Roads. On at least four separate days during the winter 1999 vernal pool fairy shrimp surveys, one or two adult bald eagles were observed soaring over grasslands to the east of the proposed Campus Parkway (EIP 2002). Given that bald eagles forage over large areas, it is assumed that eagles forage in suitable habitats throughout the Study Area.

Bald eagles may be attracted to the Study Area by Lake Yosemite, which may supply fish and waterfowl as a prey source. Locations of bald eagle day roost sites have been reported on Lake Yosemite, although the locations of evening roosts in this area are unknown (Vollmar 2001). Eagles likely use grassland habitats within the Study Area occasionally during the winter to forage for carrion, waterfowl, mammals, and waders, to supplement foraging at Lake Yosemite. Grasslands and irrigated pasture north of Cardella Road provide suitable foraging habitat for bald eagles. South of Cardella Road, irrigated pasture is flood irrigated and isolated from other suitable foraging areas by row crops or orchards, making this area less likely to support foraging activities for this species. Bald eagles likely do not nest in the vicinity of the Study Area, as suitable nesting habitat in the form of stands of large riparian trees is not present, and eagles were not observed during the breeding season. Potential bald eagle nesting habitat is present along the Merced and Chowchilla Rivers.

As described above, bald eagles have been observed in the Study Area during the winter. Bald eagles use Lake Yosemite for foraging and potentially for evening roosting. Eagles likely also use vernal pool grassland habitat within the Study Area occasionally during the winter to forage for carrion, waterfowl, mammals, and waders.

San Joaquin Kit Fox

Reasons for Decline and Threats to Survival

The status (i.e., distribution, abundance) of kit fox has decreased since its listing as a federally-endangered species in 1967, and this trend is reasonably certain to continue into the foreseeable future unless measures to protect, sustain, and restore suitable habitats, and alleviate other threats to their survival and recovery, are implemented. This finding is derived from the supporting conclusions and evidence provided in the remainder of this section.

Supporting Conclusion 1

Fewer than 20 percent of the habitat within the historical range of the kit fox remained when the subspecies was listed as federally-endangered in 1967, and there has been a substantial net loss of habitat since that time.

Historically, San Joaquin kit foxes occurred throughout California's Central Valley and adjacent foothills. Extensive land conversions in the Central Valley began as early as the mid-1800s with the Arkansas Reclamation Act. By the 1930's, the range of the kit fox had been reduced to the southern and western parts of the San Joaquin Valley (Grinnell *et al*. 1937). The primary factor contributing to this restricted distribution was the conversion of native habitat to irrigated cropland, industrial uses (e.g., hydrocarbon extraction), and urbanization (Laughrin 1970, Jensen 1972, Morrell 1972, 1975). Approximately one-half of the natural communities in the San Joaquin Valley were tilled or developed by 1958 (Service 1980*a*).

This rate of loss accelerated following the completion of the Central Valley Project and the State Water Project, which diverted and imported new water supplies for irrigated agriculture (Service in litt. 1995a). Approximately 1.97 million acres of habitat, or about 66,000 acres per year, were converted in the San Joaquin region between 1950 and 1980 (California Department of Forestry and Fire Protection 1988). The counties specifically noted as having the highest wildland conversion rates included Kern, Tulare, Kings and Fresno, all of which are occupied by kit foxes. From 1959 to 1969 alone, an estimated 34 percent of natural lands were lost within the then-known kit fox range (Laughrin 1970).

By 1979, only approximately 370,000 acres out of a total of approximately 8.5 million acres on the San Joaquin Valley floor remained as non-developed land (Williams 1985,

Service 1980a). Data from the California Department of Fish and Game (1985) and Service file information indicate that between 1977 and 1988, essential habitat for the blunt-nosed leopard lizard (*Gambelia sila*), a species that occupies habitat that is also suitable for kit foxes, declined by about 80 percent – from 311,680 acres to 63,060 acres, an average of about 22,000 acres per year (Biological Opinion for the Interim Water Contract Renewal, Ref. No. 1-1-00-F-0056, February 29, 2000). Virtually all of the documented loss of essential habitat was the result of conversion to irrigated agriculture. During 1990 to 1996, a gross total of approximately 71,500 acres of habitat were converted to farmland in 30 counties (total area 23.1 million acres) within the Conservation Program Focus area of the Central Valley Project. This figure includes 42,520 acres of grazing land and 28,854 acres of "other" land, which is predominantly comprised of native habitat. During this same time period, approximately 101,700 acres were converted to urban land use within the Conservation Program Focus area (California Department of Conservation 1994, 1996, 1998). This figure includes 49,705 acres of farmland, 20,476 acres of grazing land, and 31,366 acres of "other" land, which is predominantly comprised of native habitat. Because these assessments included a substantial portion of the Central Valley and adjacent foothills, they provide the best scientific and commercial information currently available regarding the patterns and trends of land conversion within the kit fox's geographic range.

In summary, more than one million acres of suitable habitat for kit foxes have been converted to agricultural, municipal, or industrial uses since the listing of the kit fox. In contrast, fewer than 500,000 acres have been preserved and/or are subject to community-level conservation efforts designed, at least in part, to further the conservation of the kit fox (See Table 2)(Service 1998).

Supporting Conclusion 2

The destruction and fragmentation of habitat are reasonably certain to reduce the status of the kit fox.

Land conversions contribute to declines in kit fox abundance through direct and indirect mortalities, displacement, reduction of prey populations and denning sites, changes in the distribution and abundance of larger canids that compete with kit foxes for resources, and reductions in carrying capacity. Kit foxes may be buried in their dens during land conversion activities (Knapp and Chesemore 1987, Van Horn pers. comm. 2000), or permanently displaced from areas where structures are erected or the land is intensively irrigated (Jensen 1972, Morrell 1975). Furthermore, even moderate fragmentation or loss of habitat may significantly impact the abundance and distribution of kit foxes. Capture rates of kit foxes at the Naval Petroleum Reserves in Elk Hills were negatively associated with the extent of oil-field development after 1987 (Warrick and Cypher 1998). Likewise, the California Energy Commission found that the relative abundance of kit foxes was lower in oil-developed habitat than in nearby undeveloped habitat on the

Lokern (Spiegel 1996). Researchers from both studies inferred that the most significant effect of oil development was the lowered carrying capacity for populations of both foxes and their prey species owing to the changes in habitat characteristics or the loss and fragmentation of habitat (Spiegel 1996, Warrick and Cypher 1998).

Kit foxes maintain core home range areas that are exclusive to mated pairs and their offspring (White and Ralls 1993, Spiegel 1996, White and Garrott 1997). This territorial spacing behavior eventually limits the number of foxes that can inhabit an area owing to shortages of available space and/or per capita prey. Hence, as habitat is fragmented or destroyed, the carrying capacity of an area is reduced and a larger proportion of the population is forced to disperse. Increased dispersal generally leads to lower survival rates and, in turn, decreased abundance because greater 65 percent of dispersing juvenile foxes die within 10 days of leaving their natal range (Koopman *et al*. 2000).

Dens are essential for the survival and reproduction of kit foxes which use them year-round for shelter and escape, and in the spring for rearing young (REFS). Hence, kit foxes generally have dozens of dens scattered throughout their territories (REFS). However, land conversion reduces the number of typical, earthen dens available to kit foxes. For example, the average density of typical, earthen kit fox dens at the Naval Hills Petroleum Reserves was negatively correlated with the intensity of petroleum development (Zoellick *et al*. 1987), and almost 20 percent of the dens in developed areas were found to be in well casings, culverts, abandoned pipelines, oil well cellars, or in the banks of sumps or roads (O'Farrell 1983). These results are important because the California Energy Commission found that, even though kit foxes frequently used pipes and culverts as dens in oil-developed areas of western Kern County, only earthen dens were used to birth and wean pups (Spiegel 1996). Similarly, kit foxes in Bakersfield use atypical dens, but have only been found to rear pups in earthen dens (Kelly pers. comm. 2000). Hence, the fragmentation of habitat and destruction of earthen dens could adversely impact the reproductive success of kit foxes. Furthermore, the destruction of earthen dens may also affect kit fox survival by reducing the number and distribution of escape refuges from predators.

Land conversions and associated human activities can lead to widespread changes in the availability and composition of mammalian prey for kit foxes. For example, oil field disturbances in western Kern County have resulted in shifts in the small mammal community from the primarily granivorous species (e.g., *Dipodomys*) that are the staple prey of kit foxes (Spiegel 1996, Cypher *et al*., in press), to species adapted to early successional stages and disturbed areas (e.g., California ground squirrels (*Spermophilus beecheyi*), murid rodents (Spiegel 1996, Cypher *et al*., in press). Because more than 70 percent of the diets of kit foxes usually consist of abundant leporids (*Lepus*, *Sylvilagus*) and rodents (e. g., *Dipodomys spp.*), and kit foxes often continue to feed on their staple prey during ephemeral periods of prey scarcity, such changes in the availability and/or selection of foraging sites by kit foxes could influence their reproductive rates, which are

strongly influenced by food supply and decrease during periods of prey scarcity (White and Garrott 1997, 1999).

Land conversions and associated human activities have led to changes in the distribution and abundance of coyotes (*Canis latrans*), which compete with kit foxes for resources. Coyotes occur in most areas with abundant populations of kit foxes and, during the past few decades, coyote abundance has increased in many areas owing to a decrease in ranching operations, favorable landscape changes, and reduced control efforts (Orloff *et al*. 1986, Cypher and Scrivner 1992, White and Ralls 1993, White *et al*. 1995). Increases in coyote abundance coincided with decreases in the abundances of kit foxes in these same areas, and coyotes were responsible for 50-87 percent of fox deaths in the declining populations (Cypher and Scrivner 1992, Disney and Spiegel 1992, Standley *et al*. 1992, Ralls and White 1995). Land-use changes also contributed to the expansion of nonnative red foxes (*Vulpes vulpes*) into areas inhabited by kit foxes. Historically, the geographic range of the red fox did not overlap with that of the San Joaquin kit fox. By the 1970's, however, introduced and escaped red foxes had established breeding populations in many areas inhabited by San Joaquin kit foxes (Lewis *et al*. 1993). The larger and more aggressive red foxes are known to kill kit foxes (Ralls and White 1995), and could displace them, as has been observed in the arctic when red foxes expanded into the ranges of smaller arctic foxes (Hersteinsson and Macdonald 1992).

Extensive habitat destruction and fragmentation have contributed to smaller, more-isolated populations of kit foxes. Small populations have a higher probability of extinction than larger populations because their low abundance renders them susceptible to stochastic (i.e., random) events such as high variability in age and sex ratios, and catastrophes such as floods, droughts, or disease epidemics (Lande, 1988, Frankham and Ralls 1998, Saccheri *et al*., 1998). Similarly, isolated populations are more susceptible to extirpation by accidental or natural catastrophes because their recolonization has been hampered. These chance events can adversely affect small, isolated populations with devastating results, as evidenced by the decimation of the sole colony of black-footed ferrets (*Mustela nigripes*) following its infection with canine distemper (May 1986). Extirpation can even occur when the members of a small population are healthy, because whether the population increases or decreases in size is less dependent on the age-specific probabilities of survival and reproduction than on raw chance (sampling probabilities). Owing to the probabilistic nature of extinction, many small populations will eventually lose out and go extinct when faced with these stochastic risks (Caughley and Gunn 1996).

Many populations of kit fox are at risk of chance extinction owing to small population size and isolation. This risk has been prominently illustrated during recent, drastic declines in the populations of kit foxes at Camp Roberts and Fort Hunter Liggett. Captures of kit foxes during annual livetrapping sessions at Camp Roberts decreased from 103 to 20 individuals during 1988 to 1991. This decrease continued through 1997 when

only three kit foxes were captured (White *et al.* 2000). A similar decrease in kit fox abundance occurred at nearby (approximately 20 km) Fort Hunter Liggett, and only 2 kit foxes have been observed on this installation since 1995 (Clark pers. comm. 2000). It is unlikely that the current low abundances of kit foxes at Camp Roberts and Fort Hunter Liggett will increase substantially in the near future owing to the limited potential for recruitment. The chance of substantial immigration is low because the nearest core population on the Carrizo Plain is distant (greater than 80 km) and separated from these installations by barriers to fox movement such as roads, developments, and irrigated agricultural areas. Also, there is a relatively high abundance of sympatric predators and competitors on these installations that contribute to low survival rates for kit foxes and, as a result, may limit population growth (White *et al*. 2000). Hence, these populations are currently on the verge of extinction.

The destruction and fragmentation of habitat could also eventually lead to reduced genetic variation in populations of kit foxes that are small and geographically isolated. Historically, kit foxes likely existed in a metapopulation structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998). Preliminary genetic assessments indicate that historic gene flow among populations was quite high, with effective dispersal rates of at least one to 4 dispersers per generation (Schwartz pers. comm. 2000). This level of genetic dispersal should allow for local adaptation while preventing the loss of any rare alleles. Based on these results, it is likely that northern populations of kit foxes were once panmictic (i.e., randomly mating in a genetic sense), or nearly so, with southern populations. In other words, there were no major barriers to dispersal among populations. Current levels of gene flow also appear to be adequate, however, extensive habitat loss and fragmentation continues to form more or less geographically distinct populations of foxes, which could potentially reduce genetic exchange among them. An increase in inbreeding and the loss of genetic variation could increase the extinction risk for small, isolated populations of kit foxes by interacting with demography to reduce fecundity, juvenile survival, and lifespan (Lande 1988, Frankham and Ralls 1998, Saccheri *et al*. 1998). One area of particular concern is the locale of Santa Nella in western Merced County where pending development plans threaten to eliminate the little suitable habitat that remains and provides a dispersal corridor for kit foxes between the northern and southern portions of their range. Preliminary estimates of expected heterozygosity from foxes in this area indicate that this population may already have reduced genetic variation. Other populations that may be showing the initial signs of genetic isolation are the Lost Hills area and populations in the Salinas-Pajaro River watershed (i.e., Camp Roberts and Fort Hunter Liggett). Preliminary estimates of the mean number of alleles per locus from foxes in these populations indicate that allelic diversity is lower than expected. Although these results may, in part, be due to the small number of foxes sampled in these areas, they may also be indicative of an increase in the amount of inbreeding due to population subdivision (Schwartz pers. comm. 2000). Further sampling and analyses are necessary to adequately assess the effects of these potential genetic bottlenecks.

Supporting Conclusion 3

The loss and fragmentation of habitat by agricultural, municipal, and industrial developments continue to be the primary threats to the survival and recovery of the kit fox, and are reasonably certain to continue into the foreseeable future.

As the human population of central California increases, and more land is converted to municipal and industrial uses, the amount and quality of habitat suitable for kit foxes will inevitably decrease. It has been estimated that between 12,000 and 50,000 acres of land are converted from agricultural use to urban use per year in the Central Valley; a number that is expected to increase in the future (Sokolow 1997). Conversion of agricultural land to urban use between 1995 and 2040 has been predicted to exceed 1,000,000 acres (Thompson *et al*. 1995). The Program Environmental Impact Statement for the Central Valley Project Improvement Act forecasts that municipal and industrial land uses in the Central Valley will increase 50 percent in the next 30 years (Bureau of Reclamation 1997).

This reliable delivery of Federal/State water may contribute for the conversion of habitat throughout the Valley, which could reduce habitat for kit foxes both within and outside the surface delivery areas. Our recent estimate the rate of land conversion in counties that receive Interim Water Contract water, and are within the range of the kit fox, is approximately 9,000 acres per year (Biological Opinion for the Interim Water Contract Renewal, Ref. No. 1-1-00-F-0056, February 29, 2000). Although this rate of conversion is projected to decrease in some counties as the amount of remaining native habitat diminishes, substantial conversion is expected to continue into the foreseeable future as agriculture expands into new areas. Also, the integration of this Federal water with the totality of water supplies in the region will provide water districts and land owners with the flexibility to transfer water to lands throughout the San Joaquin Valley. Consequently, while in some cases Friant or Interim surface water deliveries may not be used directly to convert habitat for listed species, they could serve to free, expedite, or otherwise make available other water sources that can be used to convert habitat of listed species. Thus, enclaves of habitat within the service area boundaries will gradually be lost to agricultural conversions, urban development, and/or other operations. Also, continued water delivery to the identified service areas will preclude some restoration of former habitats for the kit fox. Furthermore, changes to more-intensive farming practices (e.g., from dryland farming to irrigated agriculture or from discing to deep-ripping) and the proliferation of vineyards could increase the severity of agricultural effects on kit foxes and their staple prey species. For example, the rapid conversion of habitat to vineyards along State Highway 46 is threatening the viability of an essential linkage between the Salinas-Pajaro River watershed and the Carrizo Plain and San Joaquin Valley.

To affect these types of impacts, programs such as CVPIA (b)(1)other and CVPCP are designed to restore habitat for threatened and endangered species. Friant water contractors, and part of their long term contract commitments, have agreed not to deliver water to landowners converting native lands and have contributed funding to numerous restoration activities.

The proliferation of electrical generation facilities in the southern part of the San Joaquin Valley will also facilitate private development in areas occupied by kit foxes. According to the Energy Element of the Kern County General Plan, 25 cogeneration projects (representing 994 MW) had begun operation in Kern County by 1990 and an additional 25 projects with a combined output of 1,076 MW were permitted, under construction, or had permit applications pending (Sunrise Cogeneration and Power Project Biological Assessment, June 23, 1999). Currently, there are two 300 MW cogeneration plants in the Kern River oil field and a 225 MW Midway Sunset Cogeneration plant in the Midway Sunset field. However, several additional large-scale generation facilities are pending or proposed, including the 1,000 MW La Paloma project, 500 MW Elk Hills, 320 MW Sunrise Cogeneration and Power project, and the 500 MW Midway Sunset Cogeneration Company project. Although it is impossible to determine where the electricity generated by these facilities will actually be used because it will be introduced into the power grid, it is reasonably certain that the increased electricity will affect the density, distribution, scope, duration, or timing of growth and development in central California and, as a result, indirectly affect the distribution and abundance of kit foxes.

Oil fields in the southern half of the San Joaquin Valley also continue to be an area of expansion and development activity (Sunrise Cogeneration and Power Project Biological Assessment, June 23, 1999). This expansion is reasonably certain to increase in the near future owing to market-driven increases in the price of oil. The cumulative and long-term effects of oil extraction activities on kit fox populations are not fully known, but recent studies indicate that moderate- to high-density oil fields may contribute to a decrease in carrying capacity for kit foxes owing to habitat loss or changes in habitat characteristics (Spiegel 1996, Warrick and Cypher 1998).

In summary, the new infrastructure and increased reserve capacity necessary for continued population growth and development within the Central Valley is currently being provided. There are no limiting factors or regulations that are likely to retard this development or force it to other areas which are already served. Hence, it is reasonably certain that development will continue to destroy and fragment kit fox habitat into the foreseeable future.

Supporting Conclusion 4

Other threats to the survival and recovery of kit foxes have not been alleviated.

Since the listing of the kit fox in 1967, several other threats that limit and/or regulate their populations have been identified. These threats are described in the following paragraphs:

Competitive Interactions with Other Canids: The diets and habitats selected by coyotes and kit foxes living in the same areas are often quite similar (White *et al*. 1995, Cypher and Spencer 1998). Hence, the potential for resource competition between these species may be quite high when prey resources are scarce such as during droughts (which are quite common in semi-arid, central California). Coyotes may attempt to lessen resource competition with kit foxes by killing them. Coyote-related injuries accounted for 50-87 percent of the mortalities of radiocollared kit foxes at Camp Roberts, the Carrizo Plain Natural Area, the Lokern Natural Area, and the Naval Petroleum Reserves (Cypher and Scrivner 1992, Standley *et al*. 1992, Ralls and White 1995, Spiegel 1996). Coyote-related deaths of adult foxes appear to be largely additive (i. e., in addition to deaths caused by other mortality factors such as disease and starvation) rather than compensatory (i. e., tending to replace deaths due to other mortality factors; White and Garrott 1997). Hence, the survival rates of adult foxes decrease significantly as the proportion of mortalities caused by coyotes increase (Cypher and Spencer 1998, White and Garrott 1997), and increases in coyote abundance may contribute to significant declines in kit fox abundance (Cypher and Scrivner 1992, Ralls and White 1995, White *et al*. 1996). There is some evidence that the proportion of juvenile foxes killed by coyotes increases as fox density increases (White and Garrott 1999). This density-dependent relationship would provide a feedback mechanism that reduces the amplitude of kit fox population dynamics and keeps foxes at lower densities than they might otherwise attain. In other words, coyote-related mortalities may dampen or prevent fox population growth, and/or accentuate, hasten, or prolong population declines.

The increased abundance and distribution of nonnative red foxes will also likely adversely impact the status of kit foxes because they are closer morphologically and taxonomically, and would likely have higher dietary overlap than coyotes, potentially resulting in more intense competition for resources. Two documented deaths of kit foxes due to red foxes have been reported (Ralls and White 1995), and red foxes appear to be displacing kit foxes in the northwestern part of their range (Lewis *et al*. 1993). At Camp Roberts, red foxes have usurped several dens that were used by kit foxes during previous years (California Army National Guard, Camp Roberts Environmental Office, unpubl. data). In fact, opportunistic observations of red foxes in the cantonment area of Camp Roberts have increased 5-fold since 1993, and no kit foxes have been sighted or captured in this area since October 1997. Also, a telemetry study of sympatric red foxes and kit foxes in the Lost Hills area has detected spatial segregation between these species, suggesting that kit foxes may avoid or be excluded from red fox-inhabited areas (Kelly pers. comm. 2000). Such avoidance would limit the resources available to local populations of kit foxes and possibly result in decreased fox abundance and distribution.

Disease: Wildlife diseases do not appear to be a primary mortality factor that consistently limits kit fox populations throughout their range (McCue and O'Farrell, 1988, Standley and McCue 1992, Miller *et al*. 1998). However, central California has a high incidence of wildlife rabies cases (Schultz and Barrett 1991), and high seroprevalences of canine distemper virus and canine parvovirus indicate that kit fox populations have been exposed to these diseases (McCue and O'Farrell, 1988, Standley and McCue 1992, Miller *et al*. 1998). Hence, disease outbreaks could potentially cause substantial mortality or contribute to reduced fertility in seropositive females, as was noted in closely-related swift foxes (*Vulpes velox*) (Miller *et al*. 1998). For example, there are some indications that rabies virus may have contributed to a catastrophic decrease in kit fox abundance at Camp Roberts, San Luis Obispo County, California, during the early 1990's. San Luis Obispo County had the highest incidence of wildlife rabies cases in California during 1989 to 1991, and striped skunks (*Mephitis mephitis*) were the primary vector (Barrett 1990, Schultz and Barrett 1991, Reilly and Mangiamele 1992). A rabid skunk was trapped at Camp Roberts during 1989 and two foxes were found dead due to rabies in 1990 (Standley *et al*. 1992). Captures of kit foxes during annual livetrapping sessions at Camp Roberts decreased from 103 to 20 individuals during 1988 to 1991. Captures of kit foxes were positively correlated with captures of skunks during 1988 to 1997; suggesting that some factor(s) such as rabies virus was contributing to concurrent decreases in the abundances of these species. Also, captures of kit foxes at Camp Roberts were negatively correlated with the proportion of skunks that were rabid when trapped by County Public Health Department personnel two years previously. These data suggest that a rabies outbreak may have occurred in the skunk population and spread into the fox population. A similar time lag in disease transmission and subsequent population reductions was observed in Ontario, Canada, although in this instance the transmission was from red foxes to striped skunks (Macdonald and Voigt 1985).

Pesticides and Rodenticides: Pesticides and rodenticides pose a threat to kit foxes through direct or secondary poisoning. Kit foxes may be killed if they ingest rodenticide in a bait application, or if they eat a rodent that has consumed the bait. Even sublethal doses of rodenticides may lead to the death of these animals by impairing their ability to escape predators or find food. Pesticides and rodenticides may also indirectly affect the survival of kit foxes by reducing the abundances of their staple prey species. For example, the California ground squirrel, which is the staple prey of kit foxes in the northern portion of their range, was thought to have been eliminated from Contra Costa County in 1975, after extensive rodent eradication programs. Field observations indicated that the long-term use of ground squirrel poisons in this county severely reduced kit fox abundance through secondary poisoning and the suppression of populations of its staple prey (Orloff *et al*. 1986).

Kit foxes occupying habitats adjacent to agricultural lands are also likely to come into contact with insecticides applied to crops owing to runoff or aerial drift. Kit foxes could be affected through direct contact with sprays and treated soils, or through consumption

of contaminated prey. Data from the California Department of Pesticide Regulation indicate that acephate, aldicarb, azinphos methyl, bendiocarb, carbofuran, chlorpyrifos, endosulfan, s-fenvalerate, naled, parathion, permethrin, phorate, and trifluralin are used within one mile of kit fox habitat. A wide variety of crops (alfalfa, almonds, apples, apricots, asparagus, avocados, barley, beans, beets, bok choy, broccoli, cantaloupe, carrots, cauliflower, celery, cherries, chestnuts, chicory, Chinese cabbage, Chinese greens, Chinese radish, collards, corn, cotton, cucumbers, eggplants, endive, figs, garlic, grapefruit, grapes, hay, kale, kiwi fruit, kohlrabi, leeks, lemons, lettuce, melons, mustard, nectarines, oats, okra, olives, onions, oranges, parsley, parsnips, peaches, peanuts, pears, peas, pecans, peppers, persimmons, pimentos, pistachios, plums, pomegranates, potatoes, prunes, pumpkins, quinces, radishes, raspberries, rice, safflower, sorghum, spinach, squash, strawberries, sugar beets, sweet potatoes, Swiss chard, tomatoes, walnuts, watermelons, and wheat), as well as buildings, Christmas tree plantations, commercial/industrial areas, greenhouses, nurseries, landscape maintenance, ornamental turf, rangeland, rights of way, and uncultivated agricultural and non-agricultural land, occur in close proximity to San Joaquin kit fox habitat.

Efforts have been underway to reduce the risk of rodenticides to kit foxes (Service in litt. 1993). The Federal government began controlling the use of rodenticides in 1972 with a ban of Compound 1080 on Federal lands pursuant to Executive Order. Above-ground application of strychnine within the geographic ranges of listed species was prohibited in 1988. A July 28, 1992, biological opinion regarding the Animal Damage Control (now known as Wildlife Services) Program by the U.S. Department of Agriculture found that this program was likely to jeopardize the continued existence of the kit fox owing to the potential for rodent control activities to take the fox. As a result, several reasonable and prudent measures were implemented, including a ban on the use of M-44 devices, toxicants, and fumigants within the recognized occupied range of the kit fox. Also, the only chemical authorized for use by Wildlife Services within the occupied range of the kit fox was zinc phosphide, a compound known to be minimally toxic to kit foxes (Service 1992).

Despite these efforts, the use of other pesticides and rodenticides still pose a significant threat to the kit fox, as evidenced by the death of 2 kit foxes at Camp Roberts in 1992 owing to secondary poisoning from chlorophacinone applied as a rodenticide, (Berry *et al.* 1992, Standley *et al.* 1992). Also, the livers of 3 foxes that were recovered in the City of Bakersfield during 1999 were found to contain detectable residues of the anticoagulant rodenticides chlorophacinone, brodifacoum, and bromadiolone.

To date, no specific research has been conducted on the effects of different pesticide or rodent control programs on the kit fox (Service 1998). This lack of information is problematic because Williams (in litt. 1989) documented widespread pesticide use in known kit fox and Fresno kangaroo rat (*Dipodomys nitratoides exilis*) habitat adjoining agricultural lands in Madera County. In a separate report, Williams (in litt. 1989)

documented another case of pesticide use near Raisin City, Fresno County, where treated grain was placed within an active Fresno kangaroo rat precinct. Also, farmers have been allowed to place bait on Reclamation property to maximize the potential for killing rodents before they entered adjoining fields (Biological Opinion for the Interim Water Contract Renewal, Ref. No. 1-1-00-F-0056, February 29, 2000). A September 22, 1993, biological opinion with the EPA regarding the regulation of pesticide use (31 registered chemicals) through administration of the Federal Insecticide, Fungicide, and Rodenticide Act found that use of the following chemicals would likely jeopardize the continued existence of the kit fox: 1) aluminum and magnesium phosphide fumigants, 2) chlorophacinone anticoagulants, 3) diphacinone anticoagulants, 4) pival anticoagulants, 5) potassium nitrate and sodium nitrate gas cartridges, and 6) sodium cyanide capsules (Service 1993). Reasonable and prudent alternatives to avoid jeopardy included restricting the use of aluminum/magnesium phosphide, potassium/sodium nitrate within the geographic range of the kit fox to qualified individuals, and prohibiting the use of chlorophacinone, diphacinone, pival, and sodium cyanide within the geographic range of the kit fox, with certain exceptions (e.g., agricultural areas that are greater than 1 mile from any kit fox habitat). (1999 National Pesticide Consultation with EPA) However, the EPA's position on the use of rodenticides within the geographic range of the kit fox is that rodent control compounds will have no adverse effects on the kit fox provided that EPA registered compounds are applied with strict observance of EPA approved label restrictions. Even the minimal evidence provided above tends to refute this position.

Section 9 Violations and Noncompliance with the Terms and Conditions of Existing Biological Opinions: The intentional or unintentional destruction of areas occupied by kit foxes is an issue of serious concern. Section 9 of the Act prohibits the "take" (e.g., harm, harass, pursue, injure, kill) of federally-listed wildlife species. "Harm" (i.e., "take") is further defined to include habitat modification or degradation that kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering. Congress established two provisions (sections 7 and 10) that allow for the "incidental take" of listed species of wildlife by Federal agencies, non-Federal government agencies, and private interests. Incidental take is defined as "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Such take requires a permit from the Secretary of the Interior that anticipates a specific level of take for each listed species. If no permit is obtained for the incidental take of listed species, the individuals or entities responsible for these actions could be liable under the enforcement provisions of section 9 of the Act if any unauthorized take occurs.

There are numerous examples of section 9 violations; tables 8 and 9 present examples of such violations that the Service is aware of in five San Joaquin Valley counties as of September 1999 (attached). The violations listed in the tables affected vernal pool grasslands, which are used by kit foxes as well as protected vernal pool crustaceans and plants. In the five counties, a total of 9,820 acres of habitat is known to have been

destroyed without incidental take authority from the Service. In Merced County 3,180 acres have been documented as destroyed without authorization.

Risk of Chance Extinction Owing to Small Population Size, Isolation, and High Natural Fluctuations in Abundance: Historically, kit foxes may have existed in a metapopulation structure of core and satellite populations, some of which periodically experienced local extinctions and recolonization (Service 1998). Today's populations exist in an environment drastically different from the historic one, however, and extensive habitat fragmentation will result in geographic isolation, smaller population sizes, and reduced genetic exchange among populations; all of which increase the vulnerability of kit fox populations to extirpation. Populations of kit foxes are extremely susceptible to the risks associated with small population size and isolation because they are characterized by marked instability in population density. For example, the relative abundance of kit foxes at the Naval Petroleum Reserves, California, decreased 10-fold during 1981 to 1983, increased 7-fold during 1991 to 1994, and then decreased 2-fold during 1995 (Cypher and Scrivner 1992, Cypher and Spencer 1998). Similarly, the relative abundance of kit foxes at the Camp Roberts Army National Guard Training Site, California, decreased 4-fold during 1989 to 1991, increased 2-fold in 1994, and decreased 5-fold during 1995 (Berry and Standley 1992, Eliason unpubl. data). Rapid decreases in the population density of kit foxes have also been detected at other sites (Ralls and White 1995, Spiegel 1996).

Desert systems are characterized by unpredictable fluctuations in precipitation, which lead to high frequency, high amplitude fluctuations in the abundance of mammalian prey for kit foxes (Williams and Germano 1992, Goldingay *et al*. 1997, White and Garrott 1999, Cypher *et al*. 1992). Because the reproductive and neonatal survival rates of kit foxes are strongly depressed at low prey densities (White and Ralls 1993, White and Garrott 1997, 1999), periods of prey scarcity owing to drought or excessive rain events can contribute to population crashes and marked instability in the abundance and distribution of kit foxes (White and Garrott 1999). In other words, unpredictable, short-term fluctuations in precipitation and, in turn, prey abundance can generate frequent, rapid decreases in kit fox density that increase the extinction risk for small, isolated populations.

Supporting Conclusion 5

To date, conservation efforts for kit foxes have not been successful at reversing the declining trend in kit fox status, and the conservation needs of kit foxes have not been met.

The kit fox was listed as federally-endangered on March 11, 1967 (32 *Federal Register* 4001). The principal reason for this action was the extensive loss, degradation, fragmentation, and isolation of habitats for kit foxes owing to agricultural, industrial, and

urban developments in the San Joaquin Valley. Critical habitat was not designated for this subspecies.

A recovery plan approved in 1983 proposed interim objectives of halting the decline of the kit fox and increasing population sizes above 1981 levels (Service 1983). Six recovery tasks were proposed in this plan. The first task was to reduce or reverse the rate of habitat destruction by initiating a program of essential habitat management, protection, and acquisition. The goal was to protect a total of 25,000 acres in western Kern County and the Carrizo Plain in eastern San Luis Obispo County. Although no specific "program" was initiated, there was a coordinated effort by agencies and nonprofit organizations (e.g., U.S. Bureau of Land Management, California Department of Fish and Game, California Energy Commission, Reclamation, Service, and The Nature Conservancy) to acquire and manage lands for this purpose. Purchases most significant to conservation efforts were the acquisitions in the Carrizo Plain Natural Area, Ciervo-Panoche Natural Area, and the Lokern Natural Area. To date, however, the target goal for acquisition has been met only for the Carrizo Plain.

The second task was to acquire additional information necessary to understand the ecological life history requirements of the kit fox and to determine their compatibility with native and nonnative sympatric species and human activities. Many research programs were developed in the following years to answer such questions, and today there are hundreds of published and unpublished papers and reports regarding the kit fox. Although there are still many information gaps that need to be filled to conserve the kit fox, our knowledge regarding this subspecies and threats to its recovery have greatly improved since 1983.

The third task was to restore degraded essential habitats by enhancing natural routes and rates of vegetation. Although much of the land protected under task 1 has been managed for the kit fox, it has not reached or retained the goal of 1.4 adult kit foxes per square mile (Service 1993).

Task 4 was to monitor progress of recovery by determining changes in kit fox distribution and abundance, habitat losses or gains, rates of habitat restoration, and acquisition of new information concerning kit foxes. Although scattered monitoring programs have provided site-specific information on the trends in some populations of kit foxes (e.g., Elk Hills, Camp Roberts, Carrizo Plain), there has never been a range wide survey to determine kit fox abundance and distribution (Service 1998). Furthermore, most monitoring programs are not conducted with sufficient rigor or defined goals to allow for the effective interpretation of trends and implementation of management actions to benefit recovery.

The fifth task was to investigate the feasibility of reintroductions in portions of the original range of the kit fox. Minimal research has been conducted on this task (Service 1998).

The sixth task was to develop strategies for integrating recovery plan objectives into development and management goals for the southern San Joaquin Valley. There has been, and continues to be, much progress on this task. Habitat conservation plans, biological opinions, and resource management plans all take into account goals for kit fox recovery, and should contribute to the long-term survival of the kit fox by implementing conservation measures that fully offset the temporary and permanent loss of kit fox habitat by preserving habitat in other areas that are more essential for the survival and recovery of the kit fox. As alluded to in the previous section, however, there have been many failures of these plans and opinions where conservation measures have been ineffective or not implemented.

By the mid 1990's, it became clear that the goals outlined in the 1983 recovery plan were either inadequate, or the tasks were not being sufficiently implemented, to halt the decline of the kit fox and reverse this trend toward recovery. Hence, the status of the kit fox was assessed in 1995 during the critical needs analysis for the Biological Opinion for Interim Contract Renewal (Service in litt. 1995). That analysis found that the kit fox had critical needs, which were defined as any intrinsic state or external situation that threatens a species with extinction or preclusion of recovery and requires action during the next year to improve or avoid a further deterioration of that species' chances of survival and recovery. These critical needs were used to revise and/or develop additional recovery tasks and priorities for the kit fox.

The revised 1998 *Recovery Plan* identified a goal of establishing a viable complex of kit fox populations (i.e., a viable metapopulation) on private and public lands throughout the geographic range of the kit fox. The viability of the metapopulation hinges on the protection and management of 3 core populations, 9 satellite populations, and intervening linkage areas that encompass as much of the environmental and geographic variation of the historic geographic range as possible. The 3 core populations are located in the Carrizo Plain Natural Area, western Kern County, and the Ciervo-Panoche area. Satellite populations and linkages were to be established and/or protected in the northern range and Valley edges (Alameda, Contra Costa, San Joaquin, and Stanislaus counties), northern Valley floor (Merced and Madera counties), central Valley floor (Fresno County), west-central Valley edge (Fresno and Kings counties), southeast Valley floor (Tulare and Kern counties), Kettleman Hills (Fresno, Kings, and Kern counties), southwestern Valley floor (Kern County), Salinas-Pajaro Rivers watershed (Monterey, Santa Benito, and San Luis Obispo counties), and upper Cuyama Valley (Santa Barbara and San Luis Obispo counties). These areas must be secured and protected from uses that are incompatible with the conservation of the kit fox. The Recovery Plan called for protecting at least 90 percent of the existing habitat in western Kern County and the

Ciervo-Panoche areas, and 100 percent of the existing habitat in the Carrizo Plain Natural Area. Service-approved management plans that include the long-term survival of the kit fox as a primary objective must be implemented for each of these recovery areas. In order for the Service to delist the kit fox, the abundance of each core population, and at least 3 of the satellite populations, must be stable or increasing through one precipitation cycle, and there must be demonstrated population interchange between one or more core populations and the satellite populations.

To date, the goal of the *Recovery Plan* has not been met, and none of the current threats to the survival and recovery of the kit fox have been alleviated through conservation efforts. Fewer than 10 percent of the historic range of the kit fox existed when the revised *Recovery Plan* was issued in 1998. As outlined in previous sections, the unpermitted conversion of habitat in the San Joaquin Valley has continued at a rate of more than 9,800 acres per year.

Today, kit foxes persist in 3 core populations (Carrizo Plain, western Kern County, and the Ciervo-Panoche Natural Area) and approximately 9 smaller and more-isolated satellite populations (Service 1998). Both the Carrizo Plain and western Kern County populations have undergone population declines during the past few decades (Cypher and Scrivner 1992, Cypher and Spencer 1998, White and Ralls 1993), while some of the smaller satellite populations (e.g., Camp Roberts, Fort Hunter-Liggett) have decreased to such low abundances (i.e., fewer than 10 known foxes) that local extinction is possible. Also, the distribution and abundance of the kit fox in the entire northern portion of its range (i.e., eastern Contra Costa and Alameda Counties, and the western edge of San Joaquin County) has been reduced during the last 2 decades owing to the rapid conversion of grasslands and agricultural areas to suburban homes and light industry (Orloff *et al*. 1986, Bell 1994). As a result, the kit fox population in this region is highly susceptible to local extinction. The status of the Ciervo-Panoche area population has not been monitored effectively.

In summary, the kit fox is already at a point where its survival and recovery are tenuous and cannot be ensured in the long-term owing to the magnitude of historical habitat losses, an expanding agricultural base, and increasing municipal and industrial development. Hence, any future, unmitigated land conversions that contribute to a net loss of habitat, or result in the removal of native habitat, can reasonably be expected to reduce the likelihood of both the survival and recovery of the kit fox. Given that there is no regulation of agricultural conversion under State or Federal law, and that Federal and State water purveyors do not acknowledge the causal relationship between the provision of water and land conversion, most of the current and future effects to habitat for kit foxes will likely be unmitigated. This continuing, unmitigated loss of suitable habitat for kit foxes will preclude recovery options, result in decreased abundance, and possibly lead to the local extinction of isolated or remnant populations (i.e., decreased distribution). Hence, the status of kit fox, which has been declining since its listing, is expected to

continue in a downward trend unless measures to protect, restore, and sustain remaining habitats, and the ecosystem processes upon which they depend, are immediately implemented.

San Joaquin Kit Fox in Merced County

The current distribution of the San Joaquin kit fox can be grouped into three large geographic areas. In the northern range, of which Merced County is a part, kit fox populations are small and isolated, and have exhibited significant decline in past years. Reasons for decline are attributed to a combination of loss of habitat, barriers to migration, competition and predation by red fox (*Vulpes vulpes*) and coyotes (*Canis latrans*), and direct and indirect poisoning by rodenticides. Rodent eradication programs were carried out by many counties in the 1930s through the 1970s. By the late 1970s, the counties passed the choice of rodent control to private landowners, most of whom continued the process (Bell 1994). Kit foxes can be poisoned by either directly ingesting the poison, or feeding on a ground squirrel or other rodent that has ingested poison. Conversion of natural lands to agriculture has also restricted the kit fox to the Santa Nella area on the west side of Merced County, the Sandy Mush Road corridor and the Kesterson National Wildlife Refuge , and the eastern edge of the valley in grasslands and on the edges of farmland and canals.

From 1995 to 2002, the Service entered formal consultation on 36 projects in Merced County of which 6 were located in eastern Merced County. Kit fox habitat was lost to two prisons along Sandy Mush Road, and a prison at the former Castle Air Force Base. In addition, consultation has been initiated by the U.S. Army Corps of Engineers on 30 acres of grassland to be converted to homes within the Study Area.

Habitat in the northern range is highly fragmented by highways, canals, and development. The canal system that distributes water from Lake Yosemite impedes lateral kit fox travel. These and other developments are slowly chipping away at the last remaining kit fox habitat, and we expect development pressures to increase in the future (see Cumulative Effects). The protection of the remaining travel corridor is vital to the survival of this population. In response the drastic loss of habitat, California Department of Transportation (Caltrans) and the Service convened a San Joaquin Kit Fox Conservation and Planning Team to address the rapid decline of kit fox habitat in the northern range, and increasing barriers to kit fox dispersal. Consisting of Federal, State, and local agencies, local land trusts, environmental groups, researchers, and other concerned individuals, the goal of this team is to proactively implement actions that will recover the species, and troubleshoot threats to San Joaquin kit foxes as they emerge. The team is currently working on conservation strategies to protect critical kit fox corridors in the area.

The recent sightings scattered across eastern Merced County and north into Stanislaus and Tuolumne County are described in the Species Account earlier in this document. The recent sightings, most made during surveys required by the Service for development projects, show that kit foxes are present in eastern Merced County. With increased surveying due to increased development, the Service expects the number of recorded sightings to increase. Additional data is still needed to adequately characterize kit fox movement patterns in eastern Merced County.

Mountain Plover

Reasons for Decline and Threats to Survival

Conversion of grassland habitat, agricultural practices, the management of domestic livestock, and decline of native herbivores are factors that likely have contributed to the mountain plover's decline. Pesticides are applied to cultivated fields during the 5 months that mountain plovers occupy these wintering habitats (Knopf 1996*b*). Birds are exposed to pesticides by adsorption through the skin, preening, ingestion, and inhalation (Driver *et al* 1991). Adult birds and eggs were analyzed for concentration of organochlorines, selenium, and heavy metals. Residues of DDE ranged from near 1 to 10 parts per million (Carson in litt. 1992, Archuleta pers. comm. 1995). Twenty-two of the 54 eggs collected in Colorado and Montana had DDE residues similar to those found in the wintering birds. Residues found in adults may cause death to some individuals if they are mobilized to the brain (USEPA 1975).

Recovery Actions. A unique Memorandum of Agreement (MOA) was signed in 1995 by the Secretary of the Department of the Interior and the Governor of Colorado. The purpose of the MOA is to address the conservation needs of declining species in Colorado, with a goal of preventing their decline to a point at which Federal listing could be needed. The mountain plover is mentioned specifically in this MOA, and a work group now exists to address its needs. The Service has participated diligently with the work group to pursue the goals of the MOA and believes that the MOA can be an effective vehicle to promote and implement mountain plover conservation actions in Colorado, and perhaps encourage similar conservation actions in adjoining states (Service 1999*b*). In addition, mountain plovers occur on lands administered by the Service, Forest Service, BLM, and other agencies. Evaluation and modification of activities on Federal lands and their effects on the mountain plover will occur and assist in the recovery of the species.

Conversion of grassland habitat, agricultural practices, the management of domestic livestock, decline of native herbivores, and pesticides are factors that likely have contributed to the mountain plover's decline. The grassland conversion estimates described in the baseline for vernal pool species in this document also apply to mountain plover habitat. Pesticides are routinely applied to cultivated fields during the 5 months that mountain plovers occupy their winter habitat in California (Knopf 1996*b*).

Mountain Plovers in Merced County

The 1998 California Bird Census found 2,179 mountain plovers in 10 California counties, including Imperial, Kings, Los Angeles, Monterey, Riverside, San Benito, San Luis Obispo, San Bernardino, Solano, and Yolo Counties (Hunting in litt. 1998). Mountain plovers are generally considered to be an uncommon migrant in eastern Merced County (Vollmar 2002). Five individuals were seen at the Flying M Ranch on March 8, 1999 (CNDDB 2001), and two other sightings were recently made in the Study Area (EIP Associates 2001)(Bumgardner pers. comm. 2001, 2002).

Effects of the Proposed Actions

General Effects of the Proposed Actions

This section addresses the potential effects of the Proposed Actions in the Study Area. A discussion of species-specific effects follows. Development of the Proposed Actions could result in a variety of effects on biological resources, and may eliminate a substantial amount of habitat for listed species. The specific amounts and types of habitat affected by the Proposed Actions, and the severity of these effects, could differ substantially depending on the location, extent, and configuration of the Campus, Infrastructure Project, and University Community within the Study Area. For example, if the footprint of the Proposed Actions were reduced, effects on biological resources would be lessened. Alternatively, if a location other than the Applicants' Proposed Projects site was selected in the southernmost extent of the Study Area through the NEPA and Section 404 processes, the Preferred Alternative would increase loss of agricultural lands while reducing effects on vernal pool/grassland habitat near the center of the Study Area.

The University and County have committed to applying the Parameters described earlier in this document to the Proposed Actions that are ultimately selected by the Corps during the Section 404(b)(1) and NEPA process. Consequently, the Preferred Alternative will be located and configured in compliance with the Parameters. Moreover, the University and County have further proposed a number of Conservation Measures as part of the Proposed Actions, which will in many cases implement the Parameters. The Parameters and the Conservation Measures are considered to be part of the Proposed Actions and will serve to avoid, minimize, or compensate for effects caused by the Proposed Actions. Specific types of direct and indirect effects are summarized below.

Construction-Related Effects

During construction, uncontrolled trespass of construction equipment and personnel into adjacent vernal wetland habitats could result in disturbance of the habitats and their watersheds as well as in take of individuals of listed species. Other construction-related effects could include dust emissions, erosion, sedimentation, hazardous material spills,

introduction of invasive nonnative plant species, and injury or direct mortality of wildlife. However, as discussed in the Conservation Measures, the University and County have adopted conservation measures to avoid or minimize potential for these effects. These measures include preconstruction measures to minimize direct effects on the San Joaquin kit fox, construction monitoring, best management practices (BMPs), training of construction personnel, enforcement of protection measures through construction contracts, a spill-response plan, erosion control measures, measures to prevent introduction of invasive nonnative plant species, and marking and fencing of sensitive exclusion areas.

Altered Hydrology and Nonpoint Source Pollution

Impervious surfaces (e.g., concrete, asphalt, rooftops) decrease water infiltration into soil, thereby increasing the amount and concentrating the duration of stormwater runoff. These alterations can disrupt normal patterns of vernal pool inundation and desiccation, thereby affecting the life cycles of vernal pool-dependent species. Moreover, runoff from urbanized areas can carry sediment and pollutants (e.g., fertilizers, pesticides, oil, fuel) into surrounding habitat and water bodies. However, as discussed in the Conservation Measures, the University and County have committed to conservation measures to avoid and minimize these effects. For example, design and siting of the Proposed Actions would minimize development in watersheds supporting federally listed species; stormwater drainage would be directed to stormwater management facilities; and irrigation runoff would be controlled to prevent discharge into habitat areas adjacent to the Campus and University Community.

Pesticides

In the absence of an adequate landscape management plan, pesticides used at the developed Campus and University Community or for habitat management activities in preserved areas could affect special-status species. For example, drift of herbicides or insecticides could result in direct mortality of plants and wildlife; similarly, rodenticides could affect the prey base or cause injury or direct mortality to the San Joaquin kit fox. However, the University and County have committed to a set of conservation measures that would avoid or minimize effects of the Proposed Actions. A landscape management plan would be prepared for University facilities that would define management measures to minimize pesticide use and risk to adjacent resources. This plan will include restrictions on certain compounds, modes of application, and conditions of application (e.g., wind speeds, location). Similarly, the University will develop a management plan for easement lands it controls (CNR and VST) to ensure that use of pesticides is restricted to protection of habitat values (i.e., for localized control of invasive species). Additionally, the County will implement maintenance and adaptive management practices for the Infrastructure Project; these practices will include restrictions on chemical application in sensitive habitat areas. These measures are expected to reduce the effects

of pesticides such that they would not appreciably reduce the reproduction, numbers, or distribution of any listed or proposed species in the Study Area.

Human Disturbance

Without proper controls, management, and enforcement, increased human activity in habitat surrounding the Proposed Actions could disturb habitats and populations of listed species. Potential human uses could include bicycling, off-highway vehicle (OHV) use, hiking, and plant collection. Such activities could result in trampling of vegetation and soil compaction, inadvertent introduction of nonnative invasive plant species, disturbance of wildlife species, introduction of litter and debris, and recruitment of opportunistic wildlife species that can compete with or prey upon native species. However, the University and the WCB have acquired or will acquire ownership or conservation easements on many important habitat areas in the Study Area; these easements will incorporate strict controls on human use. As discussed in the Conservation Measures, the University and County have committed to conservation measures to minimize the adverse effects of public access to these and other areas surrounding the Proposed Actions. These measures could include public education, signage, fencing, litter cleanup, exclusion and enforcement of unauthorized uses, careful control of authorized uses of habitat areas for research and educational purposes, and monitoring and managing protected habitat areas. Additionally, implementation of Parameters 2a and 2e will ensure that the University and County develop management strategies, satisfactory to the Service, that will control indirect effects caused by human disturbance.

Introduction of Nonnative Species

Construction of the Proposed Actions could result in the introduction of nonnative plant and animal species in adjacent habitats. Nonnative plant species could be introduced during ground-disturbing activities associated with construction and could then disperse to adjacent habitats. Also, use of nonnative species for ornamental landscaping associated with the Proposed Actions could create a source for invasion by such species. However, the University and County have committed to conservation measures to address the potential introduction of nonnative invasive plant species. Construction measures include use of certified weed-free materials in erosion control during construction and removal of seed sources from earth-moving construction equipment. Campus operations measures include excluding known invasive species for use in campus landscaping and monitoring adjacent habitat areas to detect and control potential introductions of invasive species from developed areas. Measures associated with management of easement lands under University control (VST and CNR) include developing and implementing management plans to discourage invasive species through livestock grazing practices, prescribed burning, and other management measures as appropriate. The County also will require Infrastructure Project contractors to implement management measures to control the dispersal of invasive species into sensitive habitats.

Urbanization also may favor generalist wildlife species, such as raccoon, red fox, coyote, feral pig, and bullfrog, that may prey upon or compete with listed species. In addition, domestic dogs and cats can disturb and prey upon native wildlife species, and feral populations can become established in undeveloped areas. As discussed in the Conservation Measures, substantial efforts would be made to exclude domestic dogs and cats from protected habitat areas by developing animal control policies, programs, and design measures and by conducting monitoring and control of detrimental nonnative species in the University's easement lands.

Fragmentation of Habitat

Habitat fragmentation can occur when lands, habitats, or species become isolated as a result of urban development that creates a barrier between previously contiguous habitats or populations. Such isolation can increase the risk of stochastic extinction, decrease genetic diversity, and reduce suitability of habitat to support species that are particularly susceptible to fragmentation. The Study Area is partially fragmented by the presence of agricultural lands, canals, existing development, and roads. The northern section of the Study Area is less fragmented than lands to the south. The extent of fragmentation resulting from the construction of the Proposed Actions would depend on the specific site that is ultimately selected within the Study Area.

The extent of fragmentation resulting from the construction of the Proposed Actions would depend on the specific site that is ultimately selected for the Preferred Alternative within the Study Area. The Applicants' Proposed Projects site, for example, is located adjacent to Lake Yosemite, agricultural lands, and subdivided lands on the western edge of the extensive area of grassland habitat in the Study Area. Because areas west of this site already exhibit extensive fragmentation and disturbance, this site would result in less fragmentation than other potential configurations to the east, where grassland/vernal pool habitat is largely undisturbed and contiguous. Also, the University's and WCB's acquisition and protection of the VST Remainder Property, CNR, and CST lands would maintain a 8,854-acre area of contiguous habitat through the northern and central portions of the Study Area.

Although fragmentation is likely to result from construction of the Proposed Actions, the project description and the Conservation Measures will preserve extensive contiguous high-quality habitat to compensate for the potential fragmentation of habitat resulting from project implementation. The Parameters and Conservation Measures specify habitat restoration and enhancement, as appropriate, for effects on vernal pools; such restoration and enhancement will offset some of the effects of habitat loss and fragmentation. In addition, Merced County has agreed with the Service that for discretionary projects permitted by the County within the Study Area which may result in take of listed species, the County will require compliance with the Act (see Parameter 3).

Air Pollution

The Proposed Actions could result in increased levels of air pollution and these increased levels could potentially have adverse effects on listed plant species. In response to these concerns, an extensive literature review was conducted to assess the current available information pertaining to such effects on these vegetation types. While region-specific information was limited, some laboratory studies have been conducted.

Background ozone (O_3) concentrations in the San Joaquin Valley air basin are at the lower end of the range that is considered harmful. However, O_3 is assessed regionally by air pollution control agencies, and management of O_3 levels is addressed through the State Implementation Plan.

The available literature indicates that NO_x (measured as NO_2) can have a localized impact on vegetation. The Applicants conducted a modeling analysis to evaluate the likely effects of increased NO_x emissions on listed vernal pool species. The Service has not reviewed the modeling analysis. However, the Applicants state that the modeling analysis indicated that NO_x emissions that would result from complete Campus buildout would not reach the established level of effects for grasses, trees, or shrubs. However, the Proposed Actions could contribute to a regional increase in NO_x emissions, which may then affect plants. Increased actual distribution and effects of pollutants are difficult to predict and are subject to multiple factors, such as weather patterns and soil characteristics.

If further studies were to indicate that locally increased emissions could adversely affect listed vernal pool plant species, then it is possible that siting the Proposed Actions in a portion of the Study Area as far as is practicable from habitat that supports these species could reduce such effects. For example, locating the Campus and University Community in the extreme southern portion of the Study Area would place the heaviest concentration of emission sources further from vernal pool habitats as compared to the Applicants' Proposed Projects.

Compensation Lands and Management Strategies

The University has committed to acquiring and providing enhanced management of 5,780 acres of vernal pool grasslands on VST and CNR lands. These lands are considered suitable for the San Joaquin kit fox and contain occurrences of listed vernal pool plants and crustaceans. In addition, the WCB is protecting more than 20,000 acres of habitat in and adjacent to the Study Area. Thus, more than 26,000 acres in eastern Merced County have been or will be placed under conservation easements to protect this habitat in perpetuity (Table 1).

The University will develop and implement a Management Plan for the remaining VST areas it has acquired. This land will be protected under conservation easements in

perpetuity to preserve existing vernal pool habitats; these easements will also restrict human activities and access to control human use and prevent human disturbance of these areas. CNR and VST lands will be monitored to detect and prevent establishment of detrimental invasive species.

The Management Plan will also establish the management measures and maintenance of preserve lands under WCB easements. WCB easement lands may be managed differently from University-controlled preserve lands. Management of WCB easement lands will be conducted under the terms of the conservation easements in place for each property. Easement terms will be examined to ensure that they meet the requirements of the Parameters and other compensation and mitigation needs of the Proposed Actions. Existing WCB easements do not fulfill all of the requirements of the Parameters at this time. However, existing WCB easements may be adjusted at a future date. Conservation easements should allow the easement holder, the Corps, the Service, and CDFG to work with the landowner to preserve, protect, identify, monitor (including the right to access the property to conduct evaluations of wetland quantity and quality, evaluations of habitat quantity and quality, and to survey for threatened and endangered species and monitor their population), enhance, and restore in perpetuity the conservation values. Parameter 2 (a) will require close coordination with easement holder(s) and state and local agencies to provide access for management and monitoring activities. Compensation lands will have beneficial effects that may help to offset adverse effects of the Proposed Actions.

General Effects Resulting from Phase 1 Construction and Operation

Construction and operation of the Phase 1 Campus have potential to introduce or disseminate nonnative plants that may be detrimental to vernal wetland ecosystems occupied by listed species. Conservation measures to control invasive weeds during construction, discourage use of invasive species in Campus landscaping, and control human and pet disturbance will minimize the risk of effects on wetland-dependant species. Because no grading or construction activities will occur outside of the Phase 1 Campus or within any vernal pool or other wetland habitats, construction of the Phase 1 Campus would not fragment existing vernal pool or wetland habitats. Implementation of the adopted Conservation Measures will further assure that indirect effects are avoided and minimized and do not result in further fragmentation of existing habitats.

Adherence to Conservation Measures governing design, construction, operation, and management of the Phase 1 Campus will avoid or minimize construction related disturbances (see *Conservation Measures*). These measures include but are not limited to installation of temporary construction fencing, installation of permanent fencing as part of Campus design, conducting environmental awareness training for construction personnel, incorporation of protection obligations and violation penalties into construction contracts, enforcement of human and pet use restrictions, signage at the Phase 1 Campus

boundary, and education of campus residents. While the potential for human disturbance cannot be fully eliminated, it will be reduced to a level that is not expected to adversely affect any occurrences of listed species.

Species Specific Effects

Phase 1 Effects on Federally Listed Plants

The Phase 1 Campus site will be located on part of an existing golf course that does not support a vernal pool complex. Consequently, development of the Phase 1 Campus will have very limited potential for direct effects to fleshy owl's-clover, Hoover's spurge, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, and Greene's tuctoria. Likewise, the Phase 1 Campus site does not support suitable habitat for vernal pool dependent species and, consequently, will not result in direct effects to the habitats of any of the federally listed plant species considered in this biological opinion. No known occurrences of Hartweg's golden sunburst or suitable habitat occur on or near the Phase 1 Campus site. Generally, indirect effects on adjacent federally listed plant occurrences resulting from dust emissions, erosion, sedimentation, hazardous material spills, and introduction of invasive nonnative plant species during construction will be minimized through implementation of adopted construction and operation conservation measures.

Without implementation of water-management conservation measures, the Phase 1 Campus will result in hydrologic disruption and pollution of wetland habitats occupied by fleshy owl's- clover. In accordance with the Parameters and Conservation Measures, the Phase 1 Campus has been sited outside the watershed of all vernal pools. In most locations, the Phase 1 Campus boundary is generally placed to maintain a 250-foot buffer from vernal pools. Although the northern perimeter of the Phase 1 Campus boundary will be within approximately 20 feet of the nearest vernal pools, building construction and grading will occur approximately 50 feet from these pools. All grading and construction will be outside the watershed of any vernal pools and will therefore not disrupt pool hydrology. In addition, a 30-foot-wide, disced fire control buffer will be established along the interior of the Phase 1 Campus's southeastern perimeter. Limited grading will also occur within this buffer; however, along the western portion of the buffer it will be restricted to 10 feet of the 30-foot buffer, so as to further ensure that no grading occurs near vernal pools.

The stormwater capture and detention system for the Phase 1 Campus will contain and regulate runoff to avoid alteration of the hydrology of adjacent wetlands and discharge of unnatural levels of runoff from the campus. The University will implement standard BMPs to control water quality effects.

The following effects discussion is specific to each plant species in this biological opinion.

Fleshy Owl's-Clover - Effects of the Proposed Actions

Although no systematic botanical survey has been conducted for fleshy owl's-clover across its range or in the Study Area, the Study Area represents a significant portion (approximately one-third of the known occurrences) of the taxon's known range. Construction of the Proposed Actions will result in both direct and indirect effects on fleshy owl's-clover. Direct effects entail loss of habitats as a result of construction, indirect effects could include dust emissions, sedimentation, equipment trespass during construction activities, disturbance from humans and pets, runoff from landscape irrigation, introduction of pesticides resulting from Campus and University Community operations, and management of preserved areas. Additionally, the University has agreed that lands under conservation easements will not be developed. By enacted or proposed acquisition and application of easements on CNR, VST, and CST lands, additional occurrences of fleshy owl's-clover will be protected. However, construction of the Proposed Actions in the central or eastern portions of the Study Area can eliminate occurrences of fleshy owl's-clover. Because known suitable habitats are lacking in the southern portion of the Study Area, fleshy owl's-clover would not be adversely affected if the Proposed Actions were sited there.

The University and County have committed to the Parameters and Conservation Measures to avoid and minimize effects to fleshy owl's-clover to the greatest extent practicable and to ensure the establishment of a comprehensive conservation program for the conservation of the species. The University and WCB have committed to the preservation and management of 8,854 acres of extensive high-quality contiguous habitats on CNR, VST, and CST lands and the protection of 17,214 acres of other lands in eastern Merced County. In accordance with Parameter 2a, this commitment will be examined to ensure that occupied habitat for fleshy owl's- clover will be preserved in areas approved by the Service. The Applicants' Proposed Projects will result in adverse effects to fleshy owl's-clover; however, with implementation of the Parameters and Conservation Measures, these adverse effects will be offset by the University's protection afforded to the species. Selecting an alternative site for the Proposed Actions with less vernal pool habitat could greatly reduce direct and indirect effects to fleshy owl's-clover.

Fleshy Owl's-Clover - Effects of Phase 1

There are no known occurrences of fleshy owl's-clover on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect fleshy owl's-clover.

Hoover's spurge - Effects of the Proposed Actions

Hoover's spurge is endemic to larger vernal pools, often in association with rare *Orcuttieae* grasses. There are no known occurrences of Hoover's spurge in the Study

Area. However, no systematic botanical surveys have been conducted within all suitable habitats in the Study Area. Nearby occurrences include one record 15 miles west of Highway 99 in Merced County and several records just north of the Merced County line in Stanislaus County (Vollmar Consulting 2002). The species was not located during surveys of the Applicants' Proposed Projects site and surrounding lands (EIP Associates 2002) or surveys of eastern Merced County ranches (Vollmar Consulting 2002). However, given the observed dynamic nature of Hoover's spurge occurrences, rainfall conditions during recent survey periods, and the incompleteness of botanical surveys, potential exists for the species to occur in the Study Area. Any additional discoveries of Hoover's spurge would be highly significant from a conservation perspective (Vollmar Consulting 2002).

Hoover's Spurge - Effects of Phase 1

There are no known occurrences of Hoover's spurge on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect Hoover's spurge.

Colusa Grass - Effects of the Proposed Actions

No systematic targeted botanical surveys have been conducted for Colusa grass within the Study Area. Although 28 of the 44 known extant occurrences of Colusa grass are within eastern Merced County, only six occurrences of Colusa grass were observed in the Study Area in special-status plant surveys conducted in 1999-2001. All six of these occurrences are on VST land which the University has committed to preserve. The CNDDB also lists a historic occurrence in the western portion of the Study Area; however, this occurrence has not been observed since 1943 and is described as possibly extirpated. Two CNDDB occurrences were not reverified during the 1999-2001 surveys. Colusa grass was not found on lands for which WCB has acquired or will acquire title or conservation easements. The current documented occurrences should not be viewed as an exhaustive inventory because not all pools were surveyed in the 1999-2001 surveys. Because Colusa grass is restricted to long-duration vernal pools and some selected stockponds, and because vernal pools in the central, southern, and western portions of the Study Area occur on low-gradient land that supports shallower pools of shorter duration, these areas have little likelihood of supporting Colusa grass occurrences.

Development of the Proposed Actions occurring in the Study Area may directly and indirectly adversely affect some presently unknown occurrences of Colusa grass. However, the Applicants' Proposed Projects can avoid direct effects on known Colusa grass occurrences. Construction of the Proposed Actions, operation and management of the Campus and University Community, and management of preserved habitats will result in indirect effects on Colusa grass. The nature, extent, and character of these effects would depend on the site and configuration selected for development. Potential mechanisms of these effects (e.g., alteration of hydrology, introduction of invasive nonnative species, human disturbance, pesticide drift, etc.) are discussed above in

General Effects of the Proposed Actions. Given the sparse and localized known distribution of Colusa grass in the Study Area and the lack of direct effects at the Applicants' Proposed Projects site, it is likely that the Proposed Actions can be located to avoid and minimize direct and indirect adverse effects to the species. Adopted conservation measures to address potential effects of project design, construction, and operation measures would be implemented to avoid and minimize these effects to the greatest extent practicable.

In keeping with the Conservation Measures and Parameters, the University and County have committed to development and implementation of a protective management plan for the VST and CNR lands occupied by occurrences of Colusa grass. Moreover, in accordance with Parameter 2a, the University will preserve occupied habitats in areas approved by the Service and the Corps for any effects to Colusa grass that result from development of the Proposed Actions. The protection of six occurrences of this species is considered to be beneficial.

Colusa Grass - Effects of Phase 1

There are no known occurrences of Colusa grass on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect Colusa grass.

San Joaquin Valley Orcutt Grass - Effects of the Proposed Actions

Although 23 occurrences of San Joaquin Valley Orcutt grass occur in eastern Merced County, only 9 occurrences have been reported for the Study Area. Of these, two CNDDB occurrences were first reported in 1980, but were not relocated during surveys in 1986. An additional CNDDB occurrence coincides with a more recent observation, where the species was reported to occur with Colusa grass. Three of the nine occurrences of San Joaquin Valley Orcutt grass in the Study Area are on CNR and VST lands. An additional five occurrences lie in the east-central portion of the Study Area; another is just outside the eastern boundary.

Although systematic surveys have not been conducted for San Joaquin Valley Orcutt grass in the Study Area or across the range of the species, all vernal pool and other areas exhibiting typical habitat characteristics were surveyed. Because this species is restricted to deeper, long-duration vernal pools and stockponds, and because vernal pools in the central, southern, and western portions of the Study Area occur on low-gradient terrain that supports shallower pools of shorter duration, these areas have little likelihood of supporting occurrences of San Joaquin Valley Orcutt grass.

Development of the Proposed Actions in the Study Area can have direct and indirect adverse effects on San Joaquin Valley Orcutt grass. However, the Applicants' Proposed Projects can avoid direct effects on known San Joaquin Valley Orcutt grass occurrences. Construction of the Proposed Actions, operation and management of the Campus and

University Community, and management of preserved habitats could result in indirect effects on San Joaquin Valley Orcutt grass. The extent and character of these effects would depend on the site and configuration selected for development. Potential mechanisms of these effects (e.g., alteration of hydrology, introduction of invasive nonnative species, human disturbance, pesticide drift, etc.) are discussed above in *General Effects of the Proposed Actions*. Given the sparse and localized known distribution of San Joaquin Valley Orcutt grass in the Study Area and the lack of direct effects at the Applicants' Proposed Projects site, the Proposed Actions can be located in the Study Area to avoid and minimize potential indirect effects. Adopted conservation measures to address potential effects of project design, construction, and operation measures would be implemented to avoid and minimize these effects to the greatest extent practicable.

In keeping with the Conservation Measures and Parameters, the University and County have committed to development and implementation of a protective management plan for the three known occurrences of San Joaquin Valley Orcutt grass on VST and CNR lands. Moreover, in accordance with Parameter 2a, the University will preserve occupied habitats in areas approved by the Service for any effects on San Joaquin Valley Orcutt grass that result from development of the Proposed Actions. The protection of the three presently unprotected known occurrences of San Joaquin Valley Orcutt grass is considered to be beneficial. As a result, the Proposed Actions are not expected to appreciably adversely affect the distribution, reproduction, or numbers of the species in the Study Area or eastern Merced County. Selection of an alternate site with known occurrences of San Joaquin Valley Orcutt grass would result in loss of occurrences and would be inconsistent with the Parameters. Possible project alternatives that entail development in the eastern portion of the Study Area will have a higher likelihood of affecting known occurrences of San Joaquin Valley Orcutt grass in that area.

San Joaquin Valley Orcutt Grass - Effects of Phase 1

No known occurrences of San Joaquin Valley Orcutt grass exist on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect San Joaquin Valley Orcutt grass.

Hairy Orcutt Grass - Effects of the Proposed Actions

Hairy Orcutt grass occurs primarily in large vernal pools. Twenty-seven extant occurrences are known, predominantly in the northern Sacramento Valley and southeastern Madera County. Only two historic records are known for the species in Merced County; both are believed extirpated. No systematic surveys for this species have occurred in the Study Area and unsurveyed potential habitat occurs in the Study Area in large pools that support other Orcutt grasses.

One extirpated occurrence of hairy Orcutt grass is more than 2 miles southwest of the Phase 1 site. The nearest single extant occurrence of hairy Orcutt grass is known from an area southwest of the Study Area. Therefore, no direct or indirect adverse effects to hairy Orcutt grass are anticipated from the Proposed Actions and related construction activities or disturbances because of implementation of the adopted Conservation Measures and Parameters. No indirect effects are anticipated above and beyond those general indirect effects described above.

The Applicants' Proposed Projects would not disturb known occurrences of hairy Orcutt grass. Larger pools that may provide suitable habitats for the species would be protected on VST and CNR lands (see discussions of San Joaquin Valley Orcutt grass and Colusa grass). Location of the Proposed Actions in portions of the Study Area where more suitable habitat is present could adversely affect these species if they were present; however, siting the Proposed Actions in an area more sensitive than the Applicants' Proposed Projects would be inconsistent with Parameter 2f. Potential habitat (i.e., deeper vernal pool and stockpond habitats) for this species is a recognizable subset of vernal wetland habitats where other listed species may occur. Finally, the Proposed Actions include protection of extensive high-quality vernal pool/grassland habitats that could serve as compensatory habitat in the event that adverse effects occur. Accordingly, the Proposed Actions are not likely to adversely affect the distribution, reproduction, or numbers of hairy Orcutt grass plants or throughout the species' range.

Hairy Orcutt Grass - Effects of Phase1

There are no known occurrences of hairy Orcutt grass on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect hairy Orcutt grass.

Hartweg's Golden Sunburst - Effects of the Proposed Actions

Hartweg's golden sunburst is a very rare species that occurs on mima mounds in upland sites in valley and foothill annual grasslands. Although no systematic range-wide or Merced County surveys for this species have been conducted, about 20 extant occurrences are known, primarily in areas near the Fresno-Madera County line and northeast Merced and southeast Stanislaus Counties. In recent surveys, Vollmar Consulting (2002) discovered four new occurrences in eastern Merced County north of the Study Area. Vollmar (2002) stated that most suitable habitat in eastern Merced County was north of the Merced River (i.e., outside the Study Area); however, he identified potential habitat for Hartweg's golden sunburst at the Chance and Nelson Ranches which are compensation sites for which conservation easements have been acquired by WCB.

Hartweg's golden sunburst was not observed in surveys of the Applicant's Proposed Projects or on surrounding lands. The potential for Hartweg's golden sunburst to occur in these areas is low. Hartweg's golden sunburst is more likely to occur on the Chance

and Nelson Ranches, where WCB has acquired easements (Vollmar Consulting 2002). Locating the Proposed Actions elsewhere in the Study Area has potential to adversely affect presently unknown occurrences of the species. Application of Parameter 2f would ensure that, if an occurrence of the Hartweg's golden sunburst could not be avoided, occupied habitat would be protected and managed as compensation.

Hartweg's Golden Sunburst - Effects of Phase 1

Although no systematic surveys for this species have occurred through the range of the species, Hartweg's golden sunburst is not known to occur on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect Hartweg's Golden Sunburst.

Greene's Tuctoria - Effects of the Proposed Actions

Greene's tuctoria occupies shallower and smaller vernal pools than other *Orcuttieae* grasses. Although no range-wide systematic surveys for this species have been conducted, twenty-one extant occurrences are known. All known extant occurrences are in the northern Sacramento Valley or eastern or southern Merced County. Of seven known extant occurrences of Greene's tuctoria in Merced County, four are believed extirpated. Vollmar Consulting (2002) found no occurrences of the species in eastern Merced County in 2001; however, 22 large vernal pools that could provide suitable habitat were identified. Application of Parameter 2f would ensure that, if an occurrence of Greene's tuctoria could not be avoided, occupied habitat would be protected and managed as compensation.

Greene's Tuctoria - Effects of Phase 1

There are no known occurrences of Greene's tuctoria on the Phase 1 Campus site. Therefore, the development of Phase 1 is not likely to adversely affect Greene's tuctoria.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp - Effects of the Proposed Actions

Although vernal pool fairy shrimp and vernal pool tadpole shrimp exhibit slightly differing habitat requirements and life cycles, they often inhabit the same vernal pool complexes and have been known to co-occur in individual vernal pools. These species are supported by similar habitat types including vernal pools, seasonally ponded areas within vernal swales, rock outcrop ephemeral pools, playas, alkali flats, and other depressions that hold water of similar volume, depth, area, and duration. Therefore, both species are subject to a common set of threats and considerations. Although some portions of the Study Area have not been surveyed, these species should be presumed to be present in all suitable habitat. Therefore, construction of the Proposed Actions in any portion of the Study

Area that supports suitable habitat is likely to adversely affect populations of vernal pool fairy shrimp and vernal pool tadpole shrimp.

Construction of the Proposed Actions, operation and management of the Campus and University Community, and management of preserved habitat could potentially result in direct and indirect adverse effects on vernal pool fairy shrimp and vernal pool tadpole shrimp. The extent and character of these effects would depend on the site and configuration selected for development. Potential mechanisms for these effects are discussed above (*General Effects of the Proposed Actions*); they may include habitat fragmentation; altered hydrology; nonpoint source pollution; pesticide drift; human disturbance; establishment of invasive nonnative plants; and possible effects of habitat enhancement, restoration, and creation activities. Adopted conservation measures to address potential effects of project design, construction, and operation measures would be implemented to avoid and minimize these effects to the greatest extent practicable.

The development of the UC Merced campus could potentially result in habitat fragmentation. The populations of vernal pool crustaceans in eastern Merced County are currently among the least fragmented in California. The results of fragmentation are inhibition of genetic exchange between populations and impediments to recolonization of habitats from which populations have been extirpated. Small, isolated populations are substantially more vulnerable to stochastic events (e.g., aberrant weather patterns, fluctuations in availability of food) and may exhibit reduced adaptability to environmental (natural or anthropogenic) changes.

Location of the Proposed Actions in the northern portion of the Study Area would result in loss of known occurrences. Siting the Proposed Actions at the extreme southern portion of the Study Area, if feasible, would reduce the likelihood of direct and indirect effects, because most of the land in that area has been converted to agricultural uses and no longer supports extensive potential habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp.

The Parameters mandate that a comprehensive strategy for the conservation of these species be in place before project implementation. The Conservation Strategy will specify compensatory conservation, subject to Service and Corps approval, for effects on vernal pool crustaceans. The University will preserve an extensive tract (8,854 acres) of high-quality contiguous vernal pool/grassland habitat (VST, CST, CNR), as well as provide for restoration, enhancement, and creation of suitable habitat. Moreover, these lands will be monitored to detect and prevent establishment of detrimental invasive species. Additional completed and pending WCB easement acquisitions will add another 17,214 acres of grassland/vernal pool habitat.

This extensive compensatory conservation program, in conjunction with BMPs, judicious siting and design of the Proposed Actions, long-term monitoring and management,

compliance with the Parameters, and restoration/creation of vernal pool habitat, is expected to achieve the goals of the Conservation Strategy.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp - Effects of Phase 1

The Phase 1 Campus site, comprising a portion of the existing Merced Hills Golf Course, does not support any known populations of vernal pool fairy shrimp or vernal pool tadpole shrimp, nor does it contain suitable habitat to support these species. Vernal pool fairy shrimp are well represented in vernal wetlands north and east of the Phase 1 campus site. Vernal pool tadpole shrimp have been documented in a cluster of occurrences concentrated in the Rascal Creek watershed southeast of the Phase 1 site, but vernal wetlands elsewhere in the vicinity are considered potentially suitable to support the species.

Indirect effects on crustacean populations adjacent to Phase 1 resulting from dust emissions, erosion, sedimentation, hazardous material spills, and introduction of invasive nonnative plant species during construction will be minimized through implementation of adopted construction and operation conservation measures.

Without implementation of water-management conservation measures, the Phase 1 Campus could result in hydrologic disruption and pollution of wetland habitats occupied by vernal pool fairy shrimp and vernal pool tadpole shrimp. In accordance with the Parameters and Conservation Measures, the Phase 1 Campus has been sited outside the watershed of any vernal pools. In most locations, the Phase 1 Campus boundary is generally placed to maintain a 250-foot buffer from vernal pools.

The Phase 1 campus grading will occur closer than 250 feet to vernal pools in three locations; at the southwest corner, at the southeast corner, and on the northern perimeter, west of the Construction Staging Area. At the southwest corner, grading will occur within 6 feet of, but downslope from a single vernal pool. The vernal pool is adjacent to and outside the boundary of Phase1 activities. At the southeast corner, the closest vernal pool in a complex of pools is approximately 20 feet from the Phase 1 boundary, and approximately 120 feet across an artificial shallow pond from grading activity. On the northern perimeter of the Phase 1 Campus boundary the closest vernal pool in a complex of pools is approximately 20 feet from the Phase 1 boundary. The grading boundary is at the Phase 1 boundary in this area; therefore, grading will occur within 20 feet of the closest vernal pool, and within 50 feet of three other pools in the complex. Eight vernal pools are within 250 feet of the Phase 1 boundary in this locale. The local topography is quite flat. All grading and construction will be outside the watershed of any vernal pools and will therefore not disrupt pool hydrology. A 30-foot-wide fire control buffer will be established along the inside of the Phase 1 Campus's southeastern perimeter. The fire control buffer will be primarily managed through discing, although portions of it will also be graded.

The stormwater capture and detention system for the Phase 1 Campus will contain and regulate runoff to avoid alteration of the hydrology of adjacent wetlands and discharge of unnatural levels of runoff from the campus. The Campus will implement standard BMPs to control water quality effects.

Without adequate controls in place, potential exists for pesticides and herbicides to drift from the Campus to adjacent vernal pools that are known to be occupied or could be occupied by these two species. However, conservation measures minimizing and restricting use of herbicides in Campus management will avoid such effects. As described in the Conservation Measures, no pesticides or herbicides will be used on the remaining areas of the golf course outside the Phase 1 boundary.

During construction, uncontrolled trespass of construction equipment and personnel into adjacent vernal wetland habitats could result in disturbance of the habitats and their watersheds as well as in take of individuals of listed species. Similarly, following construction, trespass of people and their pets into adjacent habitat areas could disturb habitat and cause direct take of individuals.

Adherence to Conservation Measures governing design, construction, and operation and management of the Phase 1 Campus will avoid or minimize such disturbances. These measures include but are not limited to installation of temporary construction fencing, installation of permanent fencing as part of Campus design, conducting environmental awareness training for construction personnel, incorporation of protection obligations and violation penalties into construction contracts, enforcement of human and pet use restrictions, signage at the Phase 1 Campus boundary, and education of campus residents. While the potential for human disturbance cannot be fully eliminated, it will be reduced to a level that is not expected to adversely affect local populations of these species.

Construction and operation of the Phase 1 Campus have potential to introduce or disseminate nonnative plants that may be detrimental to vernal wetland ecosystems occupied by listed species. Conservation measures to control invasive weeds during construction, discourage use of invasive species in Campus landscaping, and control human and pet disturbance will minimize the risk of effects on wetland-dependant species.

Construction of the Phase 1 campus would occur on 104 acres of the existing Merced Hills Golf Course. The golf course is considered a developed, landscaped area that does not contribute to the vernal pool ecosystem surrounding the golf course. No grading or construction activities will occur outside of the Phase 1 Campus or within any vernal pool or other wetland habitats. Consequently, construction of the Phase 1 Campus would not fragment existing vernal pool or wetland habitats. Implementation of the adopted Conservation Measures will further assure that indirect effects are avoided and minimized and do not result in further fragmentation of existing habitats.

The University will allow the remaining 94 acres of the golf course to be maintained in a semi-natural state. No pesticides will be applied except as necessary to control noxious weeds and any such application will be reviewed and approved by the Service. Additionally, the University has purchased a 96-acre vernal pool/grassland area. The University has committed to preserve this area as well.

Finally, the University will manage the CNR and remaining VST areas it has acquired as discussed in the conservation measures. This land will be protected under conservation easements in perpetuity to preserve existing vernal pool habitats; these easements will also restrict human activities and access to control human use and prevent human disturbance of these areas.

Conservancy Fairy Shrimp - Effects of the Proposed Actions

Because of the limited distribution of this species, every population is considered significant in terms of species survival and recovery. A single population has been documented in the Study Area; this population occupies a pool in the southern portion of the CNR, which was established to protect the occupied pool and its watershed from development effects. No direct effects on Conservancy fairy shrimp are anticipated. All lands within the watershed of the occupied pool are in the CNR, which will be under protective management.

Siting the Proposed Actions in the eastern portion of the Study Area could potentially result in indirect effects on Conservancy fairy shrimp located at the Study Area's eastern boundary. Any project configuration that would result in direct effects or substantial indirect effects would be in conflict with the Parameters and Conservation Measures and, accordingly, would be excluded from consideration. Siting of the Proposed Actions on agricultural lands in the southern portion of the Study Area, if feasible, would reduce the risk of any adverse effects.

Without careful management, the Proposed Actions could have indirect effects on Conservancy fairy shrimp habitat. If the Proposed Actions were constructed near watershed subbasins supporting Conservancy Fairy Shrimp, those populations could be subject to effects resulting from design, construction, and operation of the Proposed Actions. Potential mechanisms of these effects (e.g., alteration of hydrology, introduction of invasive nonnative species, human disturbance, pesticide drift) are discussed above in *General Effects of the Proposed Actions*. However, in keeping with Parameter 2e, such effects that are unavoidable would be off-set through compensation in accordance with Service approval and the requirements of the Conservation Measures.

The Conservation Measures and Parameters have been adopted to address potential adverse effects that could result from design and construction of the Proposed Actions, operation and management of the Campus and University Community, and management of the CNR. In adopting the Parameters, the University has also explicitly committed to

avoiding direct effects, minimizing indirect effects, and compensating for any effects through habitat preservation approved by the Service and the Corps.

The Parameters and Conservation Measures mandate a highly protective management approach for the CNR. This approach will further reduce the potential for habitat disruption resulting from invasive species. Monitoring will be conducted to detect any incursions of nonnative species that pose a threat to Conservancy fairy shrimp habitat, and appropriate control measures will be implemented.

Conservancy Fairy Shrimp - Effects of Phase 1

Conservancy fairy shrimp occur only in one clay playa pool within the Study Area. The pool is located 1.25 miles east of the Phase 1 Campus site. The University has committed to protect the occupied pool and its entire watershed within the CNR. Other occurrences of Conservancy fairy shrimp have been documented 4-5 miles east of the Phase 1 Campus site.

Areas to be disturbed by construction activities are nearly a mile from the nearest portion of the watershed in the CNR that supports the occupied clay playa pool. Accordingly, no effects associated with construction-related disturbance, altered hydrology and nonpoint source pollution, or pesticides are anticipated to result from the Phase 1 project. Because the golf course is not suitable habitat, its conversion to the Phase 1 Campus would not result in fragmentation of suitable habitat for or existing populations of Conservancy fairy shrimp. Remaining potential effects are discussed below.

Without proper controls, the increased human population at the Phase 1 Campus could result in human disturbance in the watershed that supports Conservancy fairy shrimp. To protect the pool and watershed, the University has acquired the CNR and dedicated it for protective management. The Conservation Measures described above (e.g., fencing the campus perimeter, educating campus residents, enforcing trespass laws) will avoid and minimize potential for human disturbance of Conservancy fairy shrimp habitat and populations. The Conservation Measures also entail substantial measures to protect the CNR, including development of a specific management plan to protect sensitive resources, restrictions on human use, enforcement of pet restrictions, and other practices. The CNR management plan will be developed in cooperation with and subject to the approval of CDFG and the Service.

As previously discussed, the University has committed to implement conservation measures (e.g., use of certified weed-free erosion-control material during construction, use of noninvasive species in campus landscaping, control of human and pet disturbance) for the Phase 1 Campus project to reduce the potential for introduction of invasive plant species to adjacent lands. In view of the distance between the Phase 1 site and the watershed supporting Conservancy fairy shrimp, it does not appear likely that the Campus

would result in introduction of nonnative invasive species that would affect the habitat of this species.

Valley Elderberry Longhorn Beetle - Effects of the Proposed Actions

Elderberry shrubs are expected to occur along larger streams (e.g., Bear Creek, Black Rascal Creek, Fahrens Creek), along smaller drainages (Owens Creek, and Duck Creek), and locally in uplands. Although there are no occurrence records for valley elderberry longhorn beetles in the Study Area, there are numerous elderberry shrubs in the Study Area. Of the ten elderberry shrubs inventoried along Bear Creek, at least two of the shrubs contained exit holes that may have been created by the beetle.

The potential effects of the Proposed Actions on the beetle depend on the extent to which the Preferred Alternative site overlaps with the occurrence of elderberry shrubs. The University would attempt to avoid elderberry shrubs within the footprint of the Preferred Alternative to the extent practicable; for example, project design could ensure that riparian areas remain in undeveloped portions of the Campus and University Community. There is some possibility, however, that removal of some elderberry shrubs could not be avoided. Elderberry shrubs could be directly impacted by removal, or indirectly impacted by the activities listed above in the *General Effects of the Proposed Actions*.

To minimize potential for take and to compensate for lost habitat value when elderberry shrubs must be removed, the Service has developed a standard conservation protocol that applies to all removal of any elderberry shrub with stems more than 1 inch in diameter that is within the species' range (see Section IV, *Conservation Measures, Supplemental BA*). All elderberry shrubs that may be affected by the Proposed Actions would be considered potential valley elderberry longhorn beetle habitat and would consequently be subject to this compensation program. No elderberry shrubs occur on or near the Phase 1 Campus site. Consequently, the Phase 1 project will not adversely affect this species. Additionally, because the Phase 1 project is not expected to adversely affect this species, it will not contribute to any significant cumulative effects in the region.

Valley Elderberry Longhorn Beetle - Effects of Phase 1

No known occurrences of the valley elderberry longhorn beetle are found in the Phase 1 area. Therefore, no direct or indirect effects from the Proposed Actions are anticipated from the construction of Phase 1.

Bald Eagle - Effects of the Proposed Actions

Development of the UC Merced Campus could result in a direct loss of grassland habitat, vernal pools and swales, stock ponds, and other wetland habitats that may receive some winter foraging use by the bald eagle. The level of use of this habitat, as is typically the case for the bald eagle in California, is low. Bald eagles do not breed in the Study Area

and no suitable breeding habitat is present. The only documented breeding site in eastern Merced County is on the Chowchilla River approximately 8 miles from the Study Area boundary. It is likely, however, that wintering bald eagles use Lake Yosemite as foraging habitat; day roosts have been observed. Although Lake Yosemite supports low-quality night-roosting habitat for bald eagles, it may be used on occasion. Observations of bald eagles flying above vernal pool/grassland habitat suggest that they may occasionally use these habitats in and adjacent to the Study Area for foraging.

The only direct impact on bald eagles that is likely to result from construction of the Proposed Actions is the potential loss of foraging habitat. However, bald eagles use grassland/vernal pool habitat to only a limited extent; moreover, the Conservation Measures entail preservation of more than 8,000 acres of high-quality contiguous habitat in and adjacent to the Study Area, as well as offsite acquisition of easements on more than 17,000 acres to preserve additional habitat in perpetuity.

Indirect effects could result from an increase of human recreational activity, particularly in the vicinity of Lake Yosemite. Increased human population in the project vicinity resulting from Campus development is likely to result in an increase in recreational use of Lake Yosemite, which could in turn result in disturbance of bald eagle roosting sites at the lake. Bald eagles have been known to respond adversely to human disturbance; however, the Conservation Measures make provision for restricting human access to sensitive areas. Recreation and other human activities would be restricted to protect and preserve vernal pool species within the University's conserved lands, as outlined in the Conservation Measures, minimizing the adverse effects of human activity on bald eagle foraging. Furthermore, bald eagles are more likely to respond negatively to activities that occur infrequently; they have been observed to become habituated to regularized human presence.

Development of the Infrastructure Project may result in indirect effects to the bald eagle because suitable foraging habitat in the vicinity of any new roadway corridors would be affected by increased human activity, fragmentation, and other edge effects. It is known that the magnitude of these effects generally diminishes with distance from the edge of disturbance.

Bald Eagle - Effects of Phase 1

Because of the Phase 1 site's proximity to Lake Yosemite, bald eagles could occur infrequently within the site. Any such occurrence would be considered opportunistic, and individuals are not dependent on the Phase 1 site for any life requisite. Consequently, development of the golf course site is not considered to have an adverse effect on bald eagles.

Increased human use of terrestrial habitats as a result of the Phase 1 project would be limited and is not expected to influence the existing limited use of these areas by bald

eagles. While some increased human use of Lake Yosemite will occur, there is no indication from occurrence records or the size and vegetative characteristics of the site that this water body serves as an important wintering area.

San Joaquin Kit Fox - Effects of the Proposed Actions

Direct Effects

Direct effects on San Joaquin kit fox could potentially occur as a result of construction of the UC Merced Campus. If kit foxes were to occur at or near the selected construction site, construction activities could disturb or destroy active or potential dens, resulting in take. There are few records of kit foxes in the Study Area, and therefore such an impact is not considered likely to occur unless disturbances were to take place near known use areas. Construction of the proposed project could result in loss of potential breeding and/or foraging habitat. The most deleterious effect of the proposed action to kit foxes is the blockage of the remnant valley floor portion of the corridor along the eastern edge of the San Joaquin Valley. A kit fox corridor on the valley floor along the east side of the San Joaquin Valley is identified in the *Upland Species Recovery Plan*. This effect makes preservation of the more hilly portion of the corridor east of Lake Yosemite crucial to the survival of kit fox. Direct effects to kit fox are consequently addressed in the Conservation Measures.

San Joaquin Kit Fox Corridor: The Service reviewed the easements in relation to San Joaquin kit fox needs as detailed in the *Recovery Plan for Upland Species of the San Joaquin Valley* (Service 1998). The Service identified a need for a corridor along the east side of the San Joaquin Valley for the kit fox in the *Upland Species Recovery Plan*, and the easements being purchased by the University and the WCB to assist in the protection of the corridor.

The Parameters require that the applicant develop and implement a Conservation Strategy that is consistent with the *Upland Species Recovery Plan*, as well as any future federal recovery planning efforts. The *Upland Species Recovery Plan* specifies the need to protect 90 percent of existing natural lands, as of 1998, along the northeastern Valley edge in San Joaquin, Stanislaus, Merced, and Madera Counties. The *Upland Species Recovery Plan* also identifies the objective of maintaining a suitable corridor along Sandy Mush Road for movement of kit foxes from valley floor habitats to eastern Merced County. Parameter 2b, in accordance with the *Upland Species Recovery Plan*, also directs the University to protect the corridor north and east of the Applicants' Proposed Projects and to ensure that such acquisitions are "consistent with the establishment of a connection to the Sandy Mush Road area."

Kit foxes prefer more gentle terrain and decrease in abundance as terrain ruggedness increases (Grinnell *et al* 1937, Morrell 1972, Warrick and Cypher 1998). Kit foxes were found to inhabit an area with fewer than 6 degrees of slope for most movements. Only

1.2 percent of all recorded movements were in areas with a slope greater than 6 degrees (Koopman 1993). The University's commitment to protecting CNR, VST, and CST lands would protect a movement corridor for San Joaquin kit foxes that is a minimum of 1 mile wide (assuming that kit foxes would travel on slopes up to 10 percent) (see Figure 22 in the Project BA). Kit foxes may travel through or reside in areas with small sections of open grassland habitat at 10 to 30 percent slopes; the CNR/VST/CST corridor is more than 3 miles wide under these slope criteria.

The existing canals in the area are barriers to kit fox movement in the east side corridor. The canals include Le Grand Canal and the Fairfield Canal to the east of Lake Yosemite and the Main Canal to the west. Close to the applicant's proposed project, the canals have approximately 3-foot berms on either side, have steep slopes into the canal, a fast current, and have few crossing structures at the present time. Le Grand Canal and the Fairfield Canal restrict access to the hills to the east of the Applicants' Proposed Projects, and funnel foxes moving north from Le Grand and Planada into the Applicants' Proposed Projects site between the two canals as they come together at Lake Yosemite. Le Grand Canal on the south and the Main Canal, which extends to the northwest of Lake Yosemite, both prevent foxes from moving off the valley floor into the hills. The canals dissect the eastside kit fox corridor into several corridors. The eastern portion of the corridor pushes foxes into steep hills where they are more vulnerable to predators and are less successful at finding food themselves. The middle portion of the corridor funnels foxes to a dead end at Lake Yosemite. The western finger of the corridor keeps the foxes in agricultural lands for a long stretch. As part of the Phase 1 Campus project, the University is proposing an additional crossing, subject to approval from Merced Irrigation District, to improve kit fox accessibility to the grasslands in the hills to the east on the 96-acre site which will be permanently protected. In addition, Parameter 2b and other conservation measures discuss the need to look at additional kit fox crossings over these canals.

Construction of the Proposed Actions in the eastern portion of the Study Area would entail removal of the area of vernal pool/grassland habitat in which the only two occurrences of San Joaquin kit fox in the Study Area were reported. The Parameters and Conservation Measures prohibit the selection of an alternative that would create significant disruption to kit fox movements in the Study Area. Siting the Proposed Actions on agricultural lands in the southern portion of the Study Area, if feasible, would reduce the potential for effects on the San Joaquin kit fox.

Indirect Effects

Indirect effects could result from construction and operation of the Proposed Actions. Negative effects can be expected, not just in the footprint of the project, but also from the numbers of people who will be living on campus and in the supporting community. Up to 25,000 students, and 30,000 support staff and their families will be living in or

around the Study Area when the campus and community are completed. Effects on neighboring lands will likely include:

- disturbance of nearby habitat lands from recreational activities by additional people;
- attraction of coyotes and red foxes, kit fox predators, to the urban fringes;
- additional domesticated dogs from the Campus Community will kill kit foxes;
- increased use of rodenticides around buildings, and to control squirrels, both of which poison kit foxes; and
- increased vehicular traffic on area roadways will kill more kit foxes.

These effects will be significant in at least a 2-mile radius from the campus.

Recreation effects from additional people will be significant on the grassland kit fox habitat within at least a 2-mile radius of the campus for foot traffic, and within a wider radius for mountain bikers, motorcyclists, and automobile drivers. People will be attracted to the grassland areas, and their presence there will create noise, trash, light pollution at night, and will generally disturb kit foxes by their presence. Degradation of nearby lands will lead to den loss, prey reduction, invasions by nonnative species, and environmental contamination.

It is known that coyotes and red fox can generally tolerate more human disturbance, and can fare well on urban fringes in comparison to the kit fox. Red foxes are not adapted to arid conditions, the conditions that occur on native lands in the San Joaquin Valley. Human modifications make arid conditions more hospitable to red foxes and facilitate the invasion of these habitats by red foxes.

Dogs allowed to roam will chase and kill kit foxes, and are known to be a significant source of mortality to kit foxes in the Bakersfield area. If one third of the households in the Campus Community own one dog each, approximately 3,000 dogs will be added to east Merced. Domesticated dogs will form packs, and are known to kill kit fox on the edges of other population centers in the Valley. It is unlikely that the kit foxes will learn to live with this amount of disturbance, as some of them have in Bakersfield. The Bakersfield development occurred more slowly in a larger population of foxes, and the acclimation phenomenon that occurred there has not occurred in other Valley communities.

The use of rodenticides and pesticides also poses threats to kit foxes either directly, secondarily, or indirectly by reducing prey. Rodenticides used for rural uses are controlled by application guidelines administered on County Bulletins. However, rodenticides used by homeowners are different compounds and are not controlled by County Bulletins. Compounds used by homeowners include anticoagulants that are no longer allowed by County Bulletins for agricultural use. Anticoagulants probably contributed to the deaths of five foxes picked up and sampled by one researcher in

Bakersfield in 2000. In the earlier part of the century seven kit foxes were found dead within a distance of one mile, killed from ingesting strychnine-poisoned baits put out for coyotes (Grinnell et al 1937). In 1992, two kit foxes at Camp Roberts died as a result of secondary poisoning from rodenticides (Berry *et al.* 1992, Standley *et al.* 1992). The elimination of ground squirrels in an area will reduce the prey base available to resident or dispersing kit foxes. In 1975 in Contra Costa County, where the main prey item of kit foxes is the California ground squirrel, the ground squirrel was thought to have been eliminated county-wide after extensive rodent eradication programs (Bell *et al.* 1994). Reproductive success of kit foxes is correlated with abundance of their prey (Egoscue 1975).

The increased vehicular traffic on agricultural, urban, and rural roads by the additional people in the area will cause wildlife mortalities on the roads. Roads have detrimental effects on kit foxes because they have relatively large space requirements and are highly mobile, increasing the probability of encountering roads. They usually are most active just after sunset and in the evening hours after sunset, and it is likely that the student and worker populations will be using the roads during that time of day.

The projected increase in vehicular traffic associated with campus and community activity could result in mortality of kit foxes. Additionally, kit foxes could be harassed or killed by feral or unrestrained dogs. To address this concern, the Conservation Measures provide for construction of exclusion fencing between developed areas and protected habitat, enforcement of leash laws in developed areas, and monitoring and control programs for feral and domestic animals. The University has also committed to creation of artificial dens to provide kit foxes with protection from predators if the campus is located at the University's proposed campus site as presented in the Biological Assessment; the ultimate location of the campus will determine if this measure would be beneficial.

In keeping with the Conservation Measures for the San Joaquin kit fox presented in the Description of the Proposed Action, all construction activities in kit fox habitat would be conducted in accordance with the Service's *Standardized Recommendations for Protection of the San Joaquin Kit Fox prior to or during Ground Disturbance*. The University and County have committed to the Parameters and the Conservation Measures to avoid, minimize, and compensate for effects on the San Joaquin kit fox. These measures include siting the proposed project to maintain a movement corridor; providing a substantial amount of compensatory habitat that will be managed to protect and enhance habitat values; avoiding direct take of kit foxes during construction; and minimizing the potential for disturbance of kit foxes during campus operations. With adherence to these measures, construction and operation of the Proposed Actions are not expected to appreciably affect the distribution, number, or reproduction of the San Joaquin kit fox in the Study Area or surrounding lands, and thus will not jeopardize the species.

Although some habitat fragmentation is likely to result from cumulative development and growth in the Study Area, the Proposed Actions and the Conservation Measures will preserve extensive contiguous high-quality habitat to compensate for the potential fragmentation of habitat resulting from project implementation. Moreover, the Parameters and the Conservation Measures specify habitat restoration and enhancement, as appropriate, for impacts on vernal pools; such restoration and enhancement will offset some of the effects of habitat loss and fragmentation. Parameter 3 specifies that Merced County will provide assurances that it will require discretionary projects under county jurisdiction within the Study Area to comply with The Act. Accordingly, Merced County must comply with the Parameters before future development within the Study Area may proceed.

San Joaquin Kit Fox - Effects of Phase 1

Construction of Phase 1 of the proposed campus on a portion of the golf course may affect the San Joaquin kit fox; however, that effect needs to be evaluated within the context of the minimal habitat value the golf course has for the kit fox. That small adverse effect will also be offset by following the conservation measures already completed or planned. A large amount of land has been protected through direct acquisition or acquisition of easements in the identified kit fox corridor to support development of the Applicants' Proposed Projects. This land will be managed for endangered species habitat as a temporal gain to support development of Phase 1 of the campus. In addition, the remaining portion of the golf course will be allowed to revert to a semi-natural state which will have more habitat value to kit foxes, and the 96 acres of vernal pool/grassland habitat that was purchased to mitigate for the conversion of the golf course from habitat several years ago additionally provides habitat for kit foxes. Also, the Applicants are pursuing construction of an additional crossing across the canal in a strategic location for kit foxes adjacent to habitat. Therefore, the effects of Phase 1 on the kit fox are determined to be insignificant, and are therefore not likely to adversely effect the kit fox.

Mountain Plover - Effects of the Proposed Actions

Mountain plover are present on California grasslands and on disturbed ground areas from mid-October to mid-March of each year. Within the Study Area, development of the Proposed Actions in any configuration would result in some loss of potential foraging habitat for mountain plover during migration, although much of the grassland habitat in the Study Area is too densely vegetated to provide optimal foraging habitat. However, as specified in the Conservation Measures, any such direct effects would be offset by the preservation of extensive, contiguous, high-quality habitat that likely contains some suitable (i.e., sparsely vegetated) habitat for mountain plover foraging.

Indirect effects could include disruption of foraging behavior by human encroachment and risk of predation by domestic dogs and cats. Use of pesticides or insecticides near

potential foraging areas could impact mountain plovers. Mountain plovers exhibit low sensitivity to human presence. Additionally, the Conservation Measures include provisions to limit human encroachment into sensitive resource areas. The measures also specify measures to limit, monitor, and manage incursions of domestic or feral dogs and cats into preserved habitats. Construction of the Applicant's Proposed Projects in any configuration is unlikely to jeopardize the survival of populations of mountain plover.

Mountain Plover - Effects of Phase 1

Construction of Phase 1 of the Applicant's Proposed Projects on a portion of the existing golf course will have no effect on the mountain plover because the golf course does not contain any habitat for this bird.

Cumulative Effects

Cumulative effects of the Applicants' Proposed Projects are addressed in Chapter X of the original BA. Future state, local, or private actions that are reasonably certain to occur within the Study Area may result in direct and indirect effects on wetland-dependent and upland species; such effects would be comparable to those described above and in Chapter 10 of the original BA. Cumulative construction-related impacts could include direct loss of habitat, dust emissions, erosion, sedimentation, hazardous material spills, introduction of invasive nonnative plant species, and injury or direct mortality of wildlife. Long-term cumulative effects could include hydrologic changes and water quality effects, impacts resulting from pesticide use, and adverse effects related to human disturbance and invasive species in sensitive habitat areas. Without proper controls, management, and enforcement, increased human activity in habitat surrounding development in the Study Area could disturb habitats and populations of listed species. Cumulative effects resulting from habitat fragmentation would also occur when lands, habitats, or species in the Study Area become isolated as a result of urban development that creates a barrier between previously contiguous habitats or populations.

Although some fragmentation is likely to result from cumulative development and growth in the Study Area, the Proposed Actions and the Conservation Measures will preserve extensive contiguous high-quality habitat to compensate for the potential fragmentation of habitat resulting from project implementation. Moreover, the Parameters and Conservation Measures specify habitat restoration and enhancement, as appropriate, for impacts on vernal pools; such restoration and enhancement will offset some of the effects of habitat loss and fragmentation. Parameter 3 specifies that the County will provide assurances that it will require discretionary projects under County jurisdiction within the Study Area to comply with the Act. Accordingly, the County must comply with the Parameters before future development of projects not addressed in this Biological Opinion may proceed within the Study Area. With implementation of the Conservation Measures and Parameters, the cumulative effects of the Proposed Actions will be similar

to or less than the effects of the Applicants' Proposed Projects for the reasons described above (*General Effects of the Proposed Actions*).

Fleshy owl's-clover, Colusa grass, San Joaquin Orcutt grass, hairy Orcutt grass, Hoover's spurge, Greene's tuctoria, vernal pool tadpole shrimp, vernal pool fairy shrimp, and Conservancy fairy shrimp are all wetland-dependent species. Many of the activities affecting these species within the Study Area will therefore be reviewed under section 7 of the Act as a result of the federal nexus provided by section 404 of the Clean Water Act. However, an undetermined number of future projects that alter the habitat of these vernal pool species (aquatic and surrounding upland habitats) could go forward without the need for a section 404 permit. Specifically, recent changes related to the definition of waters of the United States and the corresponding treatment of isolated waters may result in the implementation of projects with effects to federally-listed vernal pool species that would have previously been addressed in section 7 consultations related to Section 404 of the Clean Water Act. In the absence of a federal nexus, projects would still require federal take permits if they result in take of any listed vernal pool crustaceans.

Activities that would potentially affect listed vernal pool species in the Study Area include, but are not limited to: development associated with urban, water, flood control, highway/roadway and utility projects; application of herbicides/insecticides (i.e., chemical contaminants); conversion of vernal pools and/or vernal pool grasslands to agricultural uses; and application of seasonal water to create irrigated pastures. In addition, conversion of rangeland to active agricultural uses in Merced County does not require a special use permit, grading permit, or any other type of discretionary decision by the County, nor does it require a conditional use permit from the County prior to implementation of the action. Therefore, this type of conversion may go unnoticed by the local and federal agencies and an unknown amount of vernal pool and vernal pool grassland habitat may be affected by deep-ripping for the planting of vines and orchards.

It is expected that agricultural conversion within the Study Area would be limited to the periphery of the existing Redding-Pentz-Corning soil association (soils that support the formation of vernal pools). Because the hardpan associated with these soils has been shown to reestablish within a few years of disturbance, the soils are very restrictive in terms of the cost and effort needed for preparation and maintenance (e.g., cobble removal), and most conversion appears to be associated with inclusions of less constrained soils. The lack of available water for irrigation within rangelands underlined by Redding-Pentz-Corning soils also constrains the development of active agricultural uses on these lands. Vernal pool habitat in the Study Area is currently used primarily for livestock grazing, which could adversely affect listed vernal pool species if the timing, amount, and intensity of grazing degrades habitat values or removes listed plants.

All federally listed species in this biological opinion may be adversely affected by future State, local, or private actions such as urbanization, water development, flood control, and highway/roadway and utility projects that result in the loss of habitat. Due to the

widespread presence of wetlands in the Study Area, most projects in this area would require a federal 404 permit and would not be considered cumulative under section 7 of the Act. The bald eagle may also be adversely affected by the human intrusion and disturbance associated with increased recreational uses at Lake Yosemite and surrounding grasslands within the Study Area. This latter disturbance may result in the abandonment of foraging habitat or roost sites that are otherwise suitable for the species. However, given that the bald eagle is widespread and recovery goals have been met, effects within the Study Area are not likely to appreciably reduce the numbers or distribution of this species.

Available data indicates that San Joaquin kit foxes occasionally and irregularly occur in southeastern Merced County. This species may be adversely affected by future State, local, and private actions in the Study Area. In addition, the recovery plan for this species identifies a recovery strategy and actions that are intended to protect existing San Joaquin kit fox habitat (including existing connections between habitats) in the northeastern segment of the species' geographic range. Future activities in the Study Area that would either remove suitable habitat or create barriers to the movement of kit foxes from established populations on the valley floor could adversely affect the species.

Grasslands with low, sparse cover and disced agricultural fields provide foraging habitat for mountain plover that occasionally and irregularly occur in the Study Area during migration and winter. Therefore, the species may be adversely affected by future State, local, and private actions in the Study Area.

Conclusion

The Service has reviewed the current status of fleshy owl's-clover, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Hoover's spurge, Greene's tuctoria, Hartweg's golden sunburst, vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, bald eagle, and San Joaquin kit fox, the Description of the Proposed Action with Parameters, the environmental baseline for the action area, the effects of the proposed UC Merced Campus and associated infrastructure and the cumulative effects. It is the Service's biological opinion that the UC Merced Campus and associated infrastructure, based upon implementation of and compliance with all of the conservation measures and parameters, as identified in the Description of the Proposed Action, is not likely to jeopardize the continued existence of listed species. No critical habitat is now designated within the Study Area, therefore, none will be affected. As critical habitat areas are designated, the Service will examine the effects of the Proposed Actions on critical habitat and determine an appropriate response at that time.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of the Act, which refer to terms and conditions and exemptions on taking listed fish and wildlife species, do not apply to listed plant species. However, section 9(a)(2) of the Act prohibits removal, reduction to possession, and malicious damage or destruction of listed plant species on Federal lands and the removal, cutting, digging up, or damaging or destroying such species in knowing violation of any State law or regulation, including State criminal trespass law. Actions funded, authorized or implemented by a Federal agency that could incidentally result in the damage or destruction of such species on Federal lands are not a violation of the Act, provided the Service determines in a biological opinion that the actions are not likely to jeopardize the continued existence of the species.

A Preferred Alternative for the Proposed Actions will be chosen in the future as a result of the NEPA and LEDPA processes. Until such time as the Service has completed its review of the Preferred Alternative and confirmed compliance with the Parameters and conservation measures no incidental take is authorized by this biological opinion. Based on the best scientific data available at the time, the Service will determine if the Preferred Alternative is in compliance with the Parameters. Further consultation will be required for the Service to issue incidental take authority for any of the species covered by this biological opinion.

Reporting Requirements

The following reporting requirements will assist the Service in tracking the success or failure of the Conservation Measures proposed by the Applicants in the Description of the Proposed Action for Phase 1 of UC Merced. The activity, type of reporting requirement, reporting format, and timing of reporting are listed in Table 10 (attached).

The Applicants must provide the Service with annual reports to describe the progress of implementation of all the commitments in the Conservation Measures of this biological opinion. The first report is due January 31, the first year after groundbreaking, and annually thereafter, until performance criteria are met.

The Sacramento Fish and Wildlife Office is to be notified within three working days of the finding of any dead listed wildlife species or any unanticipated harm to the species addressed in this biological opinion. The Service contact person for this is the Chief, Endangered Species Division at (916) 414-6620.

The Corps must require the Applicants to report to the Service immediately any information about take or suspected take of listed wildlife species not authorized in this opinion. The Corps must notify the Service within 24 hours of receiving such information. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal. The Service contact is the Service's Law Enforcement Division at (916) 414-6660.

Any contractor or employee who during routine operations and maintenance activities inadvertently kills or injures a listed wildlife species must immediately report the incident to their representative. This representative must contact the California Department of Fish and Game immediately in the case of a dead or injured animal. The California Department of Fish and Game contact for immediate assistance is State Dispatch at (916) 445-0045.

The U.S. Fish and Wildlife Service Regional Office in Portland, Oregon, must be notified immediately if any dead or sick listed wildlife species is found in or adjacent to pesticide-treated areas. Cause of death or illness, if known, also should be conveyed to this office. The appropriate contact is Richard Hill at (503) 231-6241.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and data bases.

1) The University and County should assist the Service in implementing recovery actions identified in the *Valley Elderberry Longhorn Beetle Recovery Plan*, *Recovery Plan for Upland Species of the San Joaquin Valley*, California, the *Pacific Bald Eagle Recovery Plan*, and the *Recovery Plan for Vernal Pool Species* (in preparation).

2) Conduct scientific studies on the California tiger salamander and midvalley fairy shrimp to support conservation activities.

3) Evaluate species of concern, particularly the midvalley fairy shrimp and the California tiger salamander, and their associated habitats to assess possible adverse effects of the UC Merced campus and community and implement Conservation Measures that could protect these species.

4) Implement actions to conserve the California tiger salamander and midvalley fairy shrimp in eastern Merced County.

5) Provide outreach to the public and to schools on protecting listed species, establishing safe harbors, forming partnerships that foster conservation, and habitat conservation planning.

6) The University of California should review current management on lands it holds conservation easements for, to determine compatibility with wildlife use, and adjust if appropriate and feasible.

7) The University should coordinate with the Service, CDFG, the County, and private landowners to continue to participate in the development of an NCCP/HCP consistent with the Planning Agreement.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION--CLOSING STATEMENT

This concludes formal consultation on the action(s) outlined in the Description of the Proposed Action. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Please contact Karen Harvey or Susan Jones of this office at (916) 414-6600, if you have any questions.

Figure 1 - Study Area Map
Figure 2 - Phase 1 Campus Design
Figure 3 - Kit Fox Canal Crossings, Existing and Proposed
Figure 4 - Conservation/Mitigation Areas

Table 1 - Land and Easement Acquisitions, attached
Table 2 - Summary Table of Species Occurrence, attached
Table 3 - in text
Table 4 - in text
Table 5 - in text
Table 6 - in text
Table 7 - in text
Table 8 - Losses and Estimate of Extant Vernal Pool Grasslands in Five Counties in the San Joaquin Valley, California, attached
Table 9 - Unpermitted Conversions of Wetlands/Endangered Species Habitat in Five Counties in the San Joaquin Valley, California, attached
Table 10 - Reporting Requirements, attached

Enclosure
Abbreviation List

cc:
University of California, Merced (Attn: Ric Notini)

Sincerely,

Cay C. Goude

Cay C. Goude
Acting Field Supervisor

UC Development Office, Merced County (Attn: Bob Smith)
California Department of Fish and Game (Attn: Pat Brantley)

Mr. Michael Jewell

Enclosure

Abbreviation List

BA - Biological Assessment
BMP - Best Management Practices
CAA - Comprehensive Alternatives Analysis
CNDDB - California Natural Diversity Database
CEQA - California Environmental Quality Act
CLR - Campus Land Reserve
CNR- Campus Natural Reserve
CST - Cyril Smith Trust
CWA - Clean Water Act
DA - Department of the Army
DEIR - Draft Environmental Impact Report
EIR - Environmental Impact Report
EIS - Environmental Impact Statement
HCP - Habitat Conservation Plan
HMP - Habitat Mitigation Plan
IPM - Integrated Pest Management
LEDPA - Least Environmentally Damaging Practicable Alternative
LRDP - Long Range Development Plan
NCCP - Natural Communities Conservation Plan
NEPA - National Environmental Policy Act
OCAP - Operations Criteria and Plan; refers to the Service's March 6, 1995, 1-1-94-F-70, biological opinion on the Effects of Long-term Operations of the Central Valley and State Water Projects on the Threatened Delta Smelt and the Proposed Threatened Sacramento Splittail.
RMP - Resource Mitigation Plan
UC - University of California
UCP - University Community Plan
VST - Virginia Smith Trust
WCB - Wildlife Conservation Board

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
1-1-02-F-0107
81420-2009-F-0639

APR 28 2009

Michael Jewell
Chief, Regulatory Division
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Subject: Amendment to Formal Section 7 Consultation on the University of California, Merced Campus and Community North Project (1999900203), Merced County, California

Dear Mr. Jewell:

This document is the U.S. Fish and Wildlife Service's (Service) amended Biological Opinion (2009 BO Amendment) in response to your December 5, 2008, request for reinitiation of formal consultation on the revised University of California, Merced (UC Merced) Campus and Community North Project in Merced County, California. This 2009 BO Amendment analyses the Proposed UC Merced Campus, Phase 1 and Campus Buildout (Corps # 199900203) and Infrastructure Project (Corps # 200100570) (2002 BO) and addresses whether the requirements in the 2002 Biological Opinion (Service File Number 1-1-02-F-0107)(2002 BO) have been met. This 2009 BO Amendment addresses the effects of the University of California's (University or UC) Proposed Project on 13 listed species in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act). These 13 species include:

succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*),
Colusa grass (*Neostapfia colusana*),
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*),
hairy Orcutt grass (*Orcuttia pilosa*),
Hoover's spurge (*Chamaesyce hooveri*),
Greene's tuctoria (*Tuctoria greenei*),
Hartweg's golden sunburst (*Pseudobahia bahiifolia*),
vernal pool fairy shrimp (*Branchinecta lynchi*),
Conservancy fairy shrimp (*Branchinecta conservatio*),
vernal pool tadpole shrimp (*Lepidurus packardi*),
California tiger salamander (*Ambystoma californiense*),

TAKE PRIDE IN AMERICA

valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Critical habitat for listed vernal pool species also is addressed. The delisted bald eagle (*Haliaeetus leucocephalus*) is protected under the Bald and Golden Eagle Protection Act, and is addressed in this document.

Based on survey results and analysis presented in the 2002 BA and 2002 BA Supplement, the 2002 Biological Opinion concluded that the following species were not known to occur within the project area or mitigation sites: Hoover's spurge, hairy Orcutt grass, Hartweg's golden sunburst, and Greene's tuctoria. Extensive subsequent surveys (ICF Jones & Stokes 2008, Gibson and Skordal 2008) also did not locate these species in the former campus area (prior to reconfiguration of the Campus). Therefore, the Service concurs with the Corps' determination that both the University's Proposed Project (the Campus and Community North) and the Proposed Action (Campus and entire University Community) may affect, but are not likely to adversely affect Hoover's spurge, hairy Orcutt grass, Hartweg's golden sunburst, and Greene's tuctoria.

In addition to materials provided during consultation prior to the 2002 BO, this document is based on information provided in the following documents and other materials referenced within them:

- *Supplement to the Biological Assessment for the UC Merced Campus and Infrastructure in Support of UC Merced Project* (Airola 2008a),
- *Proposed Conservation Strategy for the UC Merced Project* (ICF Jones & Stokes 2008)
- *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced* (Airola 2008b),
- *Compensatory Wetland Mitigation and Monitoring Plan* (Gibson and Skordal 2008)
- *University of California Merced and University Community Project Environmental Impact Statement/Environmental Impact Report* (Impact Sciences 2008).
- *Special-Status Species Survey Report, 2007 and 2008 Field Seasons: Robinson Ranch Conservation Easement Property, Northeastern Merced County, California* (Vollmar Consulting 2008)

A complete consultation history and the detailed project description on which this amendment is based, are provided in this document. Species information, including Species Status and Environmental Baseline were provided in detail in the 2002 BO, and are not repeated in total here, but updated information regarding the species' statuses within the project area is provided.

Consultation History

Consultation in Support of the 2002 BO

The Service's 2002 BO describes the consultation process under the Act for the UC Merced project through 2002. The proposed UC Merced Project is the product of more than 20 years of public involvement, planning efforts, and extensive analyses. In addition to obtaining direct input from concerned citizens and interested organizations as part of the planning and environmental review processes, the University engaged in discussions with various local, State, and Federal agencies. This consultation included contacts with the Service as early as 1994 and extensive discussions and communication since 1999, including the Service's written comments on the 1994 UC Merced Site Selection Environmental Impact Report (EIR); comments on the 2002 UC Merced Long-Range Development Plan (LRDP) EIR; and numerous discussions between University and the Service as well as the U.S. Corps of Engineers (Corps), U.S. Environmental Protection Agency (USEPA), California Department of Fish and Game (DFG), the County of Merced (County), and other stakeholders. The 2002 BO documents the correspondence and informal discussions between the University and the Service.

On February 25, 2002, the Service received a letter from the Corps requesting the initiation of formal consultation under section 7 of the Act and the 2002 Biological Assessment (2002 BA) (EIP Associates 2002). On July 8, 2002, the Service received a Supplement to the Biological Assessment (2002 BA Supplement) from the University containing additional information needed for the section 7 consultation and the Phase 1 campus, including a memo describing water supply and its potential effects on downstream resources.

On August 19, 2002, the Service issued the 2002 BO evaluating the effects of the UC Merced Project and the Infrastructure Project on the fleshy (succulent) owl's-clover, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Hoover's spurge, Greene's tuctoria, Hartweg's golden sunburst, vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, valley elderberry longhorn beetle, bald eagle, and San Joaquin kit fox. For purposes of that analysis, the UC Merced Project included development of the Phase 1 Campus, which was constructed on the former Merced Hills Golf Course, in addition to the remainder of the campus buildout (2002 Proposed Project).

The 2002 Proposed Project evaluated in the 2002 BO consisted of a 910-acre campus, a 340-acre Campus Land Reserve, a 750-acre Campus Natural Reserve (CNR), and associated mitigation lands. The 2002 BO also addressed the related project to install roads and other public infrastructure (i.e., the Infrastructure Project) and the 2,000-acre University Community because of their relationship to the 2002 Proposed Project as interrelated and interdependent actions.

The Corps and the Service recognized that the Clean Water Act Section 404 permit process and the environmental review process under the National Environmental Policy Act (NEPA) could result in a modification of the proposed campus. Therefore, consistent with the project's characterization in the 2002 BA Supplement, we expanded our analysis to consider the potential

effects resulting from the development of a campus and community within the broader Study Area, which includes the 2002 Proposed Project site (Figure 1). In order to provide sufficient specificity to allow consultation to proceed, the University and the County agreed to a set of project conditions referred to as Parameters that were incorporated into the 2002 BO (Appendix A). The University and the County intended that these Parameters would be implemented or satisfied in connection with the selected alternative that would obtain Section 404 authorization.

The Parameters served as an important foundation for the consultation under the Act and for our conclusions in the 2002 BO. As part of the 2002 consultation, the University and the County agreed that the Parameters would apply to any preferred alternative located within an area defined as the Study Area in the 2002 BO (see Figure 1 in the 2002 BO) that may be selected by the Corps pursuant to its Section 404 permit and NEPA processes. The University also committed to a set of Conservation Measures designed to implement the Parameters. The project description for the 2002 consultation incorporated these measures.

Although the 2002 BO determined that the 2002 Proposed Project and the associated Infrastructure Project would not jeopardize the continued existence of federally-listed species, the 2002 BO did not authorize take of listed species. The 2002 BO recognized the need for subsequent consultation prior to issuance of a Section 404 permit in order to further minimize the effects of the 2002 Proposed Project consistent with the Parameters and Conservation Measures identified in the 2002 BO.

Consultation Subsequent to Issuance of the 2002 BO

Following the release of the 2002 BO, consultation continued between the Service, the Corps, the University, and other agencies and stakeholders to determine the most appropriate ways to achieve the requirements of the 2002 BO Parameters and Conservation Measures. Topics addressed during this consultation included provisions of the major documents and actions required through the Parameters, the planning and configuration of the UC Merced Campus and University Community, and the permitting process and supporting environmental approval process. Table 1 summarizes these meetings and discussions, which provided the basis for the University's reconfiguration of the UC Merced Campus and the University Community, which is comprised of the Community North and the Community South (Figure 2), to minimize impacts on threatened and endangered species and wetlands and other waters of the United States (see *Current Status of Campus Development* below for a description of this planning process).

On February 20, 2008, the University submitted its revised Section 404 permit application seeking authorization from the Corps to fill waters of the United States located on the UC Merced Campus and the Community North. The Corps issued one public notice in connection with the application (PN 199900203).

Relationship of the 2002 BO to the 2009 BO Amendment

For purposes of our analysis, the proposed project includes the UC Merced Campus and, more specifically, construction of the Campus Buildout (i.e., the part of the campus other than the already-constructed Phase 1 Campus), and the Community North portion of the University Community (Proposed Project). The Proposed Project includes the Infrastructure Project evaluated in the 2002 BO (Figure 1).

The 2008 BA Supplement updates previous BAs (EIP Associates 2002, Jones & Stokes 2002a) by incorporating recent actions and planning for the UC Merced Campus, Community North, and mitigation lands. The 2008 BA Supplement also documents how the University has complied with requirements of the 2002 BO, including the Parameters and supporting Conservation Measures. It updates the analysis previously provided in the 2002 BAs and in the 2002 BO regarding effects of the Proposed Project on listed species, with a focus on summarizing the amounts of occupied habitats and numbers of point locations of listed species that would be affected by the Proposed Project and are protected and managed within mitigation lands. The BA Supplement also individually addresses the effects of the Community South project. The UC Merced Campus and the entire University Community, i.e., both the Community North and the Community South, are referred to as the Proposed Action in that document.

This 2009 BO Amendment reflects the Corps request for reinitiation of consultation in light of the University's revised Section 404 permit application for wetland fill authorization associated with the Proposed Project. As such, this 2009 BO Amendment amends the 2002 BO and evaluates the Proposed Project for purposes of authorizing take under section 7 of the Act. Following the approach in the 2002 BO, this 2009 BO Amendment includes a programmatic evaluation of the Community South project as an interrelated and interdependent action, even though a Section 404 permit application for the Community South project has not been submitted to the Corps at this time. Thus, this 2009 BO Amendment does not authorize take for Community South development. If a Section 404 permit application is submitted in connection with Community South development, the Service will tier from this 2009 BO Amendment and conduct a more detailed analysis of that activity for purposes of authorizing incidental take.

AMENDED BIOLOGICAL OPINION

This is an amendment to our 2002 BO dated August 19, 2002, which addressed the effects of the Proposed Project. Only sections that have changed since the 2002 BO are included in this amended opinion. A section is changed either because (1) the Service has obtained new information pertinent to the revised project and the analysis of effects, (2) the effects of the Proposed Action are different from those effects described in the 2002 BO, or (3) the analysis is relevant to the Service's determination whether to authorize take.

Background and Current Status of UC Merced Project

The University has proposed the development of a major research university located in Merced County, California (Figure 1). As more fully described in the 2008 BA Supplement, the Proposed Action would include an 815-acre campus and a 1,951-acre contiguous, associated University Community comprised of the 833-acre Community North and the 1,118-acre Community South (Figure 2). The University Community would provide housing and commercial and other uses needed to support the UC Merced Campus. Although this 2008 BO Amendment focuses on the UC Merced Campus and the Community North, it also evaluates the Community South as an interdependent and interrelated project. The entire Proposed Action was analyzed in the University of California Merced and University Community Project Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (Impact Sciences 2008).

Action Area

Although the revised UC Merced Campus and University Community footprint is reduced in size, the action area is unchanged from the 2002 BO.

Study Area

In the 2002 BO, the Service identified an area which was subject to the Service's review at the time and within which alternatives were considered for the proposed Campus and Community through the NEPA process. The Study Area was configured to allow consideration of potential effects of locating the project in a variety of settings. The Proposed Action is located within the Study Area as depicted on Figure 1.

Phase 1 Campus

The University initiated construction of the Phase 1 portion of the Campus in 2002 following the determination in the 2002 BO that this project component would have no effects or would not be likely to result in adverse effects on listed species. The Phase 1 Campus consists of three major academic buildings, two dormitory complexes, a recreation facility, and several support structures. Future Phase 1 development includes two major academic buildings, two dormitory complexes, and additional support facilities. As of 2008, the Phase 1 Campus supports an enrollment of approximately 2,000 students. Phase 1 has an estimated capacity of 3,200 students.

Planning for Campus and University Community Reconfiguration

The University undertook planning efforts in two phases during 2007–2008 to reconfigure the remainder of the UC Merced Campus and Community North to minimize effects. The University engaged in this planning effort in order to support the Corps' determination of the

least environmentally damaging practicable alternative for purposes of the Section 404(b)(1) Guidelines under the Clean Water Act.

Campus and University Community Footprint Evaluation and Reconfiguration

The University's initial planning phase sought to meet the Parameters by focusing on the size and location of the campus footprint. In particular, this planning effort focused on the watershed and subwatershed units of the previously proposed campus and immediately adjacent lands, as well as land within the previously designated University Community. The planning analysis incorporated subwatershed-specific information on occurrence and abundance of wetlands and listed species, as well as information on campus needs, construction costs, energy efficiency, and aesthetics. The University's primary goal was to reduce the acreage of impacts to high value wetlands (vernal pools, swale wetlands, and clay slope wetlands) and associated grasslands.

The resulting campus footprint eliminated 373 acres (41%) of the previous 910-acre campus footprint by relocating lands with greater amounts of wetland and listed species habitat from the UC Merced Campus footprint to habitat preservation and mitigation lands. In order to provide sufficient acreage for the UC Merced Campus in the new configuration, 278 acres were relocated from the University Community to the UC Merced Campus. The reconfiguration substantially reduced the direct effects of the UC Merced Campus and University Community on all wetlands, especially those to higher-value natural wetlands (vernal pools, swales, and clay slope wetlands).

To offset the loss of developable acreage within the University Community due to the shift in the UC Merced Campus, additional lands were added to the east side of the previously proposed University Community. Overall, the combined acreage of the UC Merced Campus and University Community was reduced by a total of approximately 277 acres (from 3,043 to 2,766 acres) with the bulk of the acreage that was removed from development consisting of high-value vernal pool–grassland habitat.

As part of the reconfiguration of the UC Merced Campus and the University Community, the 221 acres of University owned land removed from the Campus and 340 acres previously designated as the Campus Land Reserve were added to the Campus Natural Reserve, thereby increasing the size of the Campus Natural Reserve from 750 acres to 1,307 acres (Figure 3). The University will secure a conservation easement to protect this area in perpetuity.

The University submitted to the Corps on February 20, 2008 a Clean Water Act Section 404 Permit for the fill of waters of the United States resulting from the UC Merced Campus and Community North developments. The Infrastructure Project is now subsumed within the Proposed Project and is no longer treated as a separate project in the Section 404 application, this Biological Opinion, or NEPA/California Environmental Quality Act (CEQA) approval processes.

UC Merced Long Range Development Plan

Following the decision to modify the Campus configuration, the University began extensive land use planning. UC Merced's 2009 Long Range Development Plan (LRDP) was adopted by the Regents on March 19, 2009 (Figure 4). The LRDP consists of land use, landscape and open space, and utilities elements. The LRDP is consistent with the Parameters and Conservation Measures in the 2002 Biological Opinion.

University Community Plan Amendment

The County approved the University Community Plan (UCP) in 2004. The UCP established goals, objectives and policies and an area plan for the area south of the UC Merced Campus. Following adoption of the UCP, the County amended the County General Plan to designate the site of the University Community for multiple use urban development.

In response to the shift of the campus onto land previously within the University Community Plan area, it is anticipated that the University Community Land Company, LLC (UCLC), the owners of the land within the northern portion of the University Community (Community North), will apply to the County of Merced for a General Plan Amendment to accommodate the additional 222-acres of land from the east (See Figures 1 and 2). The University's February 2008 Section 404 permit application seeks authorization to fill wetlands within the Community North.

Other University Community Lands

LWH Farms, land owner of Community South, has not applied for a permit to fill wetlands within the Community South area. This area is not included within the University's application for a Section 404 permit because the University does not control the Community South. In the event that LWH Farms were to submit to the Corps a separate Section 404 permit application for development of the Community South, the Service would reinitiate section 7 consultation. Any such future section 7 consultations likely would tier from this 2009 BO Amendment.

Section 404 Permit

The University seeks authorization from the Corps to fill approximately 76.70 acres of waters of the United States located on the UC Merced Campus and the Community North. Additonally, the fill ultimately required for development of the Community South, brings the Proposed Action impacts to a total of approximately 85.05 acres of waters of the United States. The combined 2002 LRDP and 2004 University Community Plan planning areas included approximately 121 acres of waters of the United States. The reconfigured plans reduce the amount of fill by approximately 36 acres or 30%. In addition, many of the waters of the United States now avoided because of the Proposed Action's minimized footprint include high-functioning and high-quality wetlands and vernal pool complexes.

REVISED DESCRIPTION OF THE PROPOSED ACTION

The actions evaluated by the Service during the present consultation consist of the University's Proposed Project, which is subject to the Corps permit to fill wetlands and other waters of the United States under Section 404 of the CWA. As described in the project's 2008 BA Supplement, the University's Proposed Project consists of the construction of the 815-acre UC Merced Campus and the 833-acre Community North. This action is one of two major projects under the broader Proposed Action, which also includes the development of the 1,118-acre Community South project, an interrelated and interdependent project.

The UC Merced Campus and University Community lands are located in eastern Merced County, approximately 2 miles northeast of the corporate limits of the city of Merced, California. The area is situated south of Lake Yosemite and east of Lake Road (Figures 2 and 3).

Revised Footprint and Land Uses for the UC Merced Campus and Community North

The University's initial application for the 2002 Proposed Project proposed a campus of 910 acres with a 340-acre development reserve (the Campus Land Reserve). The Proposed Action no longer includes the Campus Land Reserve, and these lands have been incorporated into the Campus Natural Reserve (Figure 3).

As such, the 2009 LRDP consolidates the UC Merced Campus and its reserve development capacity onto 815 acres, buffered on the north and east from the natural landscape by a series of perimeter road and canals (Figure 4). The University continues to employ best practices in sustainable development through on-site stormwater management. Passive and active recreation areas are located to receive upland flows along drainage pathways at the western and eastern edges of development.

The plan for the UC Merced Campus and Community North area includes five districts that provide conceptual descriptions of the *block types* (i.e., model development types for different uses) (University of California 2008), including the Academic Core, Gateway District, Student Neighborhoods, University Town Center, and University Community Neighborhood (Figure 4). Descriptions of each of the five major districts incorporated into the Campus and Community North areas appear below. Detailed descriptions of the typical block types that describe the sizes of plan units, building sizes and densities, number of dwelling units, and other features are presented in the University's Section 404 permit application.

Academic Core: The Academic Core district would be the core of the campus and would link the student neighborhoods proposed northeast, north, and west of this district to the Town Center, proposed south of this district. The Academic Core would include mixed-uses, such as institutional, research, administration, student services, parking, recreation and other services, and a main street of on-campus student, staff and faculty services mixed with housing. The Academic Core (AC-1) and Academic Main Street (AC-2) block types are proposed for this district.

Gateway District: The Gateway District (G) is proposed west of the Town Center and the Academic Core, within the UC Merced Campus and the Community North. This district would include private and public research; visitor serving facilities; sports venues; parking; and other regional attractors. A transit hub would be located within this district that would connect to the local transit system, and providing walking opportunities to most sections of each central district. The Gateway District Academic Lab (G-1) and Industrial-Research (G-2) block types are proposed for this district.

Student Neighborhoods: The Student Neighborhood district would surround the Academic Core to the northwest, north, and east, and would be located within walking distance to the core of the UC Merced Campus. This district would include residence halls and apartments supported by student services (food and recreation), park space and shared parking. The student neighborhoods would house up to 12,500 students. Two Student Neighborhood Walk-Up Apartments (SN-1) and Residence Hall/Dorm (SN-2) block types are proposed for this district.

University Community Town Center: The University Town Center district would be located in Community North, and would serve as the downtown for the UC Merced Campus and the University Community. This district would include mixed-use commercial and residential activities, cultural facilities and parking. The Town Center Commercial Mixed Use (TC-1), Residential Mixed Use (TC-2), and Residential Townhouse/Rowhouse (TC-3) block types are proposed for this district.

University Community Neighborhood: The University Community Neighborhood district would be located within the Community North. This high-density district would include a multiple mixed-use neighborhood district with an extensive network of transit, bike and pedestrian paths. The Community North Center (NHD-1), Residential Townhouse (NHD-2), Small Lot Single-Family (NHD-3), and Large Lot Single-Family (NHD-4) are proposed for this district.

Community South

UC does not control the Community South portion of the University Community and the Community South project is not included within the UC's 404 permit application. The Community South area may be subject to a future permit and environmental review process. The 1,118 acres that constitute Community South are designated Multi-Use Urban Development in the County General Plan. This area likely would develop into two residential villages. Major land uses in the Community South area may include residential neighborhoods totaling approximately 635 acres and 5,823 residential units, non-residential retail and office areas totaling approximately 24 acres and 390,000 square feet of building space.

Infrastructure Project

The revised UC Merced Campus and Community North Section 404 permit application (#199900203) supersedes the Infrastructure Project application (# 200100570). Development of the University Community, however, includes certain infrastructure necessary to serve the UC Merced Campus. This infrastructure includes construction of a major north-south arterial road north of Yosemite Drive, portions of two additional minor arterial roadways and collector streets, and construction of utility lines (storm drainage, sewer, potable water, fire and irrigation water, telecommunications, electric and gas) within the rights-of-way secured for those roadways. Although this infrastructure is required for the UC Merced Campus alone, it is proposed to be located and configured in a manner as to allow expansion to serve the proposed University Community.

Conservation Measures

This section describes conservation measures that the University and the County have agreed to apply in order to avoid, minimize, and compensate for potential effects that the Proposed Actions could have on listed species. The following contains a summary of the general conservation measures for the Proposed Action.

- Protection and conservation management for 6,430 acres of UC-owned mitigation lands adjacent to the UC Merced Campus (including the VST, CNR, and UCLC-owned Myers Easterly property), the adjacent 3,070-acre CST lands, and the 91-acre Myers Easterly parcel (Tier 1 mitigation lands) (Figure 3; Table 2).
- Acquisition of conservation easements on an additional 17,141 acres of high-value private lands in eastern Merced County (Tier 2 lands).
- Acquisition and enhancement or creation of an additional, currently unquantified area of land to mitigate for losses of jurisdictional wetlands and other waters of the U. S. (Gibson and Skordal 2008).
- Continued commitment to design, construction, and operation measures listed in the Resource Mitigation Plan (Jones & Stokes 2002a), the 2002 BA (EIP Associates 2002), BA Supplement (Jones & Stokes 2002a), and 2002 Biological Opinion (USFWS 2002) to avoid and minimize impacts.

The following section describes the status of plans and actions that were required by the 2002 BO. Following the discussion of the plans and actions, this Biological Opinion summarizes UC Merced's compliance with the 2002 Parameters and Conservation Measures.

Status of Other Required Plans and Actions

As a result of regulatory requirements, the University's Proposed Project includes a variety of other planning documents and their resulting actions. This section summarizes activity on various plans and requirements that have been conducted since issuance of the 2002 BO.

Conservation Strategy

The 2002 BO Parameters 1a and 1b require the preparation of a Conservation Strategy for the University's Proposed Project. The Conservation Strategy was intended to:

- provide guidance for developing and implementing measures to conserve wildlife and plant species affected by the project,
- summarize the University's implementation of this strategy and describe the role of the strategy in regional conservation, and
- assess the potential effects of the project on listed species and sensitive habitats in the project vicinity.

The University submitted several drafts of the strategy for review by the Service, DFG, and other agencies and interested stakeholders prior to reconfiguration of the UC Merced Campus and University Community. The University revised the Conservation Strategy in 2008 (ICF Jones & Stokes 2008) following reconfiguration and incorporation of the Community North to the University's Proposed Project. The University submitted the revised Conservation Strategy to the Service on September 23, 2008.

Management Plan for Conservation Lands

Parameters 2a and 2d of the 2002 BO required preparation of a Resource Mitigation Plan for the Campus that includes "the measures set forth in the BA supplement, as well as management strategies and financial assurance for the monitoring and management of preserve land and a strategy for addressing indirect effects," and "financial assurance for long-term monitoring and management of identified preserve lands." Because the term *Resource Mitigation Plan* was applied to a broader plan that summarized all mitigation measures for sensitive biological resources (Jones & Stokes 2002b), the document prepared to meet Parameters 2a and 2d is referred to as the Management Plan for Conservation Lands (Airola 2008b). The University has satisfied the requirement for preparation of a Habitat Mitigation Plan (HMP) for the Infrastructure Project, which has been incorporated into the University's Proposed Project, by applying the adopted requirements for the UC Merced Campus to the Community North lands, including infrastructure components (see *Status of the Conservation Measures*, below).

The University prepared a draft of the Conservation Lands Management Plan in 2008 (Airola 2008) to define management and monitoring needs to protect and maintain listed species and their habitats on UCM mitigation lands. The plan provides management goals and objectives, management guidelines, monitoring goals, and a funding and adaptive management program. The University submitted the revised Conservation Lands Management Plan to the Service on September 24, 2008 (Airola 2008b). The Conservation Lands Management Plan addresses the following mitigation lands.

- UCM Conservation Lands (Tier 1a lands): 6,430 acres of mitigation land, comprising the University's VST Preserve and CNR and the UCLC's Myers Easterly property (which will continue to be owned by the UCLC and managed by the University under a conservation easement).

- CST: the 3,070-acre CST property (Tier 1b lands) is currently owned by The Nature Conservancy (TNC). This property will be protected with a restrictive conservation easement.

- Tier 2 Conservation Lands: 17,141 acres in five private ownerships that are protected under conservation easement (Tier 2 lands).

The Conservation Lands Management Plan also addresses management of grassland portions of the Campus adjacent to Conservation Lands (Adjacent Campus Buildout) during the interim period before they are developed in various campus phases.

Compensatory Wetland Mitigation and Monitoring Plan

The University's Compensatory Wetland Mitigation and Monitoring Plan (Compensatory Wetland Mitigation Plan) (Gibson and Skordal 2008) fulfills mitigation requirements under the Clean Water Act Section 404 and also serves to protect, enhance, and create suitable habitat for listed species that require vernal pools and other seasonal wetland habitats. The plan's major components include preservation and enhancement of existing wetlands that could be subject to future degradation and restoration of degraded wetland and/or creation of new wetlands. Preservation and enhancement is designed to meet performance standards that ensure that there will be no losses in wetlands functions and values. Restoration and creation will be conducted to ensure that no net loss of wetland area occurs.

The restoration and creation component of the Compensatory Wetland Mitigation Plan specifies a goal "to establish wetlands that are similar to the impacted wetlands in terms of physical and biological characteristics" (Gibson and Skordal 2008). Wetland restoration and creation efforts will focus on vernal pool habitat, which is a primary habitat used by many of the listed species that occur within the UC Merced Campus and Community North areas. The soil and associated seedbed from vernal pools that will be eliminated as a result of construction will be used in wetland restoration and creation, unless genetic considerations suggest otherwise.

The plan has been revised and submitted to the Corps in support of the University's Section 404 Permit application.

UC Merced Campus and University Community Environmental Impact Report/Environmental Impact Statement

As lead agencies for State and Federal actions under CEQA and NEPA, the University and the Corps prepared a joint EIS/EIR to evaluate the potential for significant environmental impacts associated with the development and operation of the Proposed Action. Although a Section 404 permit application has not been filed for Community South, consistent with the Federal statement of purpose discussed in the EIS/EIR and the Corps' conclusion that the UC Merced Campus and University Community are connected actions, the impacts associated with all fills of waters of the United States required for the Campus and University Community were addressed in the EIS/EIR.

STATUS OF COMPLIANCE WITH PARAMETERS IN THE 2002 BIOLOGICAL OPINION

This 2009 BO Amendment documents the extent to which the University has complied with the Parameters and Conservation Measures identified in the 2002 BO. The University used the 2002 BO Parameters as a guide to subsequent planning for the UC Merced Campus and Community North and for acquired conservation areas. The Parameters provide general guidance, while the Conservation Measures provide more specific guidance for achieving the requirements of the Parameters. A summary of the status of compliance with the Parameters is provided in Table 3. The discussion below is a more detailed summary of the requirements of the Parameters and the status of the University's efforts to meet them.

Adopted Environmental Commitment for the UC Merced Campus

Requirement

The measure specifies that the Conservation Measures are the specific means by which the Parameters will be addressed.

Status

Conservation Measures have been or will be met, as documented in the following sections.

Resource Mitigation Plan for Campus Buildout

Requirement

This Conservation Measure specifies that the University's Resource Mitigation Plan (RMP), the Infrastructure Project HMP, the policies of the County's Draft University Community Plan (UCP), and the Parameters are the source documents for the Conservation Measures. The measure describes how measures in the RMP were modified for the 2002 BO in response to the

shift in the focus of the project from the University's Proposed Project to the more broadly defined Proposed Action. The 2002 BO Conservation Measures include measures identified in the original RMP, the Infrastructure Project HMP, policies within the County's UCP, and the Parameters.

The measure specifies that additional analysis and planning are required to develop specific conservation programs and measures and that the Service will be involved in developing these measures and will approve them. The 2002 BO also notes that "the measures demonstrate the process and specific commitments that the University is committed to employ, consistent with the Parameters to avoid, minimize and compensate for the effects of constructing a UC Merced Campus, Infrastructure Project, and associated University Community in the Study Area".

Status

The University has undertaken additional analyses and planning efforts since the 2002 BO to implement the Conservation Measures. The Service was involved in many aspects of planning and analysis to implement the Conservation Measures, including input regarding reconfiguration of the UC Merced Campus and University Community and the development of the Conservation Strategy, Conservation Lands Management Plan, and Compensatory Wetland Mitigation Plan.

Long Range Development Plan Biological Resource Policies and Mitigation Measures

Requirement

This Conservation Measure describes the University's adoption of 11 LRDP policies governing protection of natural resources that will be met through development of a resource mitigation program. The program would ensure no net loss of wetlands functions and values and avoid and minimize effects on annual grassland habitat and special- species. The program would result in acquisition and preservation of substantial acreages of vernal pool-dominated grassland habitat and other wetland resources in eastern Merced County and in the restoration, enhancement, or creation of wetland resources within these preserved areas. The program would protect and compensate for direct effects on special-status species. The Conservation Measure also describes similar avoidance, minimization, and compensation commitments for the Infrastructure Project and the County's UCP.

Status

The 2002 LRDP policies served as the foundation for the University's analysis, planning, and implementation of measures designed to minimize effects on wetlands and special-status species and to compensate for direct effects. The 2008 BA Supplement and supporting documents, including the Conservation Strategy, Conservation Lands Management Plan, and Compensatory Wetland Mitigation Plan, document both completed and proposed future measures that meet these commitments as further discussed below.

Compensation Measures for Phase 1

Requirement

This Conservation Measure introduces the separate treatment of Phase 1 commitments in the 2002 BO and specifies that later Conservation Measures address the specific Phase 1 requirements.

Status

No specific requirements are specified in this measure. The later section *Adopted Conservation Measures for Phase 1 Campus Project* describes specific Phase 1 commitments and UC's implementation of these specific Phase 1 measures.

Campus Siting Measures

The Campus Siting Measures introduce two specific Conservation Measures related to determining the ultimate location of the Campus within the Study Area.

Siting Commitments Made for the Revised Campus Location

Requirement

This Conservation Measure identifies actions that were implemented or were being implemented by the University in 2002 during siting of its proposed campus project. These actions included avoidance of important habitat areas and acquisition of conservation easements for substantial areas of key habitat for listed species. The measure notes that these actions will be evaluated and augmented as needed to meet the requirements of the Parameters. The measure specifies that the Campus will not be relocated or reconfigured within the 2002 BO Study Area in a way that results in more effects than the Proposed Project as they were identified in the 2002 BO.

Status

By August 2002, the University had acquired 5,780 acres of conservation habitat lands in fee title within the VST Preserve and CNR and dedicated these lands to conservation management as reflected in the 2002 Biological Opinion. TNC also acquired fee title ownership to the 3,070-acre CST with Wildlife Conservation Board (WCB) UCM-related funds authorized by the California legislature. The University, in joint ownership with the VST as the UCLC, also pledged the 91-acre Myers Easterly property to permanent protection and conservation management. These lands are Tier 1 conservation lands. Concurrently, the WCB acquired conservation easements for a total of 17,141 acres of private lands that support key habitats as mitigation for effects on listed and other special-status species (Tier 2 conservation lands) (see Table 2). (Acreage measurements for these parcels were refined based on the 2008 surveys.)

Following issuance of the 2002 BO, the University reconfigured the UC Merced Campus in 2007, which resulted in the dedication of an additional 557 acres of the former UC Merced Campus lands and the Campus Land Reserve to the CNR. Therefore, the total Tier 1 conservation land acreage increased to 9,498 acres (Table 2). This 2009 BO Amendment reflects the increased land conservation program. In addition to increasing the amount of conserved habitat to mitigate for project effects, the University's 2008 revised Campus configuration substantially reduced the acreage of impacts on wetland and special-status species (see later discussions of effects on species).

Restrictions on Campus Siting Imposed by Existing and Pending Conservation Easements

Requirement

This Conservation Measure identifies requirements of the Parameters as described in the 2002 RMP and HMP, which restrict UC Merced Campus siting through acquisition of conservation easements. The measure also includes requirements of the Parameters to address a movement corridor for the San Joaquin kit fox to the north and east of the proposed 2002 Proposed Project, avoid impacts on the habitat for the Conservancy fairy shrimp and the watershed surrounding its wetland habitat, and acquire compensation lands at a ratio equal or greater to that specified in the 2002 Biological Opinion (i.e., >2:1 for listed plants and >3:1 for the kit fox).

Status

The University has granted, or committed to grant, conservation easements on lands identified in the 2002 BO. The kit fox movement corridor was addressed through analysis of movement capabilities in several versions of the Conservation Strategy. This analysis guided agency discussions and reconfiguration of the UC Merced Campus, which increased the certainty of successful movement in around the northeast side of the UC Merced Campus. The 2002 UC Merced Campus design avoided any occupied habitat and the surrounding watershed for the wetland that supports the Conservancy fairy shrimp by protecting the watershed in the CNR. Subsequently, the dedication of the Campus Land Reserve to conservation management (with its incorporation into the CNR) and reconfiguration of the UC Merced Campus in 2008 provided additional permanent protection to the area adjacent to the watershed supporting the Conservancy fairy shrimp to further protect the species from potential sources of disturbance. More details regarding compensation are presented below in response to the Conservation Measure

Compensation Measures for the Proposed Actions.

Campus Design Measures

Requirement

This Conservation Measure identifies a set of specific commitments that the University agreed to incorporate into the UC Merced Campus design to avoid and minimize direct and indirect effects

on listed species and their habitats. Measures will be incorporated at least 30 days prior to issuance of construction contracts and will be reviewed and modified if necessary to meet the requirements of the Parameters. Specific measures follow below.

Control of Stormwater and Irrigation Runoff

The University agreed to design, construct, and operate a stormwater management system to avoid and minimize direct and indirect effects on aquatic systems outside the campus that support special-status species. In addition, future development within the UC Merced Campus and University Community will be designed to be consistent with Low Impact Development (LID) principles. LID is a sustainable landscape approach used to replicate or restore natural watershed functions, and further avoids and minimizes impacts to waters and associated habitats. Implementing these and other such measures will avoid and minimize alterations of natural hydrologic regime, increases in sediment and nutrients, and introduction of pesticides and other hazardous materials into runoff. Stormwater will be detained on campus and discharged to streams outside the UC Merced Campus footprint to mimic the natural runoff pattern.

Construction of Perimeter Fencing

The University will construct perimeter fencing between development areas and natural areas to discourage human and pet disturbance.

Design of Lighting to Minimize Effects on Adjacent Habitats

The University will locate, shield, and direct lights at the campus perimeter to minimize introduction of stray lighting into habitat areas.

Status

These measures were incorporated into the Phase 1 campus design and are retained as design guidelines for subsequent UC Merced Campus phases and for development of the Community North.

Construction Measures

Requirement

This Conservation Measure requires the University to prepare and implement a construction mitigation plan addressing 12 of the Service's standard construction mitigation measures

Status

The University prepared a construction mitigation plan for Phase 1 (Jones & Stokes 2002c), which was approved by the Service, and successfully implemented with regular reporting. The

University will continue to implement the prescribed measures during the future construction of the UC Merced Campus and Community North.

Campus Operation and Maintenance Measures

Requirement

This Conservation Measure identifies specific requirements that will be incorporated into the UC Merced Campus facilities management program, including the following.

- Maintaining a continuous public education program to inform the students, residents, and staff of sensitive resource protection needs.
- Establishing a leash rule and an animal control program.
- Minimizing use of herbicides and other pesticides.
- Developing an invasive species control program.
- Developing a management plan for conservation lands.

Status

The University provides regular training to all new staff, construction workers, and students on the importance of the nearby sensitive natural resources and resource protection needs. The University has adopted and is implementing an animal control program for the Phase 1 Campus. The University adopted an integrated pest management program for campus use that addresses minimization of herbicides and other pesticides. The University remains committed to controlling invasive species during construction. The University submitted the Conservation Lands Management Plan to the Service in accordance with the Parameters.

Compensation Measures for the Proposed Actions

Requirement

This Conservation Measure identifies habitat compensation commitments and specifies preparation of a Project Compensation Plan to address acquisition and protective management of high-quality habitat and lands that will be restored to provide wetland compensation. The plan will identify specific preserve lands to compensate for take and habitat loss for special-status species. The plan is required to identify measures to implement compensation, resulting in habitat benefits, and an adaptive management program. The plan will identify ownership of preserve lands, management budgets and funding, wetland habitat restoration actions, management programs for special-status species, a comprehensive monitoring program, and an adaptive management protocol. Specific measures needed to meet the Parameters will include:

- review by the Service and DFG of existing and pending easements;
- measures to provide management and monitoring of the CNR, VST, and wetland creation/restoration lands;

- establishment of a kit fox corridor;
- other possible actions to enhance kit fox movement (e.g., passage over canals);
- compensation for any unavoidable effects on the Conservancy fairy shrimp;
- preservation of habitat occupied by special-status plants; and
- development and implementation of a restoration/creation plan for effects on vernal pools and associated habitats.

Status

These requirements have been addressed in the following sections.

Overview of Existing Land Acquisition Program

Requirement

This measure introduces the land acquisition and enhancement measures described below. It notes that acquisition may vary from the 2002 commitments, depending on the characteristics of the final Preferred Alternative and resulting mitigation requirements. This section also describes the University's 2002 proposal for a 910-acre campus and the acquisition and commitments to management for the CNR (750 acres in 2002) and VST Preserve (5,098 acres; acreage revised to 5,030 in 2008). It notes that regardless of the outcome of the regulatory actions, the VST Preserve and CNR will be protected under a conservation easement, managed adaptively, and "may be used to compensate for the effect of the Campus on wetland and listed species." Finally, it notes that public activities and access on the CNR and VST Preserve lands "are restricted … with recreation activities being entirely prohibited."

The 2002 BO's description of the portion of the measure addressing recreational use differs from that characterized by the University in the RMP. The 2002 BO states, "Activities and public access on the CNR and VST Remainder Property are restricted, with recreational activities being entirely prohibited." (p. 25). In contrast, the RMP states,

"*No general unrestricted public use will be permitted. Human uses of the …CNR lands will be limited to research, educational, and recreational activities that are consistent with, or do not interfere with, the protection of listed species and their habitats. Public use will be limited to docent-supervised use and limited controlled public use of hiking and nature observation (i.e., along existing ranch roads).*" (p. 14)

Status

Land acquisition and protection for listed species increased with the University's reconfiguration of the UC Merced Campus and Community North (also see Table 4a). See subsequent sections for discussions of compensation levels achieved through land acquisition. With respect to recreation use, the University has managed its Conservation Land on an interim basis (until the

Service approves the Conservation Lands Management Plan) to exclude recreational uses. The University will allow passive recreation uses that do not pose a threat to conservation resources on University-owned Conservation Lands. Such uses are not precluded by the Conservation Easement on the VST Preserve lands, which allows "passive recreation, including bird watching hiking, horseback riding, and picnicking, except as prohibited under agency permits." In its Management Plan for Conservation Lands, the University has proposed to allow low-intensity recreation uses on UCM Conservation Lands (hiking, running, nature study) "that are consistent with resource protection and management needs" and "that would not diminish biological resource values or conflict with other required management activities" (Airola 2008b: p. 5-20).

Compensatory Wetland Mitigation and Monitoring Plan

Requirement

The measure describes the University's commitment to prepare a detailed Compensatory Wetland Mitigation and Monitoring Plan, including on-site and off-site wetland preservation, enhancement and/or restoration, and creation. The University submitted the plan for approval by the regulatory agencies. The plan is designed to ensure that construction and long-term use of the UC Merced Campus and Community North would not result in a net loss of wetland functions. The plan identifies a combination of wetland preservation, enhancement, restoration, and creation and uses a holistic watershed-level approach. The measure specifies that the plan will incorporate the broad approaches outlined in the University's Compensation Wetland Strategy, Mitigation Design Criteria, and direction in the 2002 Biological Opinion and Section 404 permit. The objectives of the plan must include the following:

- preserve vernal pool dominated grasslands at a ratio of 10:1 for each acre of this habitat that is developed or filled;
- incorporate easement protections and other enhancements on preserved lands as needed to achieve no net loss in wetland functions;
- restore wetlands by reestablishing or enhancing areas where the vernal pool signature is present, at a 1:1 ratio for filled wetlands; and
- meet the 1:1 ratio through creation in suitable areas if the replacement ratio cannot be met through restoration.

The measure also requires preparation of a Wetland Restoration/Creation Site Design Plan for each conservation site, including a wetland delineation. The Site Design Plans will include an appropriate monitoring and adaptive management measures and adequate financial assurance to conduct management and monitoring.

Status

The Compensatory Wetland Mitigation and Monitoring Plan (Gibson and Skordal 2008) was prepared with extensive involvement by the Service, Corps, and other agencies and

nongovernmental organizations. This document incorporates and supersedes previous wetland strategies and mitigation design criteria.

Land Preservation. The University secured conservation easements and/or acquired fee title to Conservation Lands that protect various substantial areas of high value wetland habitats (i.e., vernal pool, swale wetlands, clay slope wetlands) (Table 2). Most of these lands were protected prior to the 2002 BO. Additionally, reconfiguration of the UC Merced Campus resulted in additional conservation lands and a shift from lands within the Main Campus and Campus Land Reserve to the CNR (Table 2). The University is awaiting the issuance of State bonds which will include funds for the purchase of the Ichord Ranch east of the University Community. The total package of land acquisition will ultimately exceed 30,000 acres of habitat that will benefit listed species through long-term management and protection.

Land Protection. Wetlands on Tier 1a conservation lands are protected through fee title ownership by the University, conservation easements (completed for the VST preserve and Myers Easterly, in progress for the CNR), and management under the Conservation Lands Management Plan. Tier 1b and Tier 2 wetlands are protected from lands uses that would be detrimental to wetland values.

Wetland Restoration and Creation. As outlined in the Compensatory Wetland Mitigation Plan, the University will acquire mitigation bank credits or a conservation easement on one or multiple parcels of land with degraded vernal pool characteristics and restore and create vernal pool habitat to replace the wetland acreage and functional values of habitat affected by construction of the UC Merced Campus and Community North. Wetland restoration and creation will focus on creation of vernal pools and riparian wetlands (to compensate for effects on human-made wetlands). The University will restore and create vernal pools to compensate in-kind for vernal pool habitats. It also expects to use vernal pool creation and restoration to replace intermittent channel and clay slope wetlands because these latter types are difficult to restore or create. Achieving compensation goals for wetland restoration and creation efforts will require protection of a substantial, but currently unquantified area of land. Ultimately, the wetland plan will require approval by the Corps and the Service as. It is estimated that approximately 1000 acres of habitat will be preserved by this component. It will bring additional protection to endangered species habitat and is an indirect benefit to listed species.

Compensation Plan for Protected Species

Requirement

The measure specifies that the University is required to prepare and implement a Compensation Plan for protected species. The plan would consist of conservation measures, performance criteria, monitoring protocols, appropriate contingency measures, and a long-term maintenance plan, consistent with the 2002 BO.

Status

This 2009 BO Amendment incorporates compensation elements derived from several supporting documents, including the Conservation Strategy, Management Plan for Conservation Lands, the Compensatory Wetlands Mitigation Plan, and the 2008 BA Supplement, which collectively constitute the University's plan for the compensation of protected species and are in lieu of a separate, single document entitled "Compensation Plan for Protected Species."

Compensation Strategy for Listed Plants

Requirement

The measure specifies that the University will compensate for unavoidable project impacts on listed plant species, consistent with Parameter 2f, through preservation of occupied habitat in areas approved by the Service. The 2002 BO requires that compensation be based on preservation of two populations of an equal or greater size than those eliminated, at a 2:1 ratio of preservation to impacts (2:1 ratio) within 10 miles of the Proposed Action.

Status

During preparation of the Conservation Strategy, the Service, the University, and other agencies agreed to modify the survey protocol to be used in determining impacts and compensation for listed plants. The agencies agreed it was impractical to conduct a complete survey of all pools for all listed plants within the Proposed Action and potential compensation areas As a result, the data on occurrence of succulent (fleshy) owl's-clover presented in the 2002 BA (based on a sample of 5.4% of available pools) was augmented by additional surveys conducted during wetland surveys for the Wetland Functional Assessment. This 2009 BO Amendment relies on these data to evaluate impacts to occupied habitat and habitat within the conservation areas. Further, the 2008 BA Supplement used a geographic information systems (GIS) model to characterize all suitable wetlands within 200 meters of a known occurrence as "occupied habitat" to assist the Service in its consultation process.

Plant species occurrence data and determinations of occupied habitat show the only listed plant species that would be subject to project impacts is the succulent owl's-clover. Although two other species, Colusa grass and San Joaquin Valley Orcutt grass, have not been recorded in impact areas, they are present and given management attention on UC Conservation Lands.

The mitigation acreage ratio achieved by Tier 1a lands for impacts to occupied succulent owl's-clover habitat within the UC Merced Campus and Community North is 10.1:1. The addition of the CST and Tier 2 lands increases the mitigation ratio to 22:1 (Table 4a). In addition, the mitigation ratio for the number of point locations of species recorded during surveys on preserved versus affected areas also greatly exceeds 27:1 (Table 4b). The UC- and UCLC-owned conservation lands are preserved in perpetuity and support buffers to protect them from other perturbations. The management and monitoring of UC and UCLC-owned conservation land will

be funded over time through a combination of a specific endowment within the UC Endowment Fund, UC operating funds, and revenues from grazing leases (see Conservation Lands Management Plan for more details). Grazing revenue from CST and endowments also held by CRT are available to fund easement compliance management and monitoring on the CST and Tier 2 mitigation lands.

Compensation Strategy for Conservancy Fairy Shrimp

Requirement

As noted in the 2002 Biological Opinion, the only population of Conservancy fairy shrimp known within the area of the University's Proposed Project occurs within the Campus Natural Reserve. Several other populations occur on other eastern Merced County lands outside the boundaries of the proposed Campus, University Community, and Conservation Lands. As noted in the 2002 Biological Opinion, UC configured the CNR to encompass the entire watershed of the playa pool occupied by the Conservancy fairy shrimp. The University committed to protect the Campus Natural Reserve with a Service-approved standard conservation easement. Measures identified to minimize the effects of disturbance in the Campus Natural Reserve on adjacent lands included ongoing monitoring and management to minimize disruption of hydrology, degradation of water quality, establishment of invasive species, unauthorized human use, and competition or predation from nonnative species. No other habitat compensation was proposed or required for this species.

Status

UC implemented all protection measures for the Conservancy fairy shrimp identified in the 2002 Biological Opinion Conservation Measures. In addition to designating the entire watershed as the CNR, UC committed to measures to minimize effects of construction and operation of the Campus, including protection of hydrology and water quality, control of invasive and nonnative species, and unauthorized human use.

The Conservation Lands Management Plan incorporates protective management and monitoring of the Campus Natural Reserve. This plan includes substantial measures to manage and monitor livestock grazing, invasive species, and authorized and unauthorized human uses.

Reconfiguration of the UC Merced Campus footprint resulted in incorporation of the 340-acre former Campus Land Reserve into the Campus Natural Reserve, thereby committing this area to conservation management. The reconfiguration also eliminated portions of the Campus adjacent to the former Campus Land Reserve and incorporated these lands into the Campus Natural Reserve (Figures 1 and 3), thereby providing a substantial land buffer to increase security of the watershed of the occupied Conservancy fairy shrimp pool.

Compensation Strategy for Other Protected Vernal Pool Crustaceans

Requirement

This Conservation Measure specifies that acquisition of previously identified mitigation lands and proposed wetland restoration will protect and restore habitat for other vernal pool crustaceans. It notes that the nature and extent of compensation, including compensation ratios, will be at least equal to those identified in the 2002 BA.

Status

UC increased the amount of land that has been protected and managed for conservation purposes, compared to that described in the 2002 BA, by reconfiguring the UC Merced Campus and dedicating portions of the former campus and Campus Land Reserve to conservation. This reconfiguration and dedication has also reduced the impacts of the Proposed Action, thereby increasing the mitigation ratios achieved for vernal pool crustaceans (Tables 4a and 4b).

Compensation Strategy for San Joaquin Kit Fox

Requirement

As specified in Parameter 2b, UC agreed to prepare and implement a comprehensive strategy for conservation of the San Joaquin kit fox. The strategy included preserving a large area suitable for residence and a movement corridor east and north of the previously proposed Campus, through land acquisitions (in fee title or conservation easements), as well as other actions, if feasible, such as enhanced passage over existing Merced Irrigation District (MID) canals. The Parameters specify that these land acquisitions will be consistent with the establishment of a connection to the Sandy Mush Road movement corridor identified in the *Recovery Plan for Upland Species of the San Joaquin Valley* (Service 1998).

This Conservation Measure also recognized that all 806 acres of land then proposed for the Campus Buildout (i.e., the former campus exclusive of the Phase 1 campus) were suitable for kit fox occupation and movement and that UC has agreed to compensate for the loss of habitat at a ratio at or above the 3:1 typically required by the Service. The measure noted that all protected lands for which easements and fee title were acquired for mitigation were considered suitable kit fox habitat and noted that protection of the VST and CNR lands (as then proposed) would protect 5,780 acres, and thereby would exceed the required compensation ratio).

The Conservation Measure concluded that:

"*Potential effects of the Applicant's Proposed Project [i.e., 2002 Campus] on kit fox movement have been compensated through acquisition of lands to provide a corridor along the east and north sides of the proposed Campus and University Community [acquisition and management of*

the CNR, VST, and Cyril Smith Trust (CST) lands] and by the WCB preservation of other lands within the general movement corridor in eastern Merced County."

It also noted that an additional crossing had been proposed for MID canals as a part of Phase 1, and if approved, this crossing would improve potential for kit fox passage in this area. Finally, this measure concluded that the described actions were consistent with and supportive of the establishment of a connection with the Sandy Mush Road area.

Status

As noted in the 2002 BO, the requirements for compensation acreage and provision of a movement corridor were substantially met under the previous Campus configuration and mitigation lands. Since we issued the 2002 BO, UC conducted extensive analysis of habitat suitability for kit fox occupancy and movements during preparation of the Conservation Strategy. The analysis documented that approximately 331,000 acres of suitable kit fox habitat were present in the eastern Merced County study area, including over 180,000 acres suitable for kit fox occupancy (primary habitat) and over 150,000 acres suitable for kit fox dispersal and temporary non-breeding uses (secondary habitat) (see Table 2-2 in ICF Jones & Stokes 2008). UC's 2002 Proposed Project would have eliminated 3,521 acres of habitat, including 1,662 acres of primary habitat, or approximately 1% of the available primary and secondary habitat in eastern Merced County.

Following issuance of the 2002 BO, reconfiguring the UC Merced Campus eliminated additional lands on the north and east side of the former campus, which further increased the width of suitable habitat for kit fox occupancy and movement around the north and east sides of the reconfigured Campus. The UC Merced Campus and Community North combined would eliminate 1,969 acres of suitable kit fox habitat, including 1,293 acres of primary habitat, and the Proposed Action (Campus and University Community) in its entirety would eliminate approximately 3,316 habitat acres, including 1,354 acres of primary habitat (Table 4a).

UC's actions in refining its Proposed Project since the 2002 Biological Opinion has increased the availability of protected and enhanced lands to support kit fox movement in eastern Merced County. The compensation ratio achieved for the Campus and Community North exceed the 3:1 ratio specified in the Conservation Measures when considered for Tier 1a Conservation Lands (i.e., 4.7:1 for primary (potential breeding) habitat. The ratio is obviously even greater (18.6:1) when the Tier 1b and Tier 2 lands are included as mitigation lands (Table 4a).

The 2002 BO required that UC construct an additional canal crossing for kit fox passage. Such a crossing was planned in order to provide equipment access to the Myers Easterly property. This property was initially proposed as the wetlands mitigation site to offset effects from the County's past action of constructing the County golf course, a portion of which is now the site of Phase 1 of the UC Merced campus (see Jones & Stokes 2002, Figure 4-1). UC did not construct this crossing, however, because it concluded that the Myers Easterly property is not desirable for wetland creation and therefore a bridge was not needed for construction access. Also, the

reconfiguration of the Campus and the University Community extended the community into the area where the 2002 BO identified the crossing, thereby making the site unsuitable for a kit fox passage. UC will be required to provide an additional crossing of the LeGrand Canal, subject to MID approval. In the 2008 BA Supplement, UC submitted a list of candidate sites for a new canal crossing to the Service that could complement existing crossings (Figure 5).

Incorporation of Adaptive Management and Monitoring into the Management Plan

Management Strategies for University-Owned Lands

Requirements and Status

This measure specifies inclusion of detailed management and monitoring measures in a management plan for the VST and CNR lands. The specific Conservation Measures identified in the 2002 BO are addressed in the Conservation Lands Management Plan. Table 5 summarizes each measure and the status of its compliance.

Management Strategies for Wildlife Conservation Board Preserve Lands

Requirements

This measure describes actions to be employed on lands protected through WCB acquisition of conservation easements. It specifies that management will be conducted under the terms of conservation easements in place for each property. It specifies that conservation values would be preserved and maintained through grazing uses that are consistent with the conservation easement(s). This grazing would support and enhance conservation values. It specifies that "any future easement terms will be examined to ensure that they are adequate for lands that are determined to be critical to meeting the Parameters and other compensation and mitigation needs of the Proposed Actions, including monitoring of and access to preserve lands." Management objectives include maintaining cattle ranching, and maintaining healthy populations of special-status species.

Status

The WCB lands for which easements were acquired at the time of the 2002 BO remain the only conservation lands that are under conservation easement. These provisions were established between the WCB, TNC, and CRT. The easements in place at that time have not changed. If WCB acquires conservation easements on additional lands, the terms of this measure may be incorporated into easements. The requirements of the Parameters, however, have already been met through existing land and easement acquisitions.

Adopted Conservation Measures for Phase 1 Campus Project

This section describes the Phase 1 measures listed below.

Design Measures

Requirement

This measure specifies the following design measures:

- designing and constructing facilities to control stormwater and irrigation runoff to minimize effects on natural hydrology and vernal pool ecosystems,
- constructing perimeter fencing to discourage human and pet disturbance or adjacent habitat areas, and
- incorporating lighting design measures to minimize "escape" of light into surrounding habitats.

Status

The University incorporated all of these measures into the design of the Phase 1 Campus and implemented them during construction.

Construction Measures

Requirement

This measure identified development of a Service-approved comprehensive Phase 1 Construction Mitigation Plan to minimize potential for effects to listed species before ground disturbance began. The measure also required:

- designating an environmental monitor and specified requirements for reporting monitoring results;
- incorporating species protection requirements into construction contracts;
- conducting environmental sensitivity training, incorporation of construction best management practices (BMPs);
- fencing project boundaries and sensitive resources;
- implementing standard measures to protect any potential kit foxes from direct disturbance during construction;
- implementing measures to minimize potential for direct harm to the California tiger salamander, (including surveys of pool sites and fencing of occupied pool sites);
- preventing establishment of invasive plant species (including use of weed-free materials for erosion control and washing of construction equipment);

- conducting post-construction monitoring and remediation, if warranted, and conducting monitoring of vernal pools; and
- conducting monthly surveys of the perimeter of the Phase 1 campus to pick up trash and verify that runoff is not being discharged into adjacent lands.

Status

The University implemented all of the identified construction measures and monitoring for the Phase 1 Campus. Monitoring reports were submitted to the Service, and the monitoring confirmed that the measures were effective at avoiding impacts on species on site and to adjacent habitats.

Operations and Maintenance Measures

Requirement

The Conservation Measure specifies that the portions of the golf course outside of the Phase 1 boundary will not be irrigated, no pesticides will be used without authorization from the Service, and a firebreak will be constructed on the perimeter of the Phase 1 Campus.

Status

The University complied with these measures during Phase 1 and continues to comply with these requirements. The Conservation Lands Management Plan (Chapter 5) addresses management requirements for the interface between the Campus Buildout lands and the Phase 1 campus, including restrictions on herbicide use and construction and maintenance of fuelbreaks.

Measures to Minimize Effects of the Phase 1 Campus on Adjacent Habitats

Requirement

These measures include actions to protect habitat values during the operation of the Phase 1 campus to protect listed species and habitat values. These measures include public education, establishment and enforcement of leash laws, restriction on use of pesticides and invasive plants in landscaping, control of invasive weeds in undeveloped areas, and monitoring.

Status

The University has implemented the specified measures as an ongoing part of operations of the Phase 1 campus.

Compensation Measures for Phase 1

The 2002 BO identified certain compensation measures for effects to kit fox from the development of Phase 1 lands. These measures are described in more detail in the subsequent section.

Conservation Measures for San Joaquin Kit Fox

Requirement

This measure specified that the Phase 1 Campus development would result in a loss of 12 acres of disturbed annual grassland habitat and could affect the potential for kit fox movements in the area. UC proposed to set aside, as a kit fox conservation area, the 96-acre area Myers Easterly property east of the Phase 1 campus. The Myers Easterly property was initially intended to be a mitigation site for vernal pools lost during golf course construction prior to the UC's ownership. This area would be protected with a conservation easement and would be maintained and enhanced to support the kit fox. This measure also specifies the construction of a new canal crossing to the mitigation site to enhance kit fox passage. Finally, this measure notes that the then-estimated 94 acres of the golf course remaining outside of Phase 1 will be allowed to revert to an annual grassland habitat until developed for campus use, if necessary.

Status

The Myers Easterly property is no longer proposed as a mitigation site for vernal pool creation. This site will be maintained as mitigation land that preserves on-site vernal pools and grassland habitat.

The reconfiguration of the University Community extends the developed portion of the community to the east, into the area directly south of the Myers Easterly property. Therefore, construction of a crossing at this location would not serve to enhance kit fox movement. UC remains committed to constructing one canal crossing to enhance kit fox passage. UC conducted a siting analysis of potential alternate locations for the canal crossing (Figure 5) and submitted these locations to the Service for review. The crossing is expected to be built within 2 years of final project approval. As specified in the conservation measure, the University has allowed the former golf course lands to revert to non-irrigated grassland.

Adopted Environmental Commitments for the Infrastructure Project

As described previously under *Revised Description of the Proposed Project*, components of the County's Infrastructure Project have been incorporated into the University's Proposed Project. The discussion below pertains to those requirements specified in the 2002 BO that relate to the Infrastructure Project.

Requirement

Habitat Mitigation Plan

The County's HMP describes measures to compensate for impacts on biological resources from the Infrastructure Project. The HMP also outlines a process for determining mitigation standards. The measures are described for each of the following project elements.

Avoidance and Minimization Element

The element specified inclusion of the following measures into the final infrastructure plan: surface water management facilities (i.e., storm drainage and treatment facilities, roadway culverts, road runoff collection systems, in-channel settling basins) to maintain watershed integrity and perimeter landscaping and fencing.

Construction Measures

This element specifies that the County's Department of Public Works will prepare a construction mitigation plan approved by the Service that includes construction BMPs, incorporation of conservation measures into construction contracts, training for construction personnel, construction fencing, salvage of plants and invertebrates, construction measures to avoid take of kit fox take, invasive species control, and compliance monitoring.

Compensation Element

This element specifies that impacts on wetland habitats and species will be mitigated fully by achieving no net loss of wetlands functions and values. Mitigation will achieve ratios of 3 acres preserved, enhanced, restored, and/or created for each acre of wetland affected. Also, associated upland habitat in mitigation ratios must be preserved at a ratio of 9:1 for every acre of wetland preserved.

Monitoring and Adaptive Management

This component specifies that the Service will require adaptive management for preserve lands. The Service will also require that adequate funding assurances be provided to design and implement the mitigation plan.

Status

The commitments in this Conservation Measure for the Infrastructure Project are similar to those identified in the 2002 BO. In general, the requirements listed here have been met by applying the measures already identified for the Campus to both the Campus and Community North project components. The following responses address specific commitment elements.

Avoidance and Minimization Element

The requirements for water quality protection through design and operation and the requirement for perimeter landscaping and fencing are consistent with the requirements previously applied to the Campus (see *Campus Design Measures*, above) and implemented previously for the Phase 1 Campus project (see *Adopted Conservation Measures for Phase 1 Campus Project,* above). UC intends to meet these requirements for infrastructure components of the Campus and Community North by implementing measures that have been identified for the Campus and successfully implemented for the Phase 1 campus.

Construction Measures

UC has committed to construction measures identical to those included for the Infrastructure Project (see discussion under *Construction Measures* above) for the Campus and previously implemented these measures for the Phase 1 project. UC will apply the Campus measures to components of the Infrastructure Project now incorporated into the Campus and Community North.

Compensation Element

The mitigation requirements for wetlands and associated species in this measure are consistent with those that have been required for the Campus and Community (see *Compensatory Wetland Mitigation Plan* above). These measures will be applied to the infrastructure components of the Campus and Community Plan.

Monitoring and Adaptive Management

The monitoring and adaptive management measures included for the Infrastructure Project resemble those required for the UC Merced Campus. UC will incorporate mitigation for infrastructure into the mitigation program for the Campus and Community North. UC also has incorporated monitoring and adaptive management components into both the Conservation Lands Management Plan and Compensatory Wetland Mitigation Plan.

Adopted Environmental Commitments for the University Community

Requirement

This single Conservation Measure for the University Community is based on the objectives and policies of the County's current UCP. The measure specifies that the County will either expand the Infrastructure Project HMP to address the impacts of the University Community or it will develop project-specific HMPs. The measure specifies that mitigation standards should be developed based on habitat functions and values. Protected habitat would be monitored and managed to protect wetland habitat quality. Wetland impacts would be avoided through project siting and design. Additional Conservation Measures would include preservation of vernal pool

grassland habitat to support vernal pool species and fleshy (succulent) owl's-clover, and preservation of grassland habitat as foraging habitat for the mountain plover and Swainson's hawk, and to mitigate for potential effects of habitat loss on the kit fox.

Status

The University evaluated the effects of the Community North on listed species and their habitats and proposed mitigation for those effects in the 2008 BA Supplement, as well as the Conservation Strategy, Conservation Lands Management Plan, Compensatory Wetland Mitigation Plan, and the EIS/EIR. Therefore, the University will apply measures previously approved by the Service for the UC Merced Campus and University Community to avoid, minimize, and compensate for effects to listed species and habitats through project siting, design, construction, operation, and compensation to address effects related to the development of Community North. The ratios of mitigation land achieved for the Campus and Community North exceed the ratios previously identified for the original footprint configuration of the former campus and community. The measures the University will now apply are substantially more detailed than those included in the previous Infrastructure Project HMP. The net result is that the requirements of this Conservation Measure largely will be met through the UC's program. UC proposes to modify, rather than meet, one proposed conservation action in the UCP Conservation Measure, as outlined below.

Proposed Modification to UCP Corridor Establishment Policy

In the 2008 BA Supplement, the University proposed to eliminate one of the UCP policies referenced in the 2002 Biological Opinion to the Community North. UCP Policy PA 2.2 specified that the County would "*incorporate open space corridors into the Community Plan that allow the movement of wildlife through the Community Plan Area, to the extent feasible*". This policy described these corridors as at least 30 acres of existing, restored, or created wetlands.

Open space corridors have been incorporated into the design concept for the Community North, but they are intended primarily for stormwater management and recreation use. Although incidental wildlife use may occur, the University does not intend to design wildlife movement corridors into the University Community because such corridors would be an inefficient use of space (resulting in a larger footprint for the University Community) and would not be effective (i.e., the destination for any animals moving within such a corridor is unclear and such a corridor would expose wildlife to a variety of human sources of disturbance). Also, the Conservation Strategy incorporates an effective regional movement corridor to the east of the UC Merced Campus and University Community through campus reconfiguration, protection of preserve lands, and construction of an additional canal crossing. The University discussed the proposed policy modification with the Service during consultation on March 4, 2008.

The University's request for policy modification on the Community North portion of the former UCP does not affect policy consideration for the County in addressing the Community South.

RELATIONSHIP OF THE 2009 BO AMENDMENT TO THE 2002 BO

The 2002 BO, along with other regulatory requirements, guided development at UC Merced through 2008. The University's efforts to reconfigure the UC Merced Campus and University Community to minimize impacts to listed species and supporting wetland habitat was conducted with extensive agency input and consistent with the Parameters and Conservation Measures specified in the 2002 BO. The program-level assumptions, analyses, and requirements of the 2002 BO remain in effect for the current Proposed Action. This 2009 BO Amendment documents the specific means by which the University has complied with the 2002 BO's requirements.

Project Description

As described above, the University substantially modified the configuration of the Campus; increased the amount of lands allocated to preservation and mitigation; and made additional management commitments in the Conservation Strategy, Conservation Lands Management Plan, and Compensatory Wetland Mitigation Plan in response to the requirements of the 2002 BO.

2002 Parameters

The 2002 BO identified a set of required Parameters that "the University and the County agreed would apply to a Preferred Alternative that may be selected by the Corps within the Study Area" (Service 2002). The text of the Parameters, as it appears in the 2002 BO, is presented in Enclosure A.

Changes in Consultation Requirements

Changes in the listing status of several species and the designation of critical habitats for species resulted in modifications to the scope of the consultation effort and corresponding treatment of such species in this 2009 BO Amendment.

Decision to Not List Midvalley Fairy Shrimp

The 2002 BA and 2008 BA Supplement and the 2002 BO addressed the potential impacts of the 2002 Proposed Project on the midvalley fairy shrimp because the Service was evaluating a petition to list the species. On January 26, 2004, the Service reported its determination that the species did not warrant listing under the Act based on its finding that the species:

"*is well represented by occurrences on protected lands and with occurrences in areas with little or no current threat. Additionally, although several development projects and land use changes are affecting known occurrences, their effects are being mitigated and we are not aware of any occurrences likely to be extirpated in the near future due to habitat loss. While the existing regulatory mechanisms under CEQA, the CWA, and the ESA do not ensure protection of midvalley fairy shrimp, they are likely to moderate the rate and extent of habitat loss for*

midvalley fairy shrimp through their direct application and as an indirect benefit of conservation efforts undertaken for the other listed vernal pool crustaceans." (**FR 69** 3592–3598).

Therefore, the 2009 BO Amendment does not evaluate the effects of the Proposed Project on midvalley fairy shrimp.

Decision to Not List Mountain Plover

The 2002 BA and BA Supplement and the 2002 BO addressed the potential impacts of the 2002 Proposed Project on mountain plover. These analyses concluded that although the species apparently makes use of the site infrequently during migration, the loss of a small proportion of the available suitable habitat along with protection and management of mitigation habitats would not be detrimental to the species.

The Service withdrew its proposal to list the mountain plover in 2003, based on additional information provided regarding the species population status, habitat uses, and existing conservation actions. The Service determined that the threats to the species were not as significant as previously believed and that the available data do not indicate that the threats to the species and its habitat are not likely to endanger the species in the foreseeable future (**FR 68** 53083–53101). Therefore, effects of the Proposed Project on the mountain plover were not evaluated in the 2008 BA Supplement or in this 2009 BO Amendment.

Delisting of Bald Eagle

The 2002 BO addressed effects to the bald eagle. The Service delisted the species (i.e., declared it recovered and formally removed it from the Federal endangered species list) in June 2007 (**FR 72** 37346–37372). Therefore, it is no longer subject to provisions of the Act. However, because it is still protected under the Bald and Golden Eagle Protection Act (**FR 72** 31132–31140), which is enforced by the Service, UC requested that it be addressed in this consultation.

Recommendation for Delisting of Valley Elderberry Longhorn Beetle

In 2006, the Service published the required 5-year status review of the valley elderberry longhorn beetle (VELB). The Service determined that the species met recovery goals and recommended delisting of the species. Although the Service has not acted on the recommendation as of April 2009, it is possible that delisting will be proposed or will occur before consultation is completed. Until then, the species will continue to be treated as listed and is, therefore, addressed in this consultation.

California Tiger Salamander Listing and Critical Habitat Designation

The Service listed the California tiger salamander as a federally-threatened species in 2004 (**FR 69** 47211–47248) after it issued the BO. In 2005, it designated critical habitat for the species

(**FR 70** 49379–49458). Critical habitat unit 9 is located in eastern Merced County and includes 177 acres of Campus and the Community North and nearly all of the UC Conservation Lands (VST Preserve and CNR) (see *Effects of the Proposed Action*).

The species was addressed in the 2002 Supplemental BA, and the Service provided technical assistance in the Biological Opinion to address the species. The listing of the salamander requires its formal treatment in consultation and, therefore, inclusion in this 2009 BO Amendment. This is included in the following section.

Vernal Pool Species Critical Habitat Designation

In 2003, the Service published its final rule designating critical habitat (as formally defined under the Act) for vernal pool species in California and southern Oregon. Species covered included the following species that occur in the Study Area: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Hoover's spurge, succulent (fleshy) owl's-clover, Colusa grass, San Joaquin Orcutt grass, hairy Orcutt Grass, and Greene's tuctoria (**FR 68** 46684–46867). Approximately 900,000 acres of vernal pool habitat, including lands in Merced County, were not designated as critical for economic reasons.

The decision to exclude areas of vernal pool habitat was challenged in court, and on November 2, 2006, the court overturned the Service's decision. On May 31, 2007, the Service clarified its designation of critical habitat (**FR 72** 30279–30297), which resulted in the addition of 147,638 acres of critical habitat in Merced County. The designated area of critical habitat is located east of Lake Yosemite and north of La Paloma Road and does not include land within the designated Campus and University Community. Lands within the Tier 1 mitigation areas were omitted from the designation whereas most Tier 2 mitigations were designated as critical habitat. Therefore, because critical habitat remains in effect, this Biological Opinion addresses critical habitat for vernal pool species.

Vernal Pool Ecosystems Recovery Plan

In 2005, the Service published the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (*Vernal Pool Recovery Plan*)(Service 2005). The plan applies to all of the listed plants and freshwater shrimp addressed in the 2002 BA and 2002 BO. Recovery actions identified in the plan apply to federal agencies, which may meet recovery obligations by ensuring that actions they take, including issuance of permits, are consistent with or contribute to recovery actions in the plan. Therefore, this 2009 BO Amendment addresses the consistency of University's Proposed Project with the *Vernal Pool Recovery Plan.*

STATUS OF THE SPECIES

The life history and status of species addressed in this Biological Opinion, except the California tiger salamander, were provided in detail in the 2002 BO and the Conservation Strategy.

Therefore, this section provides only summary information on all other species occurrence and abundance and updated information regarding the species' statuses within the project area. The relative abundances of species in project lands, including the Campus, University Community, and Conservation Lands, is summarized in Tables 4a and 4b, based on the extent of occupied habitat and known point locations of species detected during sampling. The mountain plover was not listed and is not discussed further. The California tiger salamander was listed and critical habitat is in place. A complete life history and baseline status is provided later in this section.

During the period of 2002 to the present, there has been a change in the baseline for all of the species addressed in this BO. The Service is aware of illegal conversion of thousands of acres of grasslands and vernal pool habitats in eastern Merced County to agricultural purposes. The Service is actively pursuing litigation with several of the landowners. Because the conversion occurred without prior review, we have no way of knowing exactly what species were present as well as their status and distribution. Most of the conversions involved deep ripping of the soil which destroys the impervious clay layer that is critical to vernal pools. This lost vernal pool habitat cannot be restored. However, restoration of grasslands would still be possible. These actions have reduced the baseline for all of the species covered by this BO. Because of this reduction, the loss of the habitats that will occur from the build out of the University campus and community is of greater importance than previously described. However, because the University has compensated for these lost habitats in a greater proportion than is required to offset the impacts, the project still remains as not jeopardizing any of the covered species. Additionally, because of this overage, the compensation lands contain a greater percentage of the remaining habitat.

California Tiger Salamander

The Service issued its Final Rule listing the Santa Barbara County Distinct Population Segment of the species (65 **FR** 57241) and Final Rule for the Sonoma County Distinct Population Segment of the species (68 **FR** 13498). The Central Population of California tiger salamander was listed as threatened on August 4, 2004 (69 **FR** 47212). On August 23, 2005, 199,109 acres of critical habitat were designated in 19 counties for the central population. Detailed information about the tiger salamander can be obtained in these documents.

Life History and Habitat

The tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Recorded adult measurements have been as much as 8.2 inches long (Petranka 1998; Stebbins 2003). Tiger salamanders exhibit sexual dimorphism (differences in body appearance based on gender) with males tending to be larger than females. Tiger salamander coloration generally consists of random white or yellowish markings against a black body. The markings on adults tiger salamanders tend to be more concentrated on the lateral sides of the body, whereas other tiger salamander species tend to have brighter yellow spotting that is heaviest on the dorsal surface.

The tiger salamander has an obligate biphasic life cycle (Shaffer *et al.* 2004). Although the larvae develop in the vernal pools and ponds in which they were born, tiger salamanders are otherwise terrestrial and spend most of their post-metamorphic lives in widely dispersed underground retreats (Shaffer *et al.* 2004; Trenham *et al.* 2001). Because they spend most of their lives underground, tiger salamanders are rarely encountered even in areas where salamanders are abundant. Subadult and adult tiger salamanders typically spend the dry summer and fall months in the burrows of small mammals, such as California ground squirrels and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredo and Van Vuren 1996; Petranka 1998; Trenham 1998a). Although ground squirrels have been known to eat tiger salamanders, the relationship with their burrowing hosts is primarily commensal (an association that benefits one member while the other is not affected) (Loredo *et al.* 1996; Semonsen 1998).

Tiger salamanders may also use landscape features such as leaf litter or desiccation cracks in the soil for upland refugia. Burrows often harbor camel crickets and other invertebrates that provide likely prey for tiger salamanders. Underground refugia also provide protection from the sun and wind associated with the dry California climate that can cause excessive drying of amphibian skin. Although tiger salamanders are members of a family of "burrowing" salamanders, they are not known to create their own burrows. This may be due to the hardness of soils in the California ecosystems in which they are found. Tiger salamanders depend on persistent small mammal activity to create, maintain, and sustain sufficient underground refugia for the species. Burrows are short lived without continued small mammal activity and typically collapse within approximately 18 months (Loredo *et al.* 1996).

Upland burrows inhabited by tiger salamanders have often been referred to as aestivation sites. However, "aestivation" implies a state of inactivity, while most evidence suggests that tiger salamanders remain active in their underground dwellings. A recent study has found that tiger salamanders move, feed, and remain active in their burrows (Van Hattem 2004). Because tiger salamanders arrive at breeding ponds in good condition and are heavier when entering the pond than when leaving, researchers have long inferred that tiger salamanders are feeding while underground. Recent direct observations have confirmed this (Trenham 2001; Van Hattem 2004). Thus, "upland habitat" is a more accurate description of the terrestrial areas used by tiger salamanders.

Tiger salamanders typically emerge from their underground refugia at night during the fall or winter rainy season (November-May) to migrate to their breeding ponds (Stebbins 2003; Shaffer *et al.* 1993; Trenham *et al.* 2000). The breeding period is closely associated with the rainfall patterns in any given year with less adults migrating and breeding in drought years (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Male salamander are typically first to arrive and generally remain in the ponds longer than females. Results from a 7-year study in Monterey County suggested that males remained in the breeding ponds for an average of 44.7 days while females remained for an average of only 11.8 days (Trenham *et al.* 2000). Historically, breeding ponds were likely limited to vernal pools, but now include livestock stockponds. Ideal breeding ponds are typically fishless, and seasonal or semi-permanent (Barry and Shaffer 1994; Petranka 1998).

While in the ponds, adult salamanders mate and then the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Egg laying typically reaches a peak in January (Loredo and Van Vuren 1996; Trenham *et al.* 2000). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925; Twitty 1941). Eggs are often attached to objects, such as rocks and boards in ponds with no or limited vegetation (Jennings and Hayes 1994). Clutch sizes from a Monterey County study had an averaged of 814 eggs (Trenham *et al.* 2000). Seasonal pools may not exhibit sufficient depth, persistence, or other necessary parameters for adult breeding during times of drought (Barry and Shaffer 1994). After breeding and egg laying is complete, adults leave the pool and return to their upland refugia (Loredo *et al.* 1996; Trenham 1998a). Adult salamanders often continue to emerge nightly for approximately the next two weeks to feed amongst their upland habitat (Shaffer *et al.* 1993).

Tiger salamander larvae typically hatch within 10 to 24 days after eggs are laid (Storer 1925). The peak emergence of these metamorphs is typically between mid-June and mid-July (Loredo and Van Vuren 1996; Trenham *et al.* 2000). The larvae are totally aquatic and range in length from approximately 0.45 to 0.56 inches (Petranka 1998). They have yellowish gray bodies, broad fat heads, large, feathery external gills, and broad dorsal fins that extend well up their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume the tadpoles of Pacific treefrogs (*Pseudacris regilla*), Western spadefoot toads (*Spea hammondii*), and California red-legged frogs (J. Anderson 1968; P. Anderson 1968). Tiger salamander larvae are among the top aquatic predators in seasonal pool ecosystems. When not feeding, they often rest on the bottom in shallow water but are also found throughout the water column in deeper water. Young salamanders are wary and typically escape into vegetation at the bottom of the pool when approached by potential predators (Storer 1925).

The tiger salamander larval stage is typically completed in 3 to 6 months with most metamorphs entering upland habitat during the summer (Petranka 1998). In order to be successful, the aquatic phase of this species' life history must correspond with the persistence of its seasonal aquatic habitat. Most seasonal ponds and pools dry up completely during the summer. Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973).

Larval development and metamorphosis can vary and is often site-dependent. Larvae collected near Stockton in the Central Valley during April varied between 1.88 to 2.32 inches in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left breeding pools 60 to 94 days after eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. Longer ponding duration typically results in larger larvae and metamorphosed juveniles that are more likely to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). Larvae will perish if a breeding pond dries before metamorphosis is complete (P. Anderson 1968; Feaver 1971). Pechmann *et al.* (1989) found a strong positive correlation between ponding duration and total number of metamorphosing juveniles in five salamander

species. In Madera County, Feaver (1971) found that only 11 of 30 sampled pools supported larval California tiger salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only 6 (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998).

Following metamorphosis, juveniles leave their pools and enter upland habitat. This emigration can occur in both wet and dry conditions (Loredo and Van Vuren 1996; Loredo *et al.* 1996). Wet conditions are more favorable for upland travel but rare summer rain events seldom occur as metamorphosis is completed and ponds begin to dry. As a result, juveniles may be forced to leave their ponds on rainless nights. Under dry conditions, juveniles may be limited to seeking upland refugia in close proximity to their aquatic larval pool. These individuals often wait until the next winter's rains to move further into more suitable upland refugia. Juveniles remain active in their upland habitat, emerging from underground refugia during rainfall events to disperse or forage (Trenham and Shaffer 2005). Depending on location and other development factors, metamorphs will not return as adults to aquatic breeding habitat for 2 to 5 years (Loredo and Van Vuren 1996; Trenham *et al.* 2000).

Lifetime reproductive success for tiger salamander species is low. Results from one study suggest that the average female tiger salamander bred 1.4 times and produced 8.5 young per reproductive effort that survived to metamorphosis (Trenham *et al.* 2000). This resulted in the output of roughly 11 metamorphic offspring over a breeding female's lifetime. The primary reason for low reproductive success may be that this relatively short-lived species requires two or more years to become sexually mature (Shaffer *et al.* 1993). Some individuals may not breed until they are four to six years old. While tiger salamanders may survive for more than ten years, many breed only once, and in one study, less than 5 percent of marked juveniles survived to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well human-caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Dispersal and migration movements made by tiger salamanders can be grouped into two main categories: (1) breeding migration; and (2) interpond dispersal. Breeding migration is the movement of salamanders to and from a pond from the surrounding upland habitat. After metamorphosis, juveniles move away from breeding ponds into the surrounding uplands, where they live continuously for several years. At a study in Monterey County, it was found that upon reaching sexual maturity, most individuals returned to their natal/ birth pond to breed, while 20 percent dispersed to other ponds (Trenham *et al.* 2001). After breeding, adult tiger salamanders return to upland habitats, where they may live for one or more years before attempting to breed again (Trenham *et al.* 2000).

Tiger salamanders are known to travel large distances between breeding ponds and their upland refugia. Generally it is difficult to establish the maximum distances traveled by any species, but

tiger salamanders in Santa Barbara County have been recorded dispersing up to 1.3 miles from their breeding ponds (Sweet 1998). Tiger salamanders are also known to travel between breeding ponds. One study found that 20 to 25 percent of the individuals captured at one pond were recaptured later at other ponds approximately 1,900 and 2,200 feet away (Trenham *et al.* 2001). In addition to traveling long distances during juvenile dispersal and adult migration, tiger salamanders may reside in burrows far from their associated breeding ponds.

Although previously cited information indicates that tiger salamanders can travel long distances, they typically remain close to their associated breeding ponds. A trapping study conducted in Solano County during the winter of 2002/2003 suggested that juveniles dispersed and used upland habitats further from breeding ponds than adults (Trenham and Shaffer 2005). More juvenile salamanders were captured at traps placed at 328, 656, and 1,312 feet from a breeding pond than at 164 feet. Approximately 20 percent of the captured juveniles were found at least 1,312 feet from the nearest breeding pond. The associated distribution curve suggested that 95 percent of juvenile salamanders were within 2,099 feet of the pond, with the remaining 5 percent being found at even greater distances. Preliminary results from the 2003-04 trapping efforts at the same study site detected juvenile tiger salamanders at even further distances, with a large proportion of the captures at 2,297 feet from the breeding pond (Trenham *et al.*, unpublished data). Surprisingly, most juveniles captured, even those at 2,100 feet, were still moving away from ponds (Ben Fitzpatrick, University of California at Davis, personal communication, 2004). In Santa Barbara County, juvenile California tiger salamanders have been trapped approximately 1,200 feet away while dispersing from their natal pond (Science Applications International Corporation, unpublished data). These data show that many tiger salamanders travel far while still in the juvenile stage. Post-breeding movements away from breeding ponds by adults appear to be much smaller. During post-breeding emigration from aquatic habitat, radio-equipped adult tiger salamanders were tracked to burrows between 62 to 813 feet from their breeding ponds (Trenham 2001). These reduced movements may be due to adult tiger salamanders exiting the ponds with depleted physical reserves, or drier weather conditions typically associated with the post-breeding upland migration period.

Tiger salamanders are also known to use several successive burrows at increasing distances from an associated breeding pond. Although previously sited studies provide information regarding linear movement from breeding ponds, upland habitat features appear to have some influence on movement. Trenham (2001) found that radio-tracked adults were more abundant in grasslands with scattered large oaks (*Quercus* spp.), than in more densely wooded areas. Based on radio-tracked adults, there is no indication that certain habitat types are favored as terrestrial movement corridors (Trenham 2001). In addition, captures of arriving adults and dispersing new metamorphs were evenly distributed around two ponds completely encircled by drift fences and pitfall traps. Thus, it appears that dispersal into the terrestrial habitat occurs randomly with respect to direction and habitat types.

Documented or potential tiger salamanders predators include coyotes, raccoons, striped skunks, opossums, egrets (*Egretta* spp.), great blue herons (*Ardea herodias*), crows (*Corvus brachyrhynchos*), ravens (*Corvus corax*), garter snakes (*Thamnophis* spp.), bullfrogs (*Rana*

catesbeiana), red-legged frogs, mosquito fish (*Gambusia affinis*), and crayfish (*Procrambus* spp.). Domestic dogs (*Canis familiaris*) have been observed eating California tiger salamanders at Lake Lagunitas at Stanford University (Sean Barry, ENTRIX, personal communication to C. Nagano, July 2004).

Threats

The tiger salamander is imperiled throughout its range due to a variety of human activities (Service 2004). Current factors associated with declining tiger salamander populations include continued habitat loss and degradation due to agriculture and urbanization; hybridization with the non-native eastern tiger salamander (*Ambystoma tigrinum*) (Fitzpatrick and Shaffer 2004; Riley *et al.* 2003); and predation by introduced species. Tiger salamander populations are likely threatened by multiple factors but continued habitat fragmentation and colonization of non-native salamanders may represent the most significant current threats. Habitat isolation and fragmentation within many watersheds have precluded dispersal between sub-populations and jeopardized the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or "rescuing" extinct habitat patches). Other threats include predation and competition from introduced exotic species; possible commercial over-utilization; diseases; various chemical contaminants; road kill; and certain unrestrictive mosquito and rodent control operations. Currently, these various primary and secondary threats are largely not being offset by existing federal, state, or local regulatory mechanisms. The tiger salamander is also prone to chance environmental or demographic events, to which small populations are particularly vulnerable.

Historical and Current Distribution

The tiger salamander is endemic to California and historically inhabited the low-elevation grassland and oak savannah plant communities of the Central Valley, adjacent foothills, and inner coast ranges (Jennings and Hayes 1994; Storer 1925; Shaffer *et al.* 1993). The species has been recorded from near sea level to approximately 3,900 feet in the coast ranges and to approximately 1,600 feet in the Sierra Nevada foothills (Shaffer *et al.* 2004). Along the coast ranges, the species occurred from the Santa Rosa area of Sonoma County, south to the vicinity of Buellton in Santa Barbara County. The historic distribution in the Central Valley and surrounding foothills included northern Yolo County southward to northwestern Kern County and northern Tulare County. Three distinct California tiger salamander populations are recognized and correspond to Santa Maria area within Santa Barbara County, the Santa Rosa Plain in Sonoma County, and vernal pool/grassland habitats throughout the Central Valley.

The CNDDB lists 908 extant occurrences for this species within the state, 61 of which are located within the project region (California Natural Diversity Database 2008). Approximately, 178 acres of USFWS designated critical habitat for this species is located on the Campus and Community North portions of the project site. Within the Campus site, adult California tiger salamanders have been detected within grassland areas (UC Merced 2001). Within the Community North portion of the project site, adult California tiger salamanders have been

observed in vernal pools (Merced County 2001). Observations of adults in vernal pools are considered to represent documented breeding of the species on site. Currently, California tiger salamanders have not been detected on the Community South site, likely due to the predominance of agricultural land. A total of 1,648 acres of lands within the project site are considered to be occupied by the species. Additionally, Conservation Lands that have been incorporated in the Proposed Action account for 20,136 acres of occupied habitat for this species and 12,101 acres of critical habitat, which would be conserved at a 14:1 ratio as part of the project. The known occupied habitat reported to occur within the project site and the project region on Conservation Lands was determined based on numerous surveys listed in **Table 4.4-1** and on the methodology developed as part of the *Conservation Strategy*.

Recent studies near Lake Yosemite found hybrids of the eastern tiger salamander and the California tiger salamander in vernal pools (Fitzpatrick and Schaffer 2007). This finding may affect the management of occupied California tiger salamander habitats in the project region. This research suggests that permanent ponds have a higher representation of eastern tiger salamander genes, while intermittent ponds support more genetically pure California tiger salamander. Therefore, pond management may be available as a technique to reduce effects of hybridization

California Tiger Salamander Critical Habitat

The final rule designating critical habitat for the Central population of California tiger salamanders was issued on August 23, 2005 (Service 2005). The rule identifies approximately 199,109 acres (80,576 hectares) within 32 critical habitat units. When designating critical habitat, the Service is required to list the known primary constituent elements essential (PCE) to the conservation of the species, and that may require special management considerations and protection (50 CFR § 424.14). Such physical and biological features include, but are not limited to: (1) Space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; sites for breeding, reproduction, and rearing (or development) of offspring; (4) and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species (Service 2005). The units are located across twenty counties and are divided into four geographic regions: (1) Central Valley Region; (2) Southern San Joaquin Region; (3) East Bay Region; and (4) Central Coast Region.

The PCEs for the tiger salamander are based on our current knowledge of the life history, biology, and ecology of the species and the relationship of its essential life history functions to its habitat, we have determined that the Central population of the tiger salamander requires the following primary constituent elements: (1) Standing bodies of fresh water (including natural and manmade (*e.g.*, stock)) ponds, vernal pools, and other ephemeral or permanent water bodies which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall; (2) Upland habitats adjacent and accessible to and from breeding ponds that contain small mammal burrows or other underground habitat that CTS depend upon for food, shelter, and protection from the elements and predation; and (3)

Accessible upland dispersal habitat between occupied locations that allow for movement between such sites.

Primary Constituent Element 1:

The requisite aquatic habitat described as the first PCE is essential for the Central population of the tiger salamander for providing space, food, and cover necessary to support reproduction and to sustain early life history stages of larval and juvenile tiger salamander. Aquatic and breeding habitats consist of fresh water bodies, including natural and artificially made (e.g., stock) ponds, vernal pools, and vernal pool complexes. To be considered essential, aquatic and breeding habitats must have the capability to hold water for a minimum of 12 weeks in the winter or spring in a year of average rainfall, the amount of time needed for salamander larvae to metamorphose into juveniles capable of surviving in upland habitats. During periods of drought or less-than-average rainfall, these sites may not hold water long enough for individuals to complete metamorphosis; however, these sites would still be considered essential because they constitute breeding habitat in years of average rainfall.

Primary Constituent Element 2:

Essential upland habitats containing underground refugia described as the second PCE are essential for the survival of the Central population's adult tiger salamanders and juveniles that have recently undergone metamorphosis. Adult and juvenile tiger salamanders are primarily terrestrial; adult tiger salamanders enter aquatic habitats only for relatively short periods of time to breed. For the majority of their life cycle, tiger salamanders survive within upland habitats containing underground refugia in the form of small mammal burrows. The Central population of the tiger salamander cannot persist without upland underground refugia. These underground refugia provide protection from the hot, dry weather typical of California in the nonbreeding season. The Central population of the tiger salamander also forages in the small mammal burrows and rely on the burrows for protection from predators. The presence of small burrowing mammal populations is essential for constructing and maintaining burrows. Without the continuing presence of small mammal burrows in upland habitats, the tiger salamander would not be able to survive.

Primary Constituent Element 3:

The dispersal habitats described as the third PCE are essential for the conservation of the Central population of the tiger salamander. Protecting the ability of tiger salamander to move freely across the landscape in search of suitable aquatic and upland habitats is essential in maintaining gene flow, recolonization, and population structure. Movement between areas containing suitable upland and aquatic habitats (i.e., dispersal) is restricted due to inhospitable conditions around and between areas of suitable habitats. Because many of the areas of suitable habitats may be small and support small numbers of salamanders, local extinction of these small units may be common.

Essential dispersal habitats generally consist of upland areas adjacent to essential aquatic habitats that are not isolated from essential aquatic habitats by barriers that tiger salamanders cannot cross. Essential dispersal habitats provide connectivity among suitable aquatic and upland habitats. While the tiger salamanders can bypass many obstacles, and do not require a particular type of habitat for dispersal, the habitats connecting essential aquatic and upland habitats need to be free of barriers (e.g., a physical or biological feature that prevents salamanders from dispersing beyond the feature) to function effectively. Examples of barriers are areas of steep topography devoid of soil or vegetation. Agricultural lands such as row crops, orchards, vineyards, and pastures do not constitute barriers to the dispersal of tiger salamanders.

The UC Merced project is within the Central Valley population of the California tiger salamander and within Unit 9. Critical Habitat Unit 9 is 17,799 acres in size and contains all three of the PCE's. Land ownership had mostly been private but with the purchase in fee title and/or conservation easements regarding development and many activities, most of the habitat can be considered to be University or State owned. The proposed UC Merced campus and community would lead to a loss of 229 acres of this critical habitat unit (about 1%). Conversely, the purchase of over 25,000 acres of Conservation Lands for the University project has protected 12,100 acres of habitat in Unit 9. Thus, nearly 68% of Unit 9 is protected from most of the causes leading to the listing of the species.

Vernal Pool Species Critical Habitat

Updated Status within Project Lands

Background information on the designation of critical habitat for vernal pool species is discussed in the 2009 BO Amendment section *Changes in Consultation Requirements*. The designated boundary for critical habitat for vernal pool species adopted by the Service avoided the Campus and University Community.

Succulent (Fleshy) Owl's-Clover

Updated Status within Project Lands

Systematic surveys for succulent owl's-clover were conducted in 2003 within the previously proposed Campus, the CNR, VST Preserve, and CST mitigation lands and on the adjacent Flying M Ranch (ICF Jones & Stokes 2008: Appendix D). This survey encompassed 28 square miles of land supporting more than 15 square miles of suitable habitat. Over 1,400 vernal pools and swales were searched within previously unsurveyed habitat (representing 1–10% of the number of these features present on surveyed lands). Succulent owl's-clover was found in a total of 41 pools, at a frequency of 3 to 6% of surveyed pools and swales.

Additional surveys of the Robinson Ranch Tier 2 easement lands were conducted in 2007 and 2008 (Vollmar Consulting 2008). Based on these surveys, the species was found in 34 pools (11% of all pools surveyed) within these lands.

The Conservation Strategy identified 1,337 acres of known occupied habitat in eastern Merced County (ICF Jones & Stokes 2008; Table 3-6). A total of 689 acres of occupied habitat (52% of the regional total) occur on Conservation Lands, with 45% of that within Tier 1a lands (Table 4a). A total of 739 recognized point locations of this species occur within Conservation Lands, including 244 (33%) within Tier 1a mitigation lands (VST Preserve, CNR, and Myers Easterly lands).

Colusa Grass

Updated Status within Project Lands

No surveys have been conducted for Colusa grass since the 2002 BAs and 2002 BO, except those conducted on the Robinson Ranch Tier 2 easement lands in 2007 and 2008 (Vollmar Consulting 2008). No additional records were made during surveys and no additional incidental sightings have been reported. The Conservation Strategy identified 282 acres of occupied habitat in eastern Merced County, with 156 occupied acres (55%) occurring on Conservation Lands (all on Tier 1a mitigation lands). Five separate point locations of this species are within Conservation Lands, all of which are Tier 1a lands (the VST and CNR).

San Joaquin Valley Orcutt Grass

Updated Status within Project Lands

No extensive recent surveys have been conducted within project lands or in the surrounding region for San Joaquin Valley Orcutt grass, except those conducted on the Robinson Ranch Tier 2 easement lands in 2007 and 2008 (Vollmar Consulting 2008). No new incidental sightings have been reported. The Conservation Strategy has identified eight point locations of this species in the eastern Merced Study area, encompassing 156 acres of known occupied habitat. One occurrence, encompassing 16 acres, is within the CNR.

The extension of the boundary of the Community North area to the east was further modified by the University specifically to avoid any direct or indirect impacts on wetlands supporting San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp that occurs on the adjacent Ichord Ranch.

Vernal Pool Fairy Shrimp

Updated Status within Project Lands

This species is relatively common in eastern Merced County, with 2,384 acres of known occupied habitat. No recent surveys have been conducted for the vernal pool fairy shrimp since the 2002 BAs and BO, except those conducted on the Robinson Ranch Tier 2 easement lands in 2007 and 2008 where the species was found in 21% of pools randomly selected for survey (Vollmar Consulting 2008). No additional incidental sightings have been reported. Tier 1a lands support 490 acres of occupied habitat, and Tier 1b and Tier 2 lands support another 653 acres of occupied habitat (Table 4a).

Vernal Pool Tadpole Shrimp

Updated Status within Project Lands

No new surveys have been conducted for vernal pool tadpole shrimp, except on the Robinson Ranch Tier 2 easement lands in 2007 and 2008 (Vollmar Consulting 2008). No additional records were made during these surveys and no additional incidental sightings have been reported. The species is relatively uncommon in eastern Merced County, with only 318 acres of known occupied habitat, of which 14 acres are on Tier 1a lands.

Conservancy Fairy Shrimp

Updated Status within Project Lands

No recent surveys have been conducted for the Conservancy fairy shrimp except those conducted on the Robinson Ranch Tier 2 easement lands in 2007 and 2008 (Vollmar Consulting 2008). No additional records were made during surveys and no additional incidental sightings have been reported. The species is known to occur with the large vernal pool within the CNR (which was established to protect the watershed of this pool). This occurrence comprises 14 acres of occupied habitat. Three other point locations, encompassing107 acres of occupied habitat, occur elsewhere in eastern Merced County.

Valley Elderberry Longhorn Beetle

Updated Status within Project Lands

No new surveys have been conducted for VELB or elderberry shrubs that serve as its habitat, and no incidental sightings of shrubs or the beetle have been reported.

California Tiger Salamander

Updated Status within Project Lands

No additional surveys have been conducted for the California tiger salamander since the original project surveys conducted for the LRDP EIR (URS Corporation 2001). Occupied upland habitat was designated and quantified in the Conservation Strategy based on locations of breeding sites and the Service' recommended areas of occupied upland habitat (ICF Jones & Stokes 2008). This analysis showed that nearly all lands encompassing the campus and Tier 1a mitigation lands (the VST Preserve, CNR, and Myers Easterly) are considered occupied habitat.

California Tiger Salamander Critical Habitat

As noted in *Changes in Consultation Requirements*, the Service designated critical habitat for the California tiger salamander in 2005. The designated area includes 229 acres of Campus and Community North lands and over 12,700 acres of Conservation Lands, including nearly 5,914 acres of Tier 1a Conservation Lands and an additional 6,187 acres on other Conservation Lands (Table 4a).

San Joaquin Kit Fox

Updated Status within Project Lands

No surveys have been conducted for the San Joaquin kit fox on project lands or within eastern Merced County since the 2002 BO. No incidental sightings have been reported.

The Conservation Strategy developed and applied a habitat suitability model to identify the relative values of habitats in eastern Merced County for use by kit fox. The model characterized two kinds of habitat based on their potential for use by the kit fox: primary habitat (suitable for kit fox residence) and secondary habitat (not capable of use for residence, but suitable for use in dispersal movements). The model's key variables used to identify suitable primary and secondary habitats include land cover type (e.g., grassland, agricultural, developed), slope, and effects of adjacent uses. The model was applied using GIS analysis to evaluate potential effects of the Campus and Community (ICF Jones & Stokes 2008). The Conservation Strategy identified over 180,000 acres of primary habitat and 150,000 acres of secondary habitat in a nearly 371,000-acre area of eastern Merced County. Tier 1a mitigation lands support 6,128 acres of primary habitat, while other Conservation Lands support over 18,000 acres of additional primary habitat (Table 4a).

EFFECTS OF THE PROPOSED ACTION

The 2002 BO addressed potential effects on 12 listed species and provided technical assistance for the California tiger salamander, which was subsequently listed, as well as midvalley fairy

shrimp and mountain plover, which the Service determined did not warrant listing (see *Changes in Consultation Requirements* above).

As presented on page 2 of this Biological Opinion, the Service has concurred with the Corps that Hoover's spurge, hairy Orcutt grass, Hartweg's golden sunburst, and Greene's tuctoria may be affected, are not likely to be adversely affected by the Proposed Project. Based on survey results and analysis presented in the 2002 BA and 2002 BA Supplement, the 2002 BO concluded that the four plant species were not known to occur within the project area or mitigation sites. Extensive subsequent surveys (ICF Jones & Stokes 2008, Gibson and Skordal 2008) also did not locate these species in the former campus area (prior to reconfiguration of the Campus).

The following nine listed species and the bald eagle have the potential to be affected by the University's Proposed Project and were, therefore, addressed in the 2008 BA Supplement:

- Succulent owl's-clover
- Colusa grass
- San Joaquin Valley Orcutt grass
- Conservancy fairy shrimp
- Vernal pool fairy shrimp
- Vernal pool tadpole shrimp
- Valley elderberry longhorn beetle
- California tiger salamander
- San Joaquin kit fox

In presenting effects, consistent with treatment in the 2008 BA Supplement, this 2009 BO Amendment focuses on evaluating effects on habitat determined to be occupied by the listed species (occupied habitat) and on the amount of take. Determinations of occupied habitat for species were based on the presence of suitable habitat (Table 6) within prescribed distances of known species point locations (600 feet [200 m] for vernal pool plants and crustaceans, 1.75 miles [2,500 m] for the California tiger salamander).

Species effects assessments quantify direct and indirect impacts on species' occupied habitats based on methods described in the Conservation Strategy. Occupied habitats on Conservation Lands also were similarly quantified and used to determine mitigation ratios, for comparison against requirements in the Parameters and Conservation Measures (see *Effects of the Proposed Action*). In addition to acreage evaluations, the BA also quantified the numbers of known species point locations (as defined by the California Natural Diversity Database and quantified in the Conservation Strategy) for the UC Merced Campus, University Community lands, and Conservation Lands, which were used to determine mitigation ratios.

Potential take for species was determined qualitatively from the effects on occupied habitat. Effects of take were evaluated based on the extent of offsetting mitigation through habitat preservation, restoration, and creation.

Updated Discussion of General Effects of the Proposed Action

The 2002 BO identified a set of general impacts that could affect species and their habitats. These impacts were addressed individually for each species as applicable. Similarly, the 2008 BA and this 2009 BO Amendment addresses these impacts at a species level. This section updates the description of these general impacts.

Construction-Related Effects

As noted in the 2002 BO, a variety of potential impacts could result from construction-related activities, including dust emissions, erosion, sedimentation, hazardous material spills, introduction of non-native species, and injury or direct mortality of species. The Conservation measures directly address these potential impacts and proposed mitigation measure to avoid, minimize, and mitigate for these effects. Measures include preconstruction surveys, construction monitoring, best management practices (BMPs), training of construction personnel, enforcement of measures through construction contracts, a spill response plan, erosion control measures, measures to prevent introduction of invasive non-native species, and marking and fencing of sensitive exclusion areas. Since the 2002 BA, the University incorporated these measures into a construction mitigation plan for Phase 1 Campus project and has successfully implemented these construction mitigation measures.

Altered Hydrology and Nonpoint Source Pollution

The 2002 BO determined that alteration of hydrology has the potential to affect vernal pool wetlands and associated plants by changing patterns of runoff and introducing sediment and pollutants. The Conservation Measures, however, committed to specific avoidance and minimization measures for these effects. Since the 2002 BO, UC reconfigured the Campus and University Community to minimize potential hydrologic effects on sensitive wetlands. It implemented design and operations measures to minimize effects of its Phase 1 Campus.

The University remains committed to Conservation Measures that avoid, minimize, and mitigate potential hydrologic effects on listed wetland species. In addition, the University is committed to implementing LID planning and building practices as part of campus design and implementation of the Conservation Strategy. As explained above, LID is a sustainable landscape approach used to replicate or restore natural watershed functions. The University anticipates implementing a variety of LID practices, including the use of bio-retention areas, grass swales, and permeable pavement throughout the UC Merced Campus and University Community development.

Pesticides

The 2002 BO identifies use of pesticides on the Campus and on Conservation Lands as threats to habitat values. It noted that Conservation Measures identified commitments to develop a landscape management plan for University facilities, incorporate into the management plan for

Conservation lands measures that would restrict pesticides to uses for habitat maintenance, and restrictions of uses in areas of major infrastructure.

UC continues to agree to these commitments. It has developed integrated pest management procedures for management of the Phase 1 Campus. This plan will be updated as the Campus and Community North expand (including related infrastructure components). The *Management Plan for Conservation Lands* includes pesticide use requirements.

Human Disturbance

The 2002 BO identified human disturbance of habitat adjacent to the Campus and University Community as a potential threat to listed species. The 2002 BO also noted, however, that acquisition of Conservation Lands, and implementation of Conservation Measures to protect them, would reduce this threat. The 2002 BO concluded that implementation of the Parameters and supporting Conservation Measures would ensure that UC would develop strategies acceptable to the Service that would control indirect effects caused by human disturbance.

The University's reconfiguration of the UC Merced Campus and University Community reduced the potential for indirect impacts by increasing the amount of habitat protected and by providing a wider buffer between the Campus and Conservation Lands that support species of greatest conservation value (e.g., Conservancy fairy shrimp). The University also has incorporated measures to protect conservation lands from human disturbance into its *Management Plan for Conservation Lands*, including: restrictions on uses, public education, signage, and monitoring and enforcement.

Introduction of Non-native Species

The 2002 BO identified the potential for the introduction of non-native species through ground-disturbance during construction and the use of invasive species in landscaping. The Biological Opinion also noted that Conservation Measures adopted by UC would minimize potential for introduction of non-native species.

Since the 2002 BO, UC has developed and implemented a construction mitigation plan for the Phase 1 Campus that incorporated measures to discourage introduction of non-native weeds. The *Management Plan for Conservation Lands* includes an extensive integrated pest management program that incorporates measures to avoid and minimize potential for introduction of invasive plan and animal species, requires monitoring to detect these species, and requires a rapid response as needed to control species that threaten listed species and their habitats.

Fragmentation of Habitat

The 2002 BO identified additional fragmentation of habitat as a threat to listed species. It identified existing sources of fragmentation as canals, Yosemite Lake, agricultural lands, existing development, and roads. The 2002 BO noted that areas in the north of the Biological Opinion

Study Area were less fragmented. It noted that the extent of fragmentation from the UC Merced Campus and University Community would depend on the lands selected for these uses within the Study Area addressed at that time. It also noted that protection of substantial areas of intact high quality areas of vernal pool-grassland habitat would reduce potential for future fragmentation of these areas.

The reconfiguration of the UC Merced Campus for the Section 404 Permit application was conducted through extensive discussion with the Service and other agencies to minimize effects of fragmentation and associated disturbance on high quality habitats (Table 1). Potential effects were substantially reduced through the reconfiguration (see Table 7, and later discussions of effects on species).

Air Pollution

The 2002 BO notes localized air pollution (especially ozone concentrations) has potential to affect listed species. It noted that locating the UC Merced Campus and University Community in the southern portion of the study area could reduce these potential effects. The reconfiguration of the campus shifted its location southward and increased the area protected as Conservation Lands, thereby potentially reducing the potential effect of ozone on listed plants.

Succulent (Fleshy) Owl's-Clover

Campus and Community North Effects

Habitat Effects

The UC Merced Campus and Community North would result in direct loss of 27 acres of habitat considered occupied by succulent owl's-clover and indirect effects on an additional 4 acres (Table 4a). Tier 1a mitigation lands will protect a total of 313 acres of occupied habitat, resulting in a 10:1 ratio of land areas protected-to-affected. The University's ownership and management of Tier 1a lands under the terms of an approved Management Plan for Conservation Lands will protect and enhance 23% of the regional total amount of known occupied succulent owl's-clover habitat. An additional 378 acres of succulent owl's-clover habitat will be protected by conservation easements on CST Tier 1b lands and Tier 2 mitigation lands, resulting in achievement of a total mitigation ratio of 22:1. The UC Merced Campus and Community North would eliminate nine individual point locations of succulent owl's-clover but will conserve 244 known point locations on Tier 1a mitigation lands (Table 4b). In total all mitigation lands will protect 739 occurrences, an 82:1 mitigation ratio (Table 4b). Additionally, UC has committed to restore and create 40.12 acres of vernal pool habitat, which will be suitable for succulent owl's-clover.

Destruction of Known Plants

Development of the Campus will result in destruction of individual succulent owl's-clover within the Campus and Community North areas. The number of individuals within the 31 acres of occupied habitat to be directly or indirectly affected has not been quantified. UC has minimized this destruction to the extent feasible through campus redesign and a variety of avoidance and minimization measures and has compensated for effects through protection and management of the 689 acres in Tier 1 and Tier 2 mitigation areas.

The University has committed to restoration and creation of approximately 40 acres of vernal pool habitat to replace wetland functions and values. Upon approval by the Corps and Service, soil and seed from wetland habitats occupied by the succulent owl's-clover within the UC Merced Campus and Community North will be salvaged and used in vernal pool restoration and creation, thereby allowing the genetic pool of individuals within the UC Merced Campus and Community North to be maintained. With all of the prescribed measures, the level of take anticipated that will result from the UC Merced Campus and Community North will not have a significant detrimental impact on the species.

Community South Effects

No known point locations of succulent owl's-clover would be directly or indirectly affected by development of the Community South area. No take of individuals is anticipated within the Community South.

Total Effects of the Proposed Action

Implementation of the proposed action will result in direct loss of 27 acres of habitat considered occupied by succulent owl's-clover and indirect effects on an additional 4 acres (Table 4a). Tier 1a mitigation lands will protect a total of 313 acres of occupied habitat, resulting in a 10:1 ratio of land areas protected-to-affected.

Comparison of Effects with the 2002 Proposed Project

The reconfiguration of the UC Merced Campus and University Community reduced the amount of succulent owl's-clover habitat to be affected by 43%, from 54 acres to 31 acres (Table 7). Conserved lands increased by 85 acres (14%), and resulting mitigation ratios more than doubled for Tier 1a lands (to 10:1) and all Conservation Lands (to 22:1).

Colusa Grass

Campus and Community North Effects

Habitat Effects

As noted in the 2002 BAs and 2002 BO, and in the Conservation Strategy, Colusa grass is not present within the lands that are proposed for the Campus and University Community (Tables 4a and 4b). UC will conserve a total of 156 acres of occupied habitat and five point locations on Tier 1a mitigation lands, representing more than half of the known occupied habitat and known point locations of the species in eastern Merced County.

The reduction in the size of the currently proposed Campus (from that identified in the 2002 BAs and BO) and increasing the buffer for occupied habitat by expanding the CNR and implementation of the Conservation Lands Management Plan will reduce the potential for detrimental effects due to trespassing, invasion by noxious weeds, and other potentially negative influences. As documented in the Conservation Strategy, the configuration of the campus and protected lands also will reduce the potential for land conversion or degradation. This long-term protection and conservation management will be highly beneficial to the species.

Destruction of Known Plants

Construction-related activities would not result in the destruction of any individual Colusa grass plants. Destruction of Colusa grass individuals could occur through management activities occurring on Tier 1 mitigation lands, including regulated livestock grazing, stock pond maintenance, and invasive species control. All these management efforts will occur under provisions in the approved *Management Plan for Conservation Lands* and will be designed to provide long-term protection and management to benefit the species. Thus, any incidental take that may occur will be the byproduct of management efforts designed to maintain and enhance long-term conditions for the species.

In summary, the UC Merced Campus and Community North would have no direct or indirect detrimental effects on Colusa grass habitat or individuals. In addition, more than half of the known occupied habitat for the species will be protected and beneficially managed.

Community South Effects

Colusa grass is not known to occur within or adjacent to the Community South property. Therefore, development of Community South is not expected to result in any impacts on the species.

Total Effects of the Proposed Action

The total effects of the Proposed Action on Colusa grass is as described for the UC Merced Campus and Community North, as development of the Community South would not affect the species.

Comparison of Effects with the 2002 Proposed Project

Effects of the Proposed Action and the 2002 Proposed Project on Colusa grass are similar (Table 7). As noted under *Habitat Effects* above, adding the former Campus Land Reserve lands to the CNR provides a greater buffer distance between the Campus and the Colusa grass populations on CNR lands.

San Joaquin Valley Orcutt Grass

Campus and Community North Effects

Habitat Effects

San Joaquin Valley Orcutt grass is not present within the area identified for the Campus and Community North (Tables 4a and 4b). UC's protection and conservation management of one occurrence and 16 acres of occupied habitat (10% of the regional habitat) for San Joaquin Valley Orcutt grass on Tier 1a mitigation lands (the CNR) will be beneficial to the species.

The reduction in the size of the Campus (from that identified in the 2002 BAs and BO), and the resulting increase in the buffer for occupied habitat by expanding the CNR, will reduce the potential for detrimental effects due to trespass, invasion by noxious weeds, and other potentially negative influences.

Destruction of Known Plants

As for Colusa grass, UC would not destroy any San Joaquin Orcutt grass through it's construction activities. Destruction of Orcutt grass plants could occur during management activities on Tier 1 mitigation lands designed to protect and benefit the species, including livestock grazing, pond maintenance, and invasive species control, as conducted under the approved *Management Plan for Conservation Lands*. Thus, any incidental take that may occur will be designed to maintain and enhance long-term conditions for the species.

In summary, the Campus and Community North would have no direct or indirect detrimental effect on San Joaquin Valley Orcutt grass habitat or individuals and will protect and beneficially manage an important proportion of the known occupied habitat for the species and thereby contribute to meeting the goals of the *Vernal Pool Recovery Plan.*

Community South Effects

The April 2008 adjustment of the boundary of the Community South project to remain on the west side of the Fairfield canal (Figure 2) avoids impacts on a portion of a nearby wetland area that supports a population of the San Joaquin Valley Orcutt grass and vernal pool tadpole shrimp. Therefore, there would be no direct or indirect impacts on the habitat or individuals of the San Joaquin Valley Orcutt grass.

Total Effects of the Proposed Action

The construction of the Proposed Project will not result in effects on the San Joaquin Valley Orcutt grass, and protection of this species will occur on the Project's conservation lands.

Comparison of Effects with the 2002 Proposed Project

Effects of the Proposed Action and the 2002 Proposed Project on San Joaquin Valley Orcutt grass are similar for the Campus and Community North (Table 7). Although most of the protections included in the 2002 BA and BA Supplement remain the same, they have been developed in greater detail in the Conservation Lands Management Plan. As noted under *Habitat Effects* above, adding former Campus Land Reserve lands to the CNR provided a greater buffer distance between the Campus and the population on CNR lands.

The distance from the lands in University Community to the San Joaquin Valley Orcutt grass population on the adjacent Ichord Ranch has decreased under the Proposed Action compared with the 2002 Proposed Project. Indirect impacts will be avoided through implementation of avoidance and minimization measures during design, construction, and operation of the Community North. Therefore, the Community North will not pose any substantial additional risk for indirect impacts on the adjacent San Joaquin Valley Orcutt grass population.

Conservancy Fairy Shrimp

Campus and Community North Effects

Habitat Effects

No sites occupied by the Conservancy fairy shrimp would be affected by project construction. Protections identified in the 2002 BAs and 2002 BO for the Conservancy fairy shrimp remain in place, including incorporation of the entire watershed for the large vernal pool into the CNR. In addition, protection, management, and monitoring measures for the species and its habitat have been incorporated into the Conservation Lands Management Plan, including measures to deter trespassing, manage other human uses, ensure proper grazing use, and control invasion of habitat by noxious weeds. Overall, the Campus and Community North will protect and provide conservation management for 14 acres of occupied Conservancy fairy shrimp habitat. This area

comprises 13% of the 107 acres of known occupied habitat (and one of four known point locations) in eastern Merced County.

The recent reconfiguration of the Campus has increased the distance between developed campus lands and the occupied pool and its watershed, thereby reducing the potential for trespassing, introduction of noxious weeds, and other potentially negative influences. In addition, the commitment to incorporate the former Campus Land Reserve into the CNR, with full protection via a conservation easement and conservation management of lands, provides additional long-term protection from previously reserved potential future use of the site for the campus expansion.

The second closest population of Conservancy fairy shrimp is on the private Ichord Ranch, more than 1.5 miles from the Community North. Therefore, the University's Proposed Project would not result in indirect impacts to this population.

Take of Individuals

Campus and Community North construction activities will not result in incidental take of individual Conservancy fairy shrimp. Management of conservation lands has the potential to result in incidental take of the species, but will be avoided to the maximum extent possible and will only occur if management actions were determined to be warranted to protect the species or its habitat.

Community South Effects

No occurrences of the Conservancy fairy shrimp occur within the Community South area. The nearest occurrence, on the Ichord Ranch, is over 1.5 mile away. Therefore, the Community South would not result in any direct or indirect impacts on Conservancy fairy shrimp.

Total Effects of the Proposed Action

The Campus and University Community would have effects as described above for the Campus and Community North. The Proposed Action will benefit the Conservancy fairy shrimp by protecting, managing, and monitoring the species population and habitat, and thereby contribute to species recovery.

Comparison of Effects with the 2002 Proposed Project

Although most of the protections included in the 2002 BAs remain the same, they have been developed in greater detail in the *Management Plan for Conservation Lands*. The addition of the former Campus Land Reserve to the CNR, however, provides a permanent protection buffer for the watershed lands of the occupied pool on the CNR. The net effect is that the Proposed Action will improve protection for the Conservancy fairy shrimp.

Vernal Pool Fairy Shrimp

Updated Status within Project Lands

The species is relatively common in eastern Merced County, with 2,384 acres of known occupied habitat. No surveys have been conducted for the vernal pool fairy shrimp since the 2002 BAs and 2002 BO, and no incidental sightings have been reported.

Campus and Community North Effects

Habitat Effects

UC Merced Campus and Community North construction will result in direct or indirect impacts to 61 acres of occupied habitat representing 211 known point locations (Tables 4a and 4b). This loss represents 2.6% of the 2,384 acres of known occupied vernal pool fairy shrimp habitat within the eastern Merced County. Mitigation lands will protect 1,143 acres of occupied habitat and 670 known point locations of the vernal pool fairy shrimp, representing 48% of the known habitat in the study region, including 490 acres within Tier 1a mitigation areas (21% of the total known habitat). Mitigation ratios achieved are 8:1 for Tier 1a mitigation lands and 19:1 for all Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. Known point locations of the species also are found on mitigation lands at a ratio of greater than 3:1.

Take of Individuals

An unknown number of individual vernal pool fairy shrimp will be taken as a result of the loss or disturbance of the 61 acres of vernal pool and swale habitat considered occupied by the species. The effect of take may be reduced by salvaging soils and accompanying cysts for use in wetland restoration and creation. The effects of take are compensated in part by the permanent protection and conservation management of 1,143 acres of occupied habitat and 490 acres on Tier 1a mitigation lands.

Community South Effects

The Community South would eliminate or disturb less than one acre of occupied vernal pool fairy shrimp habitat. The 2002 BO requires that impacts to this species habitat be compensated at a ratio of 3:1.

Total Effects of the Proposed Action

Even without a specified compensation program for the Community South lands, the combined effects of proposed compensation will achieve a mitigation ratio of 19:1 relative to the impacts of the Proposed Action, substantially above the 3:1 minimum target specified in the 2002 BO.

Comparison of Effects with the 2002 Proposed Project

The University's reconfiguration of the UC Merced Campus reduced the effect on habitat for the vernal pool fairy shrimp by nearly half, from 116 acres to 61 acres (Table 7). Conserved lands increased by 47 acres (4%), more than doubling the mitigation ratios for Tier 1a (to 8:1) and all mitigation lands (to 19:1) (Table 7).

Vernal Pool Tadpole Shrimp

Campus and Community North Effects

Habitat Effects

Vernal pool tadpole shrimp do not occur within the construction footprint on the proposed UC Merced Campus. Construction of the Community North would directly or indirectly impact 4 acres of occupied vernal pool tadpole shrimp habitat (Table 4a). This loss represents 1.2% of the 318 acres of known occupied tadpole shrimp habitat within eastern Merced County. Mitigation lands will protect 14 acres of occupied habitat for the tadpole shrimp, representing 4% of the known habitat in the region, nearly all of which is within Tier 1a mitigation areas (Table 4a). The achieved mitigation ratio of 3.5:1 for Tier 1a mitigation is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. In addition, potentially suitable habitat will be restored and created as part of the compensatory wetland mitigation.

Take of Individuals

An undetermined number of individual vernal pool tadpole shrimp will be taken as a result of the loss or disturbance of the 4 acres of vernal pool and swale habitat considered occupied by the species and one known point location (Table 8). The effect of take may be reduced if soils and accompanying cysts are salvaged from the Community North lands and used in wetland restoration and creation.

Community South Effects

As described for the San Joaquin Valley Orcutt grass, the April 2008 reconfiguration of the Community South lands to avoid lands on the east side of the Fairfield Canal eliminated the potential for direct or indirect impacts on the vernal pool tadpole shrimp and its habitat.

Total Effects of the Proposed Action

The UC Merced Campus and University Community would result in 4 acres of impacts on vernal pool tadpole shrimp and will preserve population of the species in Tier 1a lands at a ratio that exceeds the 3:1 compensation requirements of the 2002 BO.

Comparison of Effects with the 2002 Proposed Project

Based on the analysis of the Conservation Strategy, the 2002 Proposed Project did not cause impacts on occupied habitat for the vernal pool tadpole shrimp. The 2008 reconfiguration of the Campus and University Community resulted in impacts to a small amount of habitat (4 acres; Table 7), representing 1.2% of known occupied habitat available regionally. The amount of conserved habitat (14 acres) did not change.

Vernal Pool Species Critical Habitat

The designated boundary for critical habitat for vernal pool species adopted by the Service avoided the Proposed Project construction footprint. Therefore, no critical habitat will be adversely affected through direct impacts. Indirect effects of the campus on adjacent designated critical habitat will be minimized through the implementation of adopted Conservation Measures to avoid, minimize, and compensate for potential impacts (See *Status of Conservation Measures*). Beneficial effects from the protection and management of conservation lands will benefit critical habitat for vernal pool species.

Valley Elderberry Longhorn Beetle

Campus and Community North Effects

Habitat Effects

No elderberry shrubs were found during surveys of the UC Merced Campus and Community North sites or within the VST or CNR lands (Service 2002; EIP Associates 2002; Jones & Stokes 2002a, ICF Jones & Stokes 2008). Although specific information is lacking on elderberry occurrence on mitigation lands under easement, it is likely that some are present (Vollmer 2002, Service 2002). The Campus and Community North have no potential to affect existing VELB habitat. Elderberry seedlings, however, are dispersed by fruit-eating birds, which are likely to increase in abundance as the Campus landscape matures. Therefore, considering the 30-year build-out schedule for the campus, it is possible that elderberries could grow on Campus or on Conservation Lands.

Dispersal of seeds by fruit-eating birds attracted to the campus landscape (e.g., cedar waxwings, American robins, European starlings) could in the establishment elderberry host plants within both the undeveloped and developed portion of the campus. The extent and rate of this colonization would depend on the availability of elderberry shrubs on adjacent lands (e.g. near Yosemite Lake). Any colonization of the Campus, Community North, and Conservation Lands by elderberries would benefit the VELB. Benefits will likely be long-term within UC controlled Conservation Lands because elderberries could be maintained over time. Within the developed campus, some colonizing elderberries likely will be maintained as a part of the long-term landscape (i.e., within protected stream courses, floodwater retention areas, and recreation lands and trails). Some colonized shrubs in future development areas would likely require eventual

removal for construction of various Campus and Community North phases. Even colonization of predevelopment habitat areas provides a temporary benefit to the species, however. Therefore, the Campus and Community North will result in net benefits to VELB habitat and presumably the species.

Take of Individuals

The UC Merced Campus and Community North would not cause take of existing VELB individuals because no suitable habitat is present. Based on current Service guidance, elderberries that grow to have stems larger than a diameter greater than 1 inch are considered suitable habitat and their removal in certain circumstances can be presumed to result in take of the species (since determination of occupancy of shrubs cannot be made nondestructively). Therefore, removal of elderberry shrubs that colonize currently undeveloped portions of the UC Merced Campus and Community North could result in take of VELB. Take also may occur during future operations, including vegetation management in parks and detention basins and along trails.

The impact of this potential VELB take is considered minor. The potential benefits of wider colonization of the Campus, Community, and Conservation Lands by elderberry shrubs in protected areas would offset take of VELB and result in the potential for an increase in VELB population.

In summary, UC Merced Campus and Community North development may increase habitat for VELB in the short-term, but it could result in a later loss of a portion of this habitat and resulting take of a portion of the future-established population. The net effect of the project on VELB habitat and populations is beneficial.

Community South Effects

Elderberry shrubs have not been reported for the Community South area. Effects of the Community South development on VELB are expected to be similar to those described for the UC Merced Campus and Community North, including establishment of new habitat and potential take of the species during future construction phases and operations. Overall effects are expected to be beneficial.

Total Effects of the Proposed Action

Overall effects of the UC Merced Campus and University Community are expected to increase habitat for VELB. Some take may occur as some of the elderberry habitat that becomes established in the future is removed during future construction phases and operations. Overall, however, elderberry habitat is expected to increase in open space areas, and therefore effects are considered beneficial.

Comparison of Effects with the 2002 Proposed Project

Effects of the Proposed Action on VELB are similar to those of the 2002 Proposed Project.

California Tiger Salamander

The effects analysis for the California tiger salamander considers effects on the species and on designated critical habitat.

Campus and Community North Effects

Habitat Effects

The reconfigured Campus and Community North will eliminate one known breeding site for the California tiger salamander and 1,884 acres of occupied upland habitat (i.e., within 1.25 miles of this and other breeding ponds) (Table 4a; also see ICF Jones & Stokes 2008: Figure 3-16, where one observation with UC lands represents an aestivating individual). Tier 1a mitigation lands will protect and conserve 6,242 acres of breeding habitat (3.3:1 ratio) and 13 breeding locations (13:1 ratio). Tier 1b and Tier 2 lands will protect an additional 13,902 acres of upland habitat, resulting in total protection of over 20,100 acres, representing a total acreage mitigation ratio of nearly 11:1, and 17 additional known breeding locations (a 30:1 ratio). Implementing the Compensatory Wetland Mitigation Plan will restore wetland and associated upland habitat that will provide additional suitable breeding and upland habitats for the salamander.

Effects on Critical Habitat

The Campus and Community North will eliminate 229 acres of critical habitat for the California tiger salamander (Table 4a). Over 5,900 acres of critical habitat will be protected on Tier 1a Conservation Lands (a 26:1 ratio to critical habitat lands to be lost). Tier 1b and Tier 2 lands will protect an additional 6,187 acres of critical habitat, for a total of over 12,100 acres protected on Conservation Lands, representing a 53:1 mitigation ratio.

Take of Individuals

Individual tiger salamanders likely would be taken during construction and operation of the UC Merced Campus. Removal of the one occupied breeding pond within the Community North area could kill adults, larvae, or eggs of the tiger salamander. Because most of the upland grasslands with the UC Merced Campus and Community North are within the 1.75 mile potential travel distance of the salamander, disturbance of 1,884 acres of grassland habitat and one known breeding location (Table 8) could result in take through most of these areas. The level of take (number of individuals), however, is difficult to estimate precisely.

UC will minimize take through measures specified in construction mitigation plans to be prepared and approved by The Service for each major construction phase. In summary, these

measures include:

- Fencing construction site perimeters to prevent incursion into undeveloped areas.
- Conducting preconstruction surveys of potential breeding habitat within construction areas and adjacent lands within 600 feet.
- Trapping and translocating adult and metamorphosed juvenile salamanders to suitable off-site breeding habitat on Conservation Lands during the breeding season prior to construction.
- When applicable, constructing drift fencing to prevent entry of migrating adult or juvenile salamanders to construction areas.

Despite the implementation of measures to minimize take, an unquantifiable amount of take of the California tiger salamander is anticipated. Such take is likely to occur during ground excavation because the adopted exclusion and translocation methods are likely to be only partially effective in removing salamanders from upland positions of construction sites, and unoccupied but suitable habitat for translocation may be difficult to identify.

With application of conservation measures, effects of this unavoidable take are expected to be minimized for the following reasons:

- All but one breeding pond was avoided through UC Merced Campus and Community North siting and reconfiguration, while at least 21 breeding ponds are protected on Conservation Lands.
- The University will conserve occupied habitat on Tier 1a lands at a 3.3:1 ratio to habitat eliminated, while all Tier 1 and 2 Conservation Lands will conserve lands at an 11:1 mitigation ratio (Table 4a).
- The University will conserve designated critical habitat for the California tiger salamander at a 26:1 ratio on Tier 1a lands and at a 53:1 ratio for all conservation lands.
- Therefore, project conservation efforts will protect and provide conservation management for a substantial amount of known occupied habitat, known occurrences, and critical habitat.
- Construction mitigation measures will minimize the amount of take by capturing and relocating salamanders from the breeding pond and excluding salamanders on adjacent areas from accessing construction sites.

Community South Effects

Lands on the Community South are not considered occupied habitat because of their agricultural uses, and were not included within the critical habitat designation. Therefore, no occupied habitat or critical habitat would be affected.

Total Effects of the Proposed Action

The impacts of the Proposed Action are the same as for the Campus and Community North because the Community South would have no effect on the California tiger salamander or on critical habitat for the species.

Comparison of Effects with the 2002 Proposed Project

Reconfiguration of the Campus and University Community reduced impacts to the area of occupied habitat for the California tiger salamander by 159 acres (8%), while the amount of occupied habitat conserved increased by over 275 acres (1.4%)(Table 7).

San Joaquin Kit Fox

Campus and Community North Effects

Habitat Effects

The reconfigured UC Merced Campus and Community North would result in direct or indirect effects on 1,293 acres of primary habitat suitable for San Joaquin kit fox residence and an additional 676 acres of additional secondary dispersal habitat (Table 4a). Therefore, the UC Merced Campus and Community North would affect 0.7% of the total amount of primary habitat and 0.5% of the total area of secondary habitat in the 371,000-acre eastern Merced County study area (ICF Jones & Stokes 2008, Table 2-2). Through preservation and management of Conservation Lands and other Tier 1 and Tier 2 Conservation Lands, the University's Proposed Project will conserve over 25,700 acres of habitat suitable for kit fox, of which 94% (24,183 acres) are primary habitat (Table 4a).

Mitigation ratios achieved for kit fox habitat are summarized in Tables 4a and 4b. In evaluating mitigation lands values for compensation, mitigation ratios achieved for kit fox primary habitat is of greatest interest because it provides not only suitable habitat for kit fox residence but also provides greater dispersal capability than does secondary habitat. Therefore, this discussion focuses on the ratios achieved for residence and for total habitat (i.e., residence and dispersal habitat combined) by Tier 1a lands and by all compensation lands (i.e., Tier 1 and 2 combined). Project compensation from Tier 1a lands alone exceed the minimum 3:1 compensation ratios specified in the 2002 BO for the UC Merced Campus and Community North (4.7:1 for primary habitat and 3.1:1 for all kit fox habitat, Table 4b). With incorporation of Tier 2 lands, compensation achieves ratios of nearly 19:1 for primary habitat and over 13:1 for both habitats. These compensation ratios substantially exceed the ratios specified in the 2002 BO.

The Conservation Strategy also has specified installation of a canal crossing to enhance kit fox dispersal in the project region. The 2008 Biological Assessment Supplement has identified potential sites for installation of a new crossing, based on quality of adjacent habitats, the

location of existing crossings, and the canal configuration to identify potential crossing sites where they will serve animals that are naturally funneled by the shape of the canal. (Figure 5).

The *Management Plan for Conservation Lands* has incorporated 2002 BO requirements to manage grazing to provide suitable grass height and to install artificial kit fox dens as specified in the 2002 BO. The plan also includes extensive measures to prevent invasion of Conservation Lands by noxious weeds and to control wildfire, human uses, free-ranging dogs, and red foxes.

Take of Individuals

Take of individual kit foxes is not likely to occur because foxes have not been observed within lands proposed for the Campus and Community North. Take, however, is possible in the future if kit foxes colonize lands designated for the Campus and Community North. Implementation of Conservation Measures will minimize the incidence and effects of any take. Protection and management of Conservation Lands for conservation purposes also will assist in offsetting potential effects of take by providing high quality managed habitat for the kit fox.

The Proposed Project includes appropriate avoidance, minimization and compensation measures, in campus siting, design, construction, and operation, as well as the protection and conservation management of substantial areas of kit fox habitat.

Community South Effects

The Conservation Strategy analysis determined that only a limited area (61 acres) of the Community South was determined to be suitable residence (primary) habitat for the kit fox, while the entire site was suitable dispersal (secondary) habitat (Table 4a).

Total Effects of the Proposed Action

The UC Merced Campus and University Community will eliminate 1,354 acres of primary kit fox habitat and 1,962 acres of secondary habitat. This impact represents 0.7% of suitable residence habitat and 1.3% of dispersal habitat in eastern Merced County. Compensation habitat will substantially exceed the 3:1 minimum ratios identified in the 2002 BO for primary habitat (18:1) and all habitat (8:1; Table 4b). As described for the Campus and Community North, measures to avoid, minimize, and compensate for impacts during siting, planning and design, construction, and operation will reduce effects on kit foxes. Reconfiguration of the UC Merced Campus has further improved the quality of dispersal habitat for the kit fox east of the UC Merced Campus and University Community lands.

Comparison of Effects with the 2002 Proposed Project

Reconfiguration of the Campus and University Community reduced the amount of impacted kit fox primary habitat by 308 acres (19%; Table 7). The amount of lower value secondary habitat affected by the project increased by 103 acres (6%) as a result of efforts to avoid primary habitat.

The kit fox is the only species for which impacts occur to occupied habitat within the Community South, which is not part of the University's Proposed Project, but is a part of the broader Proposed Action. Therefore, the evaluation of project-wide changes in mitigation ratios between the 2002 and 2008 configuration incorporates impact in the Community South that were not previously addressed as part of impacts and mitigation evaluation of the Proposed Action. This comparison, therefore, is intended to show changes in conservation effects and should not be used to judge mitigation adequacy for the Proposed Project.

Comparison of 2002 and 2008 conditions under the Proposed Action shows that dedication of former Campus lands and the Campus Land Reserve to conservation management, combined with the reduction in acreage impacts, contributed to an increase in the Action-wide mitigation ratios for primary (residence) kit fox habitat from 3.4:1 to 4.5:1 for Tier 1a lands and from 14:1 to 18:1 for all conservation lands. For all kit fox habitat, including primary and secondary (dispersal) habitat, ratios increased from 1.6:1 to 1.9:1, while ratios incorporating all conservation lands increased from 7:1 to 8:1. Again, these ratios are intended only to show the relative effects of changes in the configuration of the Proposed Action, not as a basis for evaluating mitigation adequacy.

Reconfiguration of the Campus and University Community since issuance of the 2002 BO has increased the area available for kit fox movement to the east, thereby improving potential for kit fox residence and dispersal within these lands. In summary, in comparison to the 2002 Proposed Project, the present Proposed Action will reduce the potential for impact on kit fox habitat and increase Conservation Lands for the species.

Effects of Interrelated and Interdependent Actions

The University Community was addressed in the 2002 BO as a project that was interrelated and interdependent with the 2002 Proposed Project and Infrastructure Project. The Proposed Action has since been expanded to include development of the Community North and the Community South (see *Revised Description of the Proposed Action*).

Community South Development

The Community South is an interdependent and interrelated action. As an aspect of the interdependent and interrelated University Community evaluated in the 2002 BO, the Community South development therefore was previously addressed in the 2002 BO as an interdependent and interrelated action. This 2009 BO Amendment likewise evaluates impacts related to the Community South development as an interdependent and interrelated action.

The applicant for development of the Community South would be required to initiate further consultation with the Service if a Section 404 permit or Federal incidental take authorization is required for this development.

As specified in the 2008 BA Supplement, the effects of the interrelated and independent Community South development are expected to include take of the vernal pool fairy shrimp. With described avoidance and minimization measures, however, the small number of acres of habitat destroyed will not jeopardize the existence of the vernal pool fairy shrimp. No critical habitat will be affected.

Other Development

Several other projects also were incorporated into the 2002 BAs and 2002 BO as interrelated and interdependent actions, including off-site utility connections for the Campus, off-site road intersections, and potential construction of off-site water supply wells by MID. These actions will require separate review for compliance with the Act under section 7 or 10.

Because interrelated and interdependent projects have already been identified and analyzed in the 2002 BO and measures to mitigate their effects have been determined, the Service does not think they will contribute substantially to effects on species that are affected by the University's Proposed Project.

Cumulative Effects

Cumulative effects are defined under the Act as effects of non-federal actions that are reasonable certain to occur within a project's action area for consultation and that are not related to the project. The 2002 BO identified the following construction-related impacts that could occur cumulatively, presumably as a result of other projects and activities: direct loss of habitat, dust emissions, erosion, sedimentation, hazardous material spills, introduction of invasive non-native plant species, and injury or direct mortality of wildlife. Longer-term cumulative effect could include changes in hydrology and water quality and impacts from pesticide use, human disturbance, invasive species, and habitat fragmentation.

Habitat loss has been minimized to the extent feasible through the reconfiguration of the campus. Measures incorporated into the *Management Plan for Compensation Lands*, the Conservation Strategy, and EIS/EIR will reduce the potential impact associated with effects of the Proposed Project and Proposed Action on hydrology, water quality, erosion and sedimentation, pesticide use, invasive species, and human disturbance. The 2002 BO notes that preservation of high quality habitat under the Proposed Project will compensate for potential fragmentation of habitat resulting from project implementation. Effects of development of the Community South were addressed in the 2008 BA supplement, the Conservation Strategy, and the EIS/EIR. Consistent with Parameter 3 in the 2002 BO, Merced County will provide assurance that it will require discretionary projects under its jurisdiction within the BO Study Area to comply with the Federal Act.

As was noted in the 2002 BAs and 2002 BO, many of the species considered in this consultation are wetland species, and unrelated actions that will result in filling of their wetland habitats will

require a Section 404 permit and will be subject to consultation. As a result, such actions are not considered as cumulative impacts.

Recent changes to the definition of waters of the U.S. and treatment of isolated waters could allow some wetlands occupied by listed plants and animals to be filled without issuance of a 404 permit. Even without a 404 permit, actions that resulted in take of listed animals of wetland habitats (Conservancy and vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander) will require a Federal permit under section 10(a) of the Act. However, because nonfederal actions that result in effects on listed plants are not prohibited under the Act, projects that modified nonjurisdictional wetlands and other waters, without affecting animal species, could proceed, and such effects will be considered a cumulative impact.

Potential future actions that could result in cumulative impacts were identified in the 2002 Biological Opinion as construction of urban areas; water and flood control projects; highways, roads, and utilities; and conversion to agricultural uses. The Biological Opinion noted, however, that many of these projects would be subject to environmental review and permits that would trigger compliance with the Act. Agricultural conversion could occur unnoticed, however, and thus without Federal Endangered Species Act compliance. However, some of the lands that support vernal pool species are not suitable for agricultural use because their soils support hardpans that reform rapidly after conversion, and water, necessary for agriculture, is becoming less available.

Cumulative impacts would not occur on the substantial areas of Tier 1 and Tier 2 Conservation Lands, where incompatible uses are prohibited. These 26,639 acres were selected to maximize protection for important resources, thereby reducing potential for regional cumulative effects.

A substantial amount of habitat in eastern Merced County already has been converted to non-species-compatible uses as a result of past development and agricultural conversion. In addition, it is reasonable to expect that other future development in eastern Merced County could occur under the existing City General Plan, as well as under the General Plan Update that is underway. Although all projects would be required to reduce their individual impacts to a less-than-significant level as defined under the California Environmental Quality Act (CEQA), and mitigate for impacts to wetlands and listed threatened and endangered species, some reduction in habitat would still occur. Therefore, notwithstanding protection measures incorporated into the Proposed Project and Proposed Action, and into other land use regulatory projects, past, current, and future projects would have cumulative effects on federally listed species.

In summary, although potential exists for cumulative impacts on the species addressed in this Biological Opinion, existing land use protections, regulatory mechanisms, and physical limitations are available to limit these effects.

Recovery Needs

Vernal Pool Species

In 2005, the Service approved the *Vernal Pool Recovery Plan* (Service 2005), which covers all plant species and invertebrates addressed in the 2002 BAs and 2002 Biological Opinion.

Recovery Criteria.

The *Vernal Pool Recovery Plan* lists eastern Merced County as among the most valuable areas for protection of four species (succulent owls-clover, Colusa grass, vernal pool fairy shrimp, vernal pool tadpole shrimp) that have been documented on the Proposed Project's Conservation Lands, as well as for several other species that are not known to occur on these Conservation Lands but occur in vernal pool habitats elsewhere in the region (Hoover's spurge, hairy Orcutt grass, and Greene's tuctoria; Table 9). Although eastern Merced County was not identified as part of core recovery areas for the San Joaquin Valley Orcutt grass and Conservancy fairy shrimp, which both occur on Conservation Lands, the Service's recovery criteria call for protection of 100% of any newly discovered populations for both species. Reintroduction to formerly occupied or suitable sites is specified for all Merced County species except the vernal pool fairy shrimp (Table 9).

General recovery criteria are summarized below.

1. **Habitat Protection**. Accomplish habitat protection that promotes vernal pool ecosystem function sufficient to contribute to population viability of the covered species. This protection includes protecting suitable vernal pool habitat (including supporting hydrology) within each prioritized regional core area and throughout the species' range, reintroducing and introducing the species in areas where needed, and conducting surveys to locate new species occurrences.

2. **Adaptive Habitat Management and Monitoring**. Develop adaptive habitat management plans for protected habitats, including provision for appropriate grazing, fire management, management of invasive non-native species, and incorporating new information. Ensure provisions for management in perpetuity and for long-term monitoring. Establish seed banks where needed for reintroduction efforts.

3. **Status Surveys**. Conduct status surveys and reviews that show that populations are viable.

4. **Conduct Research to Support Recovery**. Research actions have been identified and incorporated into the recovery plan. A process for identifying other priority research has been included.

Contributions of the UC Merced Project to Species Recovery.

The UC Merced's program of Campus and Community siting, design, construction, operation, and compensation thought the Conservation Lands program provides substantial support to the vernal pool species recovery program. The campus location, design, construction, and operation all have been developed to minimize impacts to listed species, directly affecting occupied habitat of the succulent owl's-clover, vernal pool fairy shrimp, and vernal pool tadpole shrimp. Protection of over 26,000 acres of high quality vernal pool grasslands protects populations of 6 listed recovery plan species (succulent owls-clover, Colusa grass, San Joaquin Valley Orcutt grass, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp) and one species of concern included in the *Vernal Pool Recovery Plan* (midvalley fairy shrimp), thereby contributing to Recovery Plan criteria 1.

The *Management Plan for Conservation Lands* applies permanent protection and adaptive management to nearly 6,428 acres of UC-owned and managed vernal pool grasslands (Tier 1a lands), while over 20,100 additional acres are protected through conservation ownership or easements to protect habitat values (Tier 1b and Tier 2 lands). . Management actions for UC Merced's Conservation Lands include management of livestock grazing, fire, invasive species, and human uses to ensure protection of habitat values in perpetuity. The plan thereby contributes to criterion 2.

The management of all Conservation Lands requires monitoring of management compliance and effectiveness and of habitat quality, thereby supporting criterion 3.

The management plan encourages research on UCM Conservation Lands. A portion of these lands are likely to be incorporated into the University's Natural Reserve System, which encourages research and conservation. Therefore, these lands and the associated management program will support conservation and recovery efforts, thereby contributing to criterion 4.

San Joaquin kit fox

The Service's *Recovery Plan for Upland Species of the San Joaquin Valley* (Service 1998) identifies general recovery criteria for the kit fox as:

- maintaining 3 core populations and more than 3 satellite populations for the species, with approved management plans
- achieving stable or increasing populations in core and satellite populations, and
- achieving genetic interchange between one or more core populations and at least 3 satellite populations.

For the north valley floor subregion, which includes Merced and Madera Counties, the plan also identifies the "site-specific protection requirement to meet delisting criteria" of protecting 80% of existing potential habitat.

The UC Merced project contributes to the kit fox recovery goals by protecting over 24,000 acres (13%) of the 180,000 acres of the potential primary habitat for the species (i.e., suitable for residence) in eastern Merced County. These lands also have either a management plan and/or conservation easements in place to ensure compatible management for kit fox use (Airola 2008b). The lands do not appear to currently support a kit fox population, but occasional sightings in the area by trained biologists give rise to the possibility that protection and conservation management of these lands makes it more likely that a kit fox population could become re-established in the future.

Conclusion

The Service has determined that the Proposed Project is in compliance with the Parameters laid out in the 2002 BO, and it is our biological opinion that the Proposed Project is not likely to jeopardize the continued existence of succulent owl's-clover, Colusa grass, San Joaquin Valley Orcutt grass, vernal pool fairy shrimp, Conservancy fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, Valley elderberry longhorn beetle and San Joaquin kit fox, or result in the destruction or adverse modification of critical habitat for the California tiger salamander. We base this conclusion on the entire package of commitments and actions proposed and already taken as described in the project description; our review of the current status of each species; and the effects of the project on each species.

Additionally, for the California tiger salamander we have made the determination that the Proposed Project will not result in adverse modification to Critical Habitat. We have not relied on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.2. Instead, we have relied upon the statutory provisions of the Act to complete our analysis with respect to critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of the Act, which refer to terms and conditions and exemptions on taking listed fish and wildlife species, do not apply to listed plan species. However, section 9(a)(2) of the Act prohibits removal, reduction to possession, and malicious damage or destruction of listed plant species on Federal lands and the removal, cutting, digging up, or damaging or destroying such species in knowing violation of any State law or regulation, including State criminal trespass law. Actions funded, authorized, or implemented by a Federal agency that could incidentally result in the damage or destruction of such species on Federal lands are not a violation of the Act, provided the Service determines in a biological opinion that the actions are not likely to jeopardize the continued existence of the species.

Amount or Extent of Take Anticipated

Despite substantial avoidance and minimization measures, incidental take of the following listed species is considered likely to occur: vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander, and San Joaquin kit fox. The extent of take cannot be precisely determined, in terms of numbers of individuals. Therefore, the number of acres of occupied habitat and number of known point locations of species is the best indication of the relative magnitude of take for these species.

Vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamanders. An unknown number of adult, juvenile and cysts of vernal pool fairy shrimp are found on 61 acres within the Proposed Project construction footprint. An unknown number of adult, juvenile and cysts of vernal pool tadpole shrimp are found on 4 acres within the Proposed Project construction footprint. California tiger salamander adults, juveniles, and eggs, are estimated to occur on 1,884 acres within the Proposed Project construction footprint. In addition there are more than 26,639 lands to be managed for conservation that are a part of this project, as detailed in the Project Description. Conservation activities on these lands, including an unknown acreage of vernal pool restoration, may result in all forms of incidental take of an unknown number of vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander, and this incidental take will be exempt from the prohibitions described under section 9 of the Act.

Valley elderberry longhorn beetle. Take of VELB could occur in the future, as elderberry bushes and VELB could be introduced to future Campus, University Community and Conservation lands; no take of VELB is authorized by this Biological Opinion.

San Joaquin kit fox. The Service expects that incidental take of San Joaquin kit foxes will be difficult to detect or quantify for the following reasons: their relatively small body size make the finding of a dead specimen unlikely, losses may be masked by seasonal fluctuations in numbers, or other causes, and the species occur in dens and burrows. Due to the difficulty in quantifying the number of San Joaquin kit foxes that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of habitat that will become unsuitable for the species as a result of the action.

Therefore the Service estimates permanent loss of 3,316 acres of kit fox habitat. Upon implementation of all the commitments in the Project Description of this Biological Opinion, incidental take associated with the Proposed Project for these acres in the form of harm or harassment to San Joaquin kit foxes from habitat loss, capture, relocation, excavation of dens and burrows, and loss of forage/prey will become exempt from the prohibitions described under section 9 of the Act for direct impacts. Harassment from management of more than 26,639 acres of conserved lands will also be exempt from the prohibitions described under section 9 of the Act.

No take of plants can be authorized under the Act.

Effect of the Take

The Service has determined that the level of anticipated take for the Proposed Action would not result in jeopardy to any listed species or the adverse modification of designated or proposed critical habitat.

Reasonable and Prudent Measure

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the impacts of incidental take of vernal pool fairy shrimp, vernal pool tadpole shrimp, VELB, and California tiger salamander. No additional measures are required.

Fully implement management and monitoring programs identified in this 2009 BO Amendment, Conservation Strategy, Management Plan for Conservation Lands, Compensatory Wetland Mitigation and Monitoring Plan, and EIS/EIR.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are mandatory.

(1) As provided within the parameters of the project description, the university will consult with the Service regarding the selection of sites for wetland mitigation. The Service will additionally review and approve of all plans for, restoration, conservation and management purposes on the preservation lands.

(2) The University will fully implement management and monitoring actions identified in the 2009 BO Amendment, Conservation Strategy, Management Plan for Conservation Lands, Compensatory Wetland Mitigation and Monitoring Plan, and EIS/EIR. These actions include commitments regarding siting, project design, construction, and operation of the Campus and Community North projects, as well as protection and management of Conservation Lands to serve as compensation for project effects.

(3) The University will report annually on compliance with the requirements of regulatory documents and management plans as specified above.

The reasonable and prudent measure, with its' implementing terms and conditions, is designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that the action will result in mortality of individuals of vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander, but that the affected individuals represent only small proportions of the regional populations of each species (as quantified by the amounts of known occupied habitat described in Table 8).

If, during the course of this action, the levels of incidental take described herein are exceeded, such incidental take represents new information that would require the reinitiation of consultation and review of the reasonable and prudent measures provided above. The Corps must immediately provide an explanation of the causes of the taking, and review with the Service the need for possible modification of the reasonable and prudent measure.

Reporting Requirements

The following reporting requirements will assist the Service in tracking the success or failure of the Conservation Measures proposed by the University. The activity, type of reporting requirement, reporting format, and timing of reporting are listed in the project EIS/EIR Mitigation Monitoring Plan (Impact Sciences 2008).

The University must provide the Service with annual reports to describe the progress of implementation of all the commitments in the Conservation Measures of this biological opinion. The first report is due January 31, 2010, and annually thereafter, until performance criteria are met.

The Sacramento Fish and Wildlife Office is required to be notified within three working days of the finding of any dead listed wildlife species or any unanticipated harm to the species addressed in this biological opinion. The Service contact person for this is the Chief, Endangered Species Division at (916) 414-6600. The Sacramento Fish and Wildlife Service Office must be notified immediately if any dead or sick listed species is found in or adjacent to pesticide-treated areas. Cause of death or illness, if known, also should be conveyed to this office.

The Corps must require the Applicants to report to the Service immediately any information about take or suspected take of listed wildlife species not authorized in this opinion. The Corps must notify the Service within 24 hours of receiving such information. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal. The Service contact is the Service's Law Enforcement Division at (916) 414-6660.

Any contractor or employee who during routine operations and maintenance activities inadvertently kills or injures a listed wildlife species must immediately report the incident to their representative. This representative must contact the California Department of Fish and Game immediately in the case of a dead or injured animal. The California Department of Fish and Game contact for immediate assistance is State Dispatch at (916) 445-0045.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by conducting conservation programs for the benefit of endangered and threatened species. Towards this end, conservation recommendations are discretionary activities that an action agency may undertake to minimize or avoid the adverse effects of a proposed action, help implement recovery plans, or develop information useful for the conservation of listed species.

The Service recommended that the Corps and the University implement the conservation recommendations listed in the 2002 BO to achieve Federal conservation requirements of the Act. These recommendations are included in this 2009 BO Amendment, and the University's comments on these recommendations are set forth below.

1) The University and the County should assist the Service in recovery actions identified in the Valley Elderberry Longhorn Beetle Recovery Plan, Recovery Plan for Upland Species of the San Joaquin Valley, the Pacific Bald Eagle Recovery Plan, and The Recovery Plan for Vernal Pool Species (in preparation).

The bald eagle was delisted in 2007 and the Service has proposed to delist the Valley elderberry longhorn beetle. The 2002 BO and the 2009 BO Amendment determined that the University's Proposed Project would have little or no impact on these species.

Implementation of the Conservation Strategy, *Management Plan for Conservation Lands*, Compensatory Wetland Mitigation Plan, as well as adherence to the commitments of the BA Supplement, RMP, 2002 BO, 2009 BO Amendment, section 404 permit, and EIR/EIS mitigation measures will contribute to meeting the recovery criteria specified in the recovery plans for upland San Joaquin Valley species and vernal pool species. Specifically, meeting the commitments within these regulatory documents will minimize the impacts of the Campus and Community North by minimizing the size of the footprint and locating these project components on lands with lower values for these species than on preserved lands. It also will minimize disturbance from campus construction and operation.

The University's Proposed Project also will protect an estimated total of more than 27,700 acres of mitigation lands supporting high quality vernal pool-grassland habitat, including nearly 9,498 acres in the Tier 1 mitigation areas, 17,141 acres in the Tier 2 mitigation areas, and an additional currently unquantified area within wetland restoration and creation mitigation sites. This level of land compensation exceeds the amounts required under the 2002 BO, and thereby contributes to

species recovery. Tier 1 and wetland restoration and creation sites will be actively managed to conserve listed species, while conservation easements on Tier 2 lands restrict potentially detrimental land uses.

2) Conduct scientific studies on the California tiger salamander and midvalley fairy shrimp to support conservation activities.

The Service declined to list the midvalley fairy shrimp in 2004, because it concluded that the threats to the species were limited and were largely being addressed by existing regulatory mechanisms (see previous section, *Changes in Consultation Requirements*). Surveys for the species and the analysis and conservation measures included in the Conservation Strategy contributed useful information for this determination. Midvalley fairy shrimp habitat will be monitored incidentally on Tier 1 mitigation lands as well as within compensatory wetland restoration and creation areas.

The UC will conduct monitoring of tiger salamander populations and its competitors as specified in the *Management Plan for Conservation Lands*.

Scientific research will be permitted within Tier 1 lands owned by the UC (the VST Preserve and CNR) subject to conditions described in the *Management Plan for Conservation Lands*. Research on the genetics of the California tiger salamander has been conducted on UC Conservation Lands since the 2002 Biological Assessment (Fitzpatrick and Shaffer 2007).

3) Evaluate species of concern, particularly the midvalley fairy shrimp and the California tiger salamander and their associated habitats to assess possible adverse effects of the UC Merced campus and community and implement Conservation Measures that could protect these species.

UC has assessed the effects of the Campus and Community North, as well as the entire Proposed Action, on both species in the Conservation Strategy and the 2008 BA Supplement. Conservation measures adopted to protect other vernal pool species will provide protection for the midvalley fairy shrimp and tiger salamander. As documented in the BA Supplement and this 2009 BO Amendment (see *Effects of the Proposed Action*), the efforts to reduce the size of the Campus and Community footprint reduced impacts to habitat for both species and increased the amount of conserved habitat. The *Management Plan for Conservation Lands* also identifies a variety of specific measures to protect and enhance California tiger salamander breeding habitat.

4) Implement actions to conserve the California tiger salamander and midvalley fairy shrimp in eastern Merced County.

See response to Conservation Recommendations 1 and 3 above. Measures implemented to conserve other vernal pool and grassland species (described in the *Management Plan for Conservation Lands*) and to restore vernal pool habitats (described in the Compensatory Wetland

Mitigation and Monitoring Plan) will also conserve these species, as documented in the 2008 BA Supplement and the Conservation Strategy.

5) Provide outreach to the public and to schools on protecting listed species, establishing safe harbors, forming partnerships that foster conservation and habitat conservation planning.

The *Management Plan for Conservation Lands* identifies policy and guidelines for encouraging education of the students, faculty, and staff at the Campus and residents of the Community North regarding conservation resources. These measures are currently being implemented. Conservation lands under UC ownership will be available for educational uses, under the plan's guidance. UC has established extensive partnerships with TNC regarding management of lands and easements for conservation lands.

6) The University of California should review current management on lands it holds conservation easement for, to determine compatibility with wildlife use, and adjust if appropriate and feasible.

Management of Tier 1 and 2 lands has been specified in the *Management Plan for Conservation Lands*. This plan specifies detailed management commitments for Tier 1a lands and summarizes Tier 1b and Tier 2 management and monitoring authorities. The management priority for Tier 1a lands, for which the University holds title and will conduct management, are to protect and enhance biological resource values. The plan substantially alters management of these lands by monitoring and controlling invasive species and establishing other protection and enhancement measures.

7) The University should coordinate with the Service, CDFG, the County and private landowners to continue to participate in the development of an NCCP/HCP consistent with the Planning Agreement.

Through extensive cooperation with the Service, DFG, Corps, USEPA, County, private landowners, and regional and local conservation interests, the UC Merced planning and permitting process has contributed to the conservation of listed species and other conservation resources in eastern Merced County. Although the NCCP/HCP planning process has been inactive for several years, UC has agreed to cooperate in future planning efforts should they be reinitiated.

REINITIATION – CLOSING STATEMENT

This concludes formal consultation on the action(s) outlined in the Description of the Proposed Action. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new

information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your continuing efforts to conserve listed species. Please contact Susan Jones, San Joaquin Valley Branch Chief, or Cay Goude, Assistant Field Supervisor of this office at (916) 414-6600, if you have any questions.

Sincerely,

Cay C. Moore

Susan K. Moore
Field Supervisor

Enclosures

Enclosure A. Parameters from the 2002 Biological Opinion (pages 9-11).

Table 1. Recent Consultation Meetings on Endangered Species Issues Related to the University of California Merced's Proposed Project
Table 2. Conservation Lands Units and Sizes
Table 3. Summary of the Status of Compliance with the Parameters Included in the 2002 Biological Opinion for The University of California Merced Campus and Infrastructure Project
Table 4a. Habitat Impacts, Conserved Lands, and Mitigation Ratios Achieved for Federally Listed and Other Key Species for the UC Merced Campus and University Community
Table 4b. Numbers of Known Species Point Locations within Project Lands and Conserved Lands, and Mitigation Ratios Determined from Numbers of Occurrences
Table 5. Summary of Management and Monitoring Requirements for UC-owned Lands Included in the 2002 BO and the Status of Compliance
Table 6. Suitable Habitats and Distances from Known Occurrences Used in Defining Occupied Habitat for Listed Species
Table 7. Comparison of Impacts, Conserved Lands, and Mitigation Ratios Achieved in the 2002 Proposed Action for Construction of the UC Merced Campus and University Community (North and South)

Table 8. Summary of Impacts on Habitat and Known Point Locations for Species Likely to be Subject to Take from the Campus and Community North (University's Proposed Project) and Campus and University Community (Proposed Action)
Table 9. Summary of species-specific recovery criteria for federally listed vernal pool species within Merced County areas

Figure 1. UC Merced Study Area and Project Components Addressed in the 2002 Biological Opinion
Figure 2. UC Merced Campus and University Community Project Lands
Figure 3. Conservation Lands for the UC Merced Project
Figure 4. Land Use Districts for the UC Merced Campus and Community North Areas
Figure 5. Alternative Locations under Consideration by UC for Placement of a Crossing over the LeGrande Canal to Enhance Kit Fox Movements

cc.
University of California at Merced, Merced, California (attention Brad Samuelson)
California Department of Fish and Game, Fresno, California (attention Julie Vance)
Airola Environmental Consulting, Sacramento, California (attention Dan Airola)
Gibson and Skordal, Sacramento, California, (attention Tom Skordal)
Clark Morrison, San Francisco, California

LITERATURE CITED

Airola, D. A. 2007. Bald eagle nesting in relation to human disturbance sources in the Lake Almanor region, California. *Transactions of the Western Section of the Wildlife Society* 43:19–26.

———. 2008a. *Supplement to the Biological Assessment for the University of California, Merced campus and the University Community North.* (September 2008). Prepared for University of California, Merced.

———. 2008b. *Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced.* (September 2008). Prepared for University of California, Merced.

Anderson, J. D. 1968. Comparison of the food habits of *Ambystoma macrodactylum sigillatum*, *Ambystoma macrodactylum croceum*, and *Ambystoma tigrinum californiense*. Herpetologica 24(4): 273-284.

Anderson, P. R. 1968. The reproductive and developmental history of the California tiger salamander. Masters thesis, Department of Biology, Fresno State College, Fresno, California. 82 pages.

Barry, S. J. and H. B. Shaffer. 1994. The status of the California tiger salamander (*Ambystoma californiense*) at Lagunita: A 50-year update. Journal of Herpetology 28(2): 159-164.

EIP Associates. 2002. Biological Assessment CWA Section 404 permit applications for UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project. (February). Prepared for University of California, Merced, and County of Merced Public Works Department, CA.

Feaver, P. E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, *Hyla regilla* Baird and Girard and *Scaphiopus hammondi hammondi* Girard. Master's thesis, Department of Biology, Fresno State College, Fresno California. 58 pages.

Fitzpatrick, B. M. an H. B. Shaffer. 2004. Environmental-dependent admixture dynamics in a tiger salamander hybrid zone. Evolution 58(6): 1282-1293.

Gibson and Skordal. 2008. Compensatory wetland mitigation and monitoring plan (Revised June 2008). Prepared for University of California, Merced.

ICF Jones & Stokes. 2008. *Proposed Conservation Strategy for the UC Merced Project.* (September 2008). Prepared for University of California, Merced.

Impact Sciences. 2008. UC Merced and University Community Project, Draft Environmental Impact Satement/Environmental Impact Report. November. Prepared for the U.S. Army Corps of Engineers, Sacramento District.

Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. Report prepared for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, 255 pages.

Jones & Stokes 2002a. *Supplement to the Biological Assessment for the UC Merced Campus Project.* (J&S 01549.) Sacramento, CA. Prepared for the University of California, Merced, and the County of Merced Department of Public Works.

———. 2002b. *Resource Mitigation Plan for Federally Listed Species That May Be Affected by the Establishment of the University of California, Merced.* February 8. Prepared for University of California, Merced.

———. 2002c. *Construction Mitigation Plan for Biological Resources for Phase 1 of the University of California, Merced Project.* Prepared for University of California, Merced.

Loredo, I., and D. Van Vuren. 1996. Reproductive ecology of a population of the California tiger salamander. Copeia 1996(4):895-901.

Loredo, I., D. Van Vuren and M. L. Morrison. 1996. Habitat use and migration behavior of the California tiger salamander. Journal of Herpetology 30(2): 282-285.

Morey, S. R. 1998. Pool duration influences age and body mass at metamorphosis in the western spadefoot toad: implications for vernal pool conservation. Pages 86-91 *in* Witham, C.W., E.T. Bauder, D. Belk, W.R. Ferren Jr., and R. Ornduff (editors). Ecology, Conservation, and Management of Vernal Pool Ecosystems - Proceedings from a 1996 Conference. California Native Plant Society. Sacramento, California. 1998.

Pechmann, J. H. K., D. E. Scott, J. W. Gibbons, and R. D. Semlitsch. 1989. Influence of wetland hydroperiod on diversity and abundance of metamorphosing juvenile amphibians. Wetlands Ecology and Management 1(1):3-11.

Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington, D.C.

Riley, S. P. D., H. B. Shaffer, S. R. Voss, and B. M. Fitzpatrick. 2003. Hybridization between a rare, native tiger salamander (*Ambystoma californiense*) and its introduced congener. Biological Applications 13(5): 1263-1275.

Scott-Graham, E. 1994. A proposal for incentive-driven habitat creation and enhancement on farmlands in the San Joaquin Valley under the Federal Endangered Species Act. American Farmland Trust. Visalia, California. 34 pp.

Semlitsch, R. D., D. E. Scott, and J. H. K. Pechmann. 1988. Time and size at metamorphosis related to adult fitness in *Ambystoma talpoideum*. Ecology 69: 184-192.

Semonsen, V. J. 1998. Natural history notes: *Ambystoma californiense* (California Tiger Salamander). Survey technique. Herpteological Review 29:96.

Shaffer, H. B., R. N. Fisher, and S. E. Stanley. 1993. Status report: the California tiger salamander (*Ambystoma californiense*). Final report for the California Department of Fish and Game. 36 pages plus figures and tables.

Shaffer, H. B., G. B. Pauly, J. C. Oliver, and P. C. Trenham. 2004. The molecular phylogenitics of endangerment: cryptic variation and historic phylogeography of the California tiger salamander, *Ambystoma californiense*. Molecular Ecology 13: 3033-3049.

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Houghton Mifflin Company, Boston, Massachusetts.

Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology, 27:1-1-342.

Sweet, S. 1998. Letter to Dwight Harvey, U.S. Fish and Wildlife Service with a report titled "Vineyard development posing an imminent threat to *Ambystoma californiense* in Santa Barbara County, California." University of California, Santa Barbara, California.

Trenham, P. C. 1998a. Radio Tracking Information, unpublished manuscript. 6 pp.

_____ 1998b. Demography, migration, and metapopulation structure of pond breeding salamanders. Ph.D. dissertation. University of California, Davis, California 96 pp.

_____ 2001. Terrestrial habitat use by adult California tiger salamanders. Journal of Herpetology 35: 343–346.

Trenham, P. C., W. D. Koenig, and H. B. Shaffer. 2001. Spatially autocorrelated demography and interpond dispersal in the salamander *Ambystoma californiense*. Ecology 82: 3519-3530.

Trenham, P. C., H. B. Shaffer, W. D. Koenig and M. R. Stromberg. 2000. Life History and Demographic variation in the California Tiger Salamander *Ambystoma californiense*. Copeia 2000(2): 365-377.

Trenham, P. C., and H. B. Shaffer. 2005. Amphibian upland habitat use and its consequences for population viability. Ecological Applications 15:1158–1168.

Twitty, V. C. 1941. Data on the life history of *Ambystoma tigrinum californiense* Gray. Copeia 1941 (1):1-4.

University of California, Merced (UC Merced). 2002. *Long Range Development Plan Final Environmental Impact Report.* (SCH No. 2001021065). January.

University of California Regents (University of California). 2008. *University of California at Merced Revised D. A. Permit Application Supplement to Eng Form 4345.* Submitted to U.S. Department of Army, Corps of Engineers, Sacramento District, Sacramento, California.

———. No date. *Integrated Pest Management Program Manual.* Merced, California.

U. S. Fish and Wildlife Service. 1998. *Recovery Plan for Upland Species of the San Joaquin Valley, California.* Authors: D. F. Williams, E. A. Cypher, P. A. Kelly, K. J. Miller, N. Norvell, S. E. Phillips, C. D. Johnson, and G. W. Colliver. For U.S. Fish and Wildlife Service Region 1, Portland, Oregon.

———. 2002. *Final Biological Opinion on the proposed University of California, Merced Campus, Phase 1 and Campus Buildout.* August 19. (1-1-02-F-0107.) Sacramento, California.

_____.2004. Endangered and threatened wildlife and plants; determination of threatened status for the California tiger salamander; and special rule exemption for existing routine ranching activities; final rule. **Federal Register** 69: 47212-47248.

———. 2005. *Recovery Plan for Vernal Pool Ecosystems of Southern Oregon and California.* December 15. Region 1. Portland, Oregon.

———. 2006. *Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus) 5-Year Review and Evaluation.* September. Sacramento, California: Sacramento Fish and Wildlife Office, Sacramento, California.

Vollmar, J. E. (ed.). 2002. Wildlife and rare plant ecology of eastern Merced County's vernal pool grasslands. Vollmar Consulting, Berkeley, California.

Wilbur, H. M. and J. P. Collins. 1973. Ecological aspects of amphibian metamorphosis. Science (n.s.), 182(4119): 1305-1314.

PERSONAL COMMUNICATIONS

Vollmar, J. E. Plant Ecologist. Vollmar Consulting. Conversation with Brad Samuelson. May 2008.

course access road, which will be used for construction access to the Phase 1 site, and they are located outside of the footprint of the construction area. Thus, because all Phase 1 construction will occur within the Phase 1 boundary and outside of the watersheds of existing vernal pools, swales, and other wetland resources, Phase 1 will not impact downgradient or upgradient wetlands.

Although Section 404 authorizations are not required for Phase 1, these development activities are an integral part of the Main Campus. Accordingly, this analysis addresses the potential effects of the development of Phase 1.

The Parameters

As described above, the University and the County have agreed that the Parameters will apply to any Preferred Alternative that may be selected by the Corps within the Study Area. These Parameters are not, however, intended to control the Corps' analysis under the laws and regulations applicable to the Corps. Where applicable, these Parameters apply both to the development projects specifically proposed by the University, the County, and to other development occurring within the Study Area. In addition to the Parameters, the University and the County have proposed a number of additional "Conservation Measures" which, in many cases, will serve to implement the Parameters described and are considered part of the Proposed Actions.
The Parameters are as follows:

1. Development of Conservation Strategy

   a. The Applicants will prepare and implement, in coordination with the Service and CDFG, a comprehensive strategy that incorporates the Conservation Measures for the San Joaquin kit fox, vernal pool plant species and branchiopods, and other protected species to guide the development and implementation of specific conservation for the Proposed Actions and as needed to assure that other development within the Study Area is consistent with the Conservation Strategy as described in parameter 1b, below.

   b. The Conservation Strategy will include monitoring and adaptive management measures and be consistent with and intended to implement the Recovery Plan for Upland Species of the San Joaquin Valley, California, and any future federal recovery planning efforts.

2. Parameters for Covered Projects

   a. All conservation actions described below will be developed and implemented by the appropriate party, including the CDFG where

appropriate. These conservation actions include, among other things, completion by the Applicants of the Conservation Strategy; completion of a review by the Service of all preserve lands which have been acquired (i.e., in fee or easement) to date to determine the applicability for conservation for protected species; advance Service review and approval of further fee or easement acquisitions; and completion of a Resource Mitigation Plan (to be prepared for the Main Campus as described below) and Habitat Mitigation Plan (to be prepared for the Infrastructure Project as described below) consistent with the parameters set forth herein. The Resource Mitigation Plan and Habitat Mitigation Plan will include, among other things and in addition to the measures set forth in the BA supplement, management strategies and financial assurances for the monitoring and management of preserve lands and a strategy for addressing indirect effects. All the above, including the terms and conditions of conservation easements and management plans, and the adequacy of funding assurances, will be subject to review and approval by the Corps and the Service.

b. The Applicants will develop, in coordination with the Service, Corps, and CDFG, a plan to address potential effects to the San Joaquin kit fox, which will be consistent with the Conservation Strategy and may be included in the Resource Mitigation Program and/or Habitat Mitigation Plan. This plan, at a minimum, will address a migration corridor to the north and northeast of the Proposed Actions (as presently proposed by the Applicants) to be protected and maintained through acquisitions and other possible actions (e.g., passage over canals). Any such acquisitions will be consistent with the establishment of a connection to the Sandy Mush Road area.

c. The extent and nature of proposed conservation, and any proposed ratios, for grassland and vernal pool species will be at least equivalent to those set forth in the BA and will be approved by the Service and the Corps together with any avoidance and minimization measures.

d. Management plans and adequate financial assurances for long-term monitoring and management of identified preserve lands will be provided to and approved by the Service and the Corps.

e. No direct impact to Conservancy fairy shrimp, including its watershed, will occur. Indirect effects to the Conservancy fairy shrimp will be minimized and avoided to the maximum extent practicable. Any unavoidable indirect effects to occupied Conservancy fairy shrimp habitat will be compensated through the preservation of habitat within areas

approved by the Service and the Corps as set forth more specifically below and found in the BA supplement.

f. For San Joaquin Valley Orcutt grass, Colusa grass, fleshy owl's-clover, hairy Orcutt grass, Hoover's spurge, Greene's tuctoria, and Hartweg's golden sunburst, the University will, to the maximum extent practicable, avoid and minimize effects on these federally listed plant species through siting, design, and conservation measures. Any occupied habitat of these seven listed species will be preserved within areas approved by the Service as set forth more specifically below in the Conservation Measures. For effects to vernal pools and associated habitats, as well as any other wetlands, the Applicants will develop and implement a restoration/creation plan focusing on areas where the vernal pool signature or suitable extirpated habitat is still present or other suitable areas. This plan will include appropriate monitoring and adaptive management measures, together with adequate financial assurances, to be reviewed and approved by the Service and the Corps.

3. Parameters Regarding Development and Other Discretionary Projects in the Study Area

a. Merced County will provide written assurance to the Service and the Corps that for all discretionary projects permitted by the County within the Study Area, other than the Proposed Actions, that may result in take of a listed species, Merced County will require compliance with the Endangered Species Act. This provision will include projects served by state or federally-funded roadways or other infrastructure that may be developed to serve the Campus or the Campus Community.

b To ensure no effect on Merced River and delta species (which are not subject to this consultation), withdrawals from the Merced River resulting from the Covered Projects (i.e., for recharge purposes) will be within the parameters of the existing OCAP biological opinion and formal consultation. The Applicants will also provide evidence that groundwater pumping and stormwater discharges will not affect listed species.

Conservation Measures

This section describes conservation measures that the University and the County have agreed to apply in order to avoid, minimize, and compensate for potential effects that the Proposed Actions could have on listed species. Conservation measures for the Proposed Actions are presented first; these are followed by specific conservation measures for the Phase 1 Campus project.

Table 1. Recent Consultation Meetings on Endangered Species Issues Related to the University of California Merced's Proposed Project

Date	Attendee Groups*	Major Subjects Covered
6/20/06	UC, USFWS, DFG, NGOs	BO requirements, project mitigation
9/27/06	UC, USFWS, NGOs	Conservation Strategy, habitat mitigation lands
12/12/06	UC, USFWS, DFG, USEPA, NGOs	Conservation Strategy, Draft EIS, and 404 permit status,
1/3/07	UC, USFWS, DFG, NGOs	Conservation Strategy, Draft EIS, Management Plan
5/17/07	UC, USFWS, DFG, NGOs	Campus planning, Conservation Strategy, Management Plan, Draft EIS, and 404 permit process.
6/1/07	UC, USFWS, USEPA, NGOs, Merced County	404 Permit Application
6/13/07	UC, USFWS, USEPA, NGOs, Merced County	Campus planning requirements
7/2/07	UC, USFWS, USACOE, USEPA	Campus Footprint
8/30/07	UC, USFWS, DFG, NGOs	Regulatory process, Management Plan
10/25/07	UC, USFWS, DFG, NGOs	Proposed cooperative agreement, project schedule
1/8/08	UC, USFWS, DFG, NGOs	NEPA process, schedule, Management Plan, Conservation Strategy
3/4/08	UC, USFWS	ESA consultation schedule, BA outline, Conservation Strategy, mitigation lands
3/4/08	UC, USFWS, DFG, NGOs	Campus and community planning, compliance schedule

Notes:

Numerous additional meetings were held during 2003 through mid-2006 involving the Conservation Strategy and Compensatory Wetlands Mitigation and Monitoring Plan.

*Key to attendees:

UC	=	University of California administration, staff, attorneys and/or consultants
USFWS	=	U. S. Fish and Wildlife Service staff
DFG	=	California Department of Fish and Game
USACOE	=	U. S. Army Corps of Engineers and consultants
USEPA	=	U. S. Environmental Protection Agency
NGOs	=	Nongovernmental organizations (The Nature Conservancy, California Native Plant Society, Vernal Pools.org, San Joaquin Raptor-Wildlife Rescue Center, Defenders of Wildlife, San Joaquin Valley Conservancy, Protect Our Water, Butte Environmental Council)

Table 2. Conservation Lands Units and Sizes

Major Land Category	Land Unit	Size (Acres)	Owner	Easement Holder
Tier 1a				
	Virginia Smith Trust (VST) Preserve	5,030	UC	The Nature Conservancy (TNC)
	Campus Natural Reserve (CNR)	1,307	UC	Not yet conveyed
	Myers Easterly	91	UCLC	TNC
Tier 1b				
	Cyril Smith Trust	3,070	TNC	Not yet conveyed
Tier 1 Subtotal		*9,498*		
Tier 2				
	Carlson	305	Private	California Rangeland Trust (CRT)
	Chance	7,619	Private	TNC
	Cunningham	1,761	Private	CRT
	Nelson	3,861	Private	CRT
	Robinson	3,595	Private	TNC
Tier 2 Subtotal		*17,141*		
Total: All Conservation Lands		**26,639**		

Table 3. Summary of the Status of Compliance with the Parameters Included in the 2002 Biological Opinion for The University of California Merced Campus and Infrastructure Project (see *Status of Conservation Measures,* for more details)

Parameter	Subparameter Requirements for Applicants	Status of Compliance
1. Development of Conservation Strategy	a. Prepare and implement a comprehensive strategy that incorporates Conservation Measures for San Joaquin kit fox, vernal pool plants and branchiopods, and other protected species to guide development and implementation of specific conservation for the proposed actions	These requirements have been met through commitments outlined in the Conservation Strategy, Conservation Lands Management Plan, Compensatory Wetland Mitigation Plan, and 2008 BA Supplement, and forthcoming EIR/EIS.
	b. Include monitoring and adaptive management measures consistent with and implementing species recovery plans	Monitoring and adaptive management measures are incorporated in to management of UCM Conservation Lands, other Conservation Lands, and compensatory wetland mitigation planning, as outlined in the Conservation Strategy, Conservation Lands Management Plan, Compensatory Wetland Mitigation Plan, and 2008 BA Supplement
2. Parameters for Covered Projects	a. (1) USFWS to review all preserve lands that have been acquired to date to determine the applicability for conservation of protected species	This review has been accomplished through the Service's review of the 2002 BAs, as addressed in the 2002 BO, and subsequently through reviews of several drafts of the Conservation Strategy and Compensatory Wetland Mitigation Plan, and numerous discussions regarding the configurations of the Campus and University Community (see Table 1-1). This parameter will be further addressed in the Service's forthcoming review of the final Conservation Strategy, 2008 BA Supplement, Conservation Lands Management Plan, and Compensatory Wetland Mitigation Plan, and 2008 BA Supplement
	a. (2) USFWS to review and approval of future fee or easement acquisitions	No additional acquisitions have been made since the 2002 BO. Lands formerly proposed as a part of the Campus and designated as the Campus Land Reserve have been incorporated into the CNR at the urging for the Service.
	a. (3) Prepare a Resource Mitigation Plan (for Main Campus)	Preparation of the Conservation Lands Management Plan has met this requirement.
	a. (4) Prepared a Habitat Mitigation Plan (for Infrastructure Project and Campus Community)	A Habitat Mitigation Plan was prepared by the County and submitted to the Service. The Infrastructure Project has now been subsumed into the University's proposed project for the Campus and Community North. Habitat mitigation for the Infrastructure and Community North portions of the project has been incorporated into the Conservation Strategy, Compensatory Wetland Mitigation Plan, and the 2008 BA Supplement.
	b. Develop a plan to address potential effects on kit fox, including a migration corridor to the north and northeast of the proposed actions, to be protected and maintained through acquisitions and other possible actions (e.g., passage over canals)	This measure was addressed in the final Conservation Strategy. The Campus and University Community were reconfigured through extensive discussion with the Service and other agencies (see ***Consultation Subsequent to Issuance of the 2002 BO)***. Maintenance of a corridor for kit

Parameter	Subparameter Requirements for Applicants	Status of Compliance
		fox movements was an important goal of this reconfiguration. Construction of a passage across the canal is proposed, as discussed in the Conservation Strategy and in this 2008 BA Supplement.
	c. Ensure that the extent and nature of proposed conservation, and any proposed ratios, for grassland and vernal pool species will be at least equivalent to those in the BA	Land conservation for listed species remains consistent with the approach described in the BA and 2002 BA Supplement. The acreage of impacts on listed species habitat has declined as a result of the Campus reconfiguration, while the assignment of former campus lands and the Campus Land Reserve to the CNR has increased the acreage of Conservation Lands. Therefore, ratios of compensation to impact acreages, which previously exceeded minimum ratios in the 2002 BA, have now increased (see Chapter 6). Summaries of impacts and mitigation acreages to occupied habitats and "occurrences" for listed species are presented in the Conservation Strategy and in this BA Supplement (Table 4-1 and 6-1).
	d. Ensure long-term funding assurances for management and monitoring of preserve lands	Funding for management and monitoring is assured through an endowment established by the University. Funding Assurances are discussed in Chapter 9 of the Conservation Lands Management Plan.
	e. Avoid any direct impact on Conservancy fairy shrimp; Avoid and minimize indirect impacts to the maximum extent practicable; compensate for any unavoidable indirect impacts though preservation of approved area.	Direct impacts on Conservancy fairy shrimp have been avoided through incorporation of the entire watershed of the pool occupied by the species within the CNR, which will protected with a conservation easement and managed according to the measures described in the Conservation Lands Management Plan. The potential for indirect impacts have been further reduced since the 2002 BO by incorporation of additional lands (the former Campus Land Reserve) adjacent to the watershed of the occupied pool in to the CNR during campus reconfiguration. The Conservation Lands Management Plan also outlines a full range of management measures to prevent unauthorized disturbance of the CNR lands, and ensure proper management for conservation values, as well as monitoring to detect and address threats of invasive species. Conservation for this species is addressed in detail in the 2002 BA and BO, Conservation Strategy, Conservation Lands Management Plan, and elsewhere in this 2008 BA Supplement.
	f. (1) Avoid and minimize effects on seven listed vernal pool plants to the maximum extent practicable through siting, design, and conservation measures	Avoidance and minimization measures implemented during Campus siting, design, and operation, and related conservation measures were previously incorporated in the 2002 BA and BA Supplement and in the 2002 BO. With the exception of the succulent owl's clover, impacts on listed vernal pool plant species were avoided during siting of the Campus and Community North. Conservation lands are protecting habitat for two species, the San Joaquin Valley Orcutt grass and Colusa grass. The project

Parameter	Subparameter Requirements for Applicants	Status of Compliance
		would result in direct and indirect impacts to 32 acres of occupied habitat for the succulent owl's clover, but would protect 689 acres (a 22:1 ratio). Conservation values for listed plants are detailed in the Conservation Strategy. Measures for managing habitats for listed plants are included in the Conservation Lands Management Plan, and in this 2008 BA Supplement.
	f. (2). Develop and implement a restoration/creation plan for vernal pools and associated habitats and other wetlands, focusing on areas where the vernal pool signature is still present or other suitable areas; include provisions for monitoring and adaptive management, and adequate financial assurances	The program outlined in the Compensatory Wetland Mitigation Plan meets these requirements.
3. Parameters Regarding Development and Other Discretionary Projects in the Study Area	a. Merced County will provide written assurances that all other projects in the study area will comply with the ESA	This requirement is the responsibility of Merced County.
	b. Applicants will provide evidence that groundwater pumping and stormwater discharges will not affect Merced River and Delta species	This issue was addressed in the 2002 project BA and in the BO. No changes to the project have altered the conclusions of these analyses that use of groundwater for the Campus and University Community will not result in impacts on the Merced River flows and Delta species

Table 4a. Habitat Impacts, Conserved Lands, and Mitigation Ratios Achieved for Federally Listed and Other Key Species for the UC Merced Campus and University Community

	Impacts of Project Components of Proposed Action[a] (acres)					Conserved Lands (acres)			Mitigation Ratios		
Species	Campus[b]	Community North[b]	Total: Proposed Project	Community South[c]	Total: Proposed Action	Tier 1a	Tiers 1b and 2	Total: All Conservation Lands	Tier 1a: Campus and Community North	Tier 1 & 2: Campus and Community North	Tier 1 & 2: Campus, and Community North and South
Succulent owl's clover	27	4	31	0	31	313	376	689	10.1	22.2	22.2
Colusa grass	0	0	0	0	0	156	0	156			
SJV Orcutt grass	0	0	0	0	0	16	0	16			
Conservancy fairy shrimp	0	0	0	0	0	14	0	14			
Vernal pool fairy shrimp	42	19	61	<1	61	490	653	1,143	8.0	18.7	18.7
Vernal pool tadpole shrimp	0	4	4	0	4	14	0	14	3.5	3.5	3.5
California tiger salamander											
Occupied habitat	971	913	1,884	0	1,884	6,242	13,902	20,144	3.3	10.7	10.7
Critical habitat	193	36	229	0	229	5,914	6,187	12,101	25.8	52.8	52.8
San Joaquin kit fox											
Primary habitat	720	573	1,293	61	1,354	6,128	18,055	24,183	4.7	18.6	17.8
Secondary habitat	196	480	676	1,286	1,962	64	1,460	1,524	0.1	2.1	0.8
All habitat	919	1,053	1,969	1,347	3,316	6,192	19,515	25,707	3.1	13.1	7.8

[a] Includes both direct and indirect impacts.

[b] Components that comprise the University's Proposed Project.

[c] This area is not part of the University's Proposed Project, but is an interrelated and interdependent project under the Proposed Action.

Table 4b. Numbers of Known Species Point Locations within Project Lands and Conserved Lands, and Mitigation Ratios Determined from Numbers of Occurrences

	Impacts of Project Components of Proposed Action[a]			Conserved Lands		Mitigation Ratios		
Species	Campus[b]	Community North[b]	Community South[c]	Tier 1a	Tiers 1b and 2	Tier 1a: Campus and Community North	Tier 1 and 2: Campus and Community North	Tier 1 and 2: Campus, and Community North and South
Succulent owl's clover	8	1		244	495	27.1	82.1	82.1
Colusa grass				5				
SJV Orcutt grass				1				
Conservancy fairy shrimp				1				
Vernal pool fairy shrimp	98	111	2	307	363	1.5	3.2	3.2
Vernal pool tadpole shrimp		1		4	1	4.0	5.0	5.0
California tiger salamander		1		13	17	13.0	30.0	30.0
San Joaquin kit fox								

[a] Includes both direct and indirect impacts.

[b] Components comprising the University's Proposed Project.

[c] This area not part of the University's Proposed Project, but is an interrelated and interdependent project under the Proposed Action.

Table 5. Summary of Management and Monitoring Requirements for UC-Owned Lands Included in the 2002 BO and the Status of Compliance

Measures to be Included in the Conservation Lands Management Plan	Status of Compliance
Compensation goals and objectives	Included in the Conservation Lands Management Plan
Maps and description of the management area compensation habitat within each site and areas to be enhanced, restored, or used for habitat creation	Compensation habitat within management areas are identified in the plan. Management measures to be applied to these areas to maintain and enhance habitat are identified. Because of the high quality habitat within conservation lands, the plan does not propose major enhancement of existing conditions or creation of new habitats. Measures to restore habitats in the future if they become degraded (e.g., through colonization by invasive weeds) are identified in the management policies of the plan
Description of how compensation meets preserve criteria specified in the RMP	USFWS previously approved preserve areas. Compensation ratios achieved are addressed in this BA Supplement, under *Effects of the Proposed Action*
Descriptions of the mechanisms used to protect the compensation habitat in perpetuity and land use restrictions to prevent incompatible activities	The Conservation Lands Management Plan provides extensive direction that commits UC to protect habitat by grazing lands compatibly, preventing unauthorized use, managing research and educational uses, controlling pest species, providing fire protection, and other actions. Lands have been protected in perpetuity through enactment of conservation easements or are committed for future application of conservation easements
The parties responsible for implementing the plan	Responsible parties and their roles are identified in the Management Plan. UC will conduct daily management and monitoring activities. The easement for the VST Preserve is held by TNC. The easement holder for the CNR has not yet been determined but will be either a government agency or a conservation organization approved by the USFWS and DFG.
Description of and restrictions on recreational, educational and scientific activities that will be permitted and protocols for approving uses	UC has adopted policies and procedures to ensure that recreational, educational, and scientific activities on Conservation Lands will not detrimentally affect conservation values. This program is included in Chapter 5 of the Management Plan
Methods for controlling illegal uses	UC has committed to and is implementing measures for controlling illegal uses of Conservation Lands, as described in Chapter 5 of the Management Plan

Measures to be Included in the Conservation Lands Management Plan	Status of Compliance
Details on habitat restoration and enhancement measures	Although no major habitat restoration or enhancement is contemplated, due to the high quality of habitat within UC Conservation Lands, UC has committed to measures that will address restoration after fire and invasion by pest species is outlined in Chapter 5 of the Management Plan
Monitoring measures, protocols, periods	UC has committed to a comprehensive monitoring program for Conservation Lands. Elements of the monitoring program are described in the Chapter 7of the Management Plan.
Short- and long-term adaptive management measures	UC has committed to adaptive management measures for management of UC Conservation Lands and conservation lands under easement (to the degree allowed there), as described in Chapter 8 of the Management Plan.
Funding assurance for habitat enhancement, monitoring, and reporting	UC's funding program ensures that funds for management and for monitoring and reporting, as described in Chapter 9 of the Management Plan.
Active management that allows grazing management, control of invasive species, and fuel management	UC has committed to an active management program for UC Conservation Lands, as described in Chapter 5 of the Management Plan.

Table 6. Suitable Habitats and Distances from Known Occurrences Used in Defining Occupied Habitat for Listed Species

	Suitable Habitats for Species							
Species	Vernal Pool	Swale Wetland	Clay Slope Wetland	Canal Wetland	Intermittent Channel	Irrigation Wetland	Annual Grassland	Distance Used to Define Occupied Habitat (m)[1]
Succulent owl's clover	X	X				X		200
Colusa grass	X	X				X		200
SJ Valley Orcutt grass	X					X		200
Conservancy fairy shrimp	X							200
Vernal pool fairy shrimp	X	X				X		200
Vernal pool tadpole shrimp	X	X				X		200
California tiger salamander	X	X	X	X	X	X	X	2500
San Joaquin kit fox	X	X	X			X	X	NA[2]

[1] Occupied habitat was defined as suitable habitat within the specified distance (in meters) of known occupied sites (see text).

[2] Not applicable: kit fox habitat suitability was based on a multivariable model described in the Conservation Strategy (Jones & Stokes 2008).

Table 7. Comparison of Impacts, Conserved Lands, and Mitigation Ratios Achieved in the 2002 Proposed Action for Construction of the UC Merced Campus and University Community (North and South)

	Campus and Community Impacts (ac)				Conservation Lands							Mitigation Ratios			
					Tier 1a		Tier 1b and 2	Total				Tier 1a Lands Only		All Mitigation Lands	
	2002	2008	Difference (Ac)	% Change	2002	2008	2002/ 2008	2002	2008	Difference (Ac)	% Change	2002	2008	2002	2008
Species															
Succulent owl's clover	54	31	-23	-43	228	313	376	604	689	+85	+14	4	10	11	22
Colusa grass	0	0	0		147	156	0	147	156	+9	+6				
San Joaquin Valley Orcutt grass	0	0	0		16	16	0	16	16	-15	-48				
Conservancy fairy shrimp	0	0	0		14	14	0	14	14	-13	-48				
Vernal pool fairy shrimp	116	61	-55	-47	443	490	653	1,096	1,143	+47	+4	4	8	9	19
Vernal pool tadpole shrimp	0	4	+4	100	14	14	0	14	14	0	0		3.5		3.5
California tiger salamander	2,052	1,884	-159	-8	5,967	6,242	13,902	19,869	20,144	+275	+1	3.0	5	9	11
San Joaquin kit fox															
Primary habitat	1,662	1,354	-308	-19	5,663	6,128	18,055	23,742	24,183	+441	+2	3.4	4.5	14	18
Secondary habitat	1,859	1,962	+103	+6	71	64	1,460	1,467	1,524	-57	-4	0	0	0.8	0.8
Total	3,521	3,316	-205	-6	5,734	6,192	19,475	25,273	25,707	+434	+2	1.6	1.9	7	8

Table 8. Summary of Impacts on Habitat and Known Point Locations for Species Likely to be Subject to Take from the Campus and Community North (University's Proposed Project) and Campus and University Community (Proposed Action)

	Habitat (acres)		Point Locations	
Species	Campus and Community North	Campus and University Community	Campus and Community North	Campus and University Community
Succulent owl's-clover	32	32	9	9
Vernal pool fairy shrimp	61	61	211	213
Vernal pool tadpole shrimp	4	4	1	1
California tiger salamander	1,884	1,884	1	1

Table 9 - Summary of species-specific recovery criteria for federally listed vernal pool species within Merced County areas

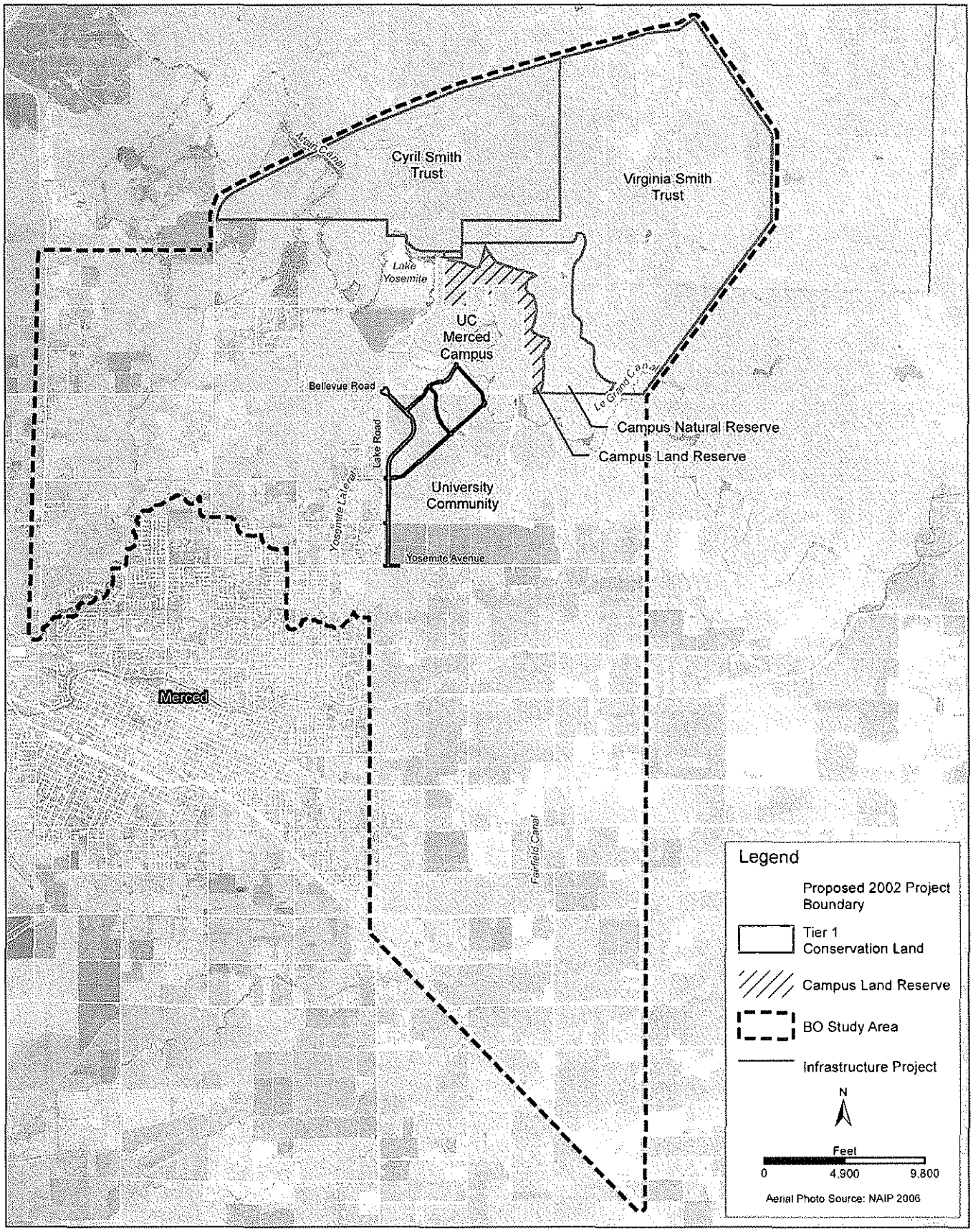
Species	Priority of Merced County for Species Conservation	Percent of Occurrences to be Protected in region	Reintroduction/ Introductions Recommended to Areas Where Species has been Extirpated?
Succulent (fleshy) owl's-clover	1	95	Yes
Hoover's Spurge	1	95	Yes
Colusa grass	1	90	Yes
San Joaquin Valley Orcutt grass	Region not included	100% of any newly discovered occurrences	Yes
Hairy Orcutt grass	1	95%	Yes
Greene's tuctoria		100% of any newly discovered occurrences	Yes
Conservancy fairy shrimp	Region not included	100% of any newly discovered occurrences	Yes
Vernal pool fairy shrimp	1	85	No
Vernal pool tadpole shrimp	1	95	Yes

Dan Airola
Airola Environmental Consulting
2700 6th Avenue
Sacramento, CA 95818

Julie Vance
California Department of Fish and Game
1234 Shaw Avenue
Fresno, California

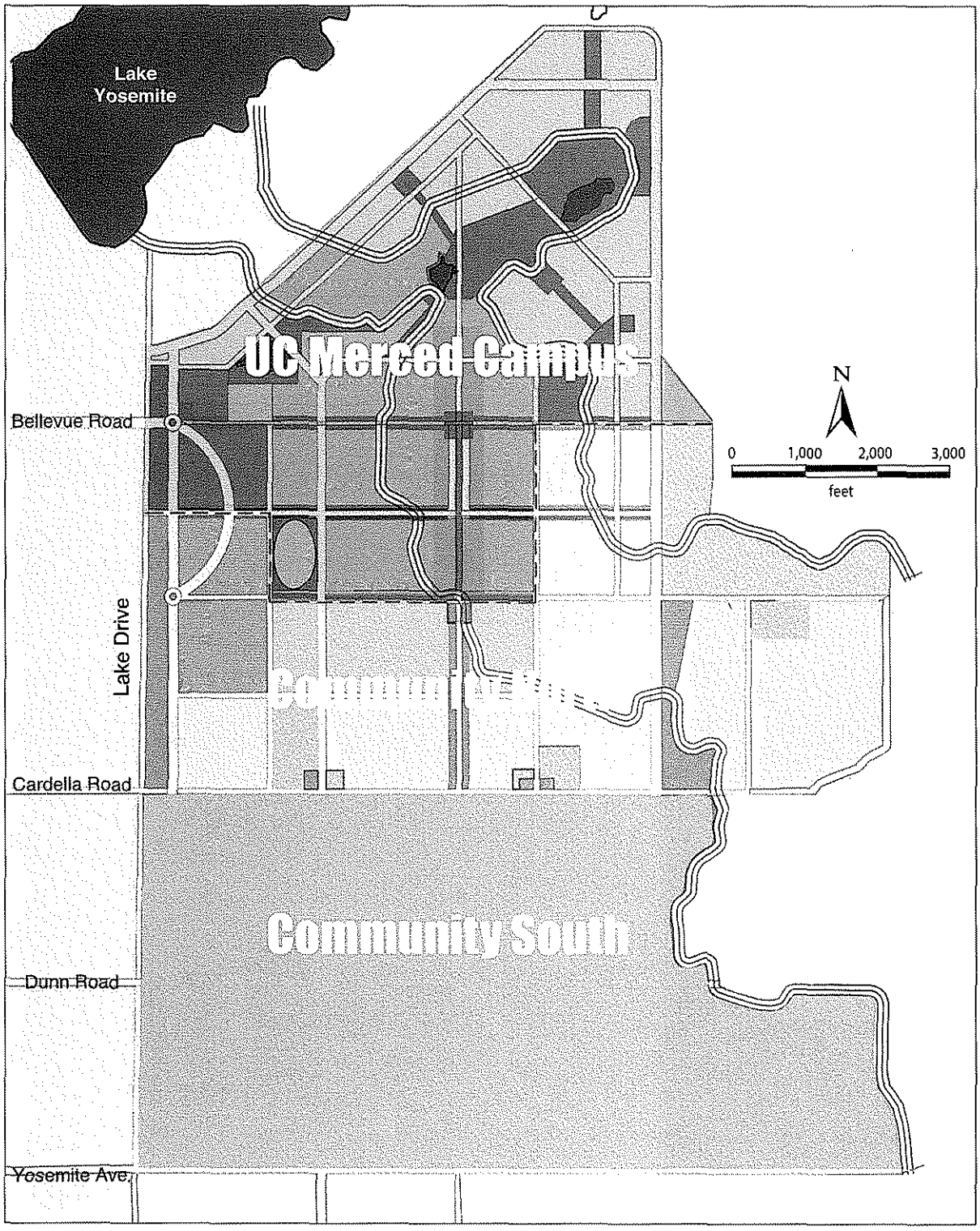
Tom Skordal
Gibson and Skordal
2277 Fair Oaks Blvd, Suite 105
Sacramento, CA 95825

Clark Morrison
555 California Street, 10th floor
San Francisco, CA 94104



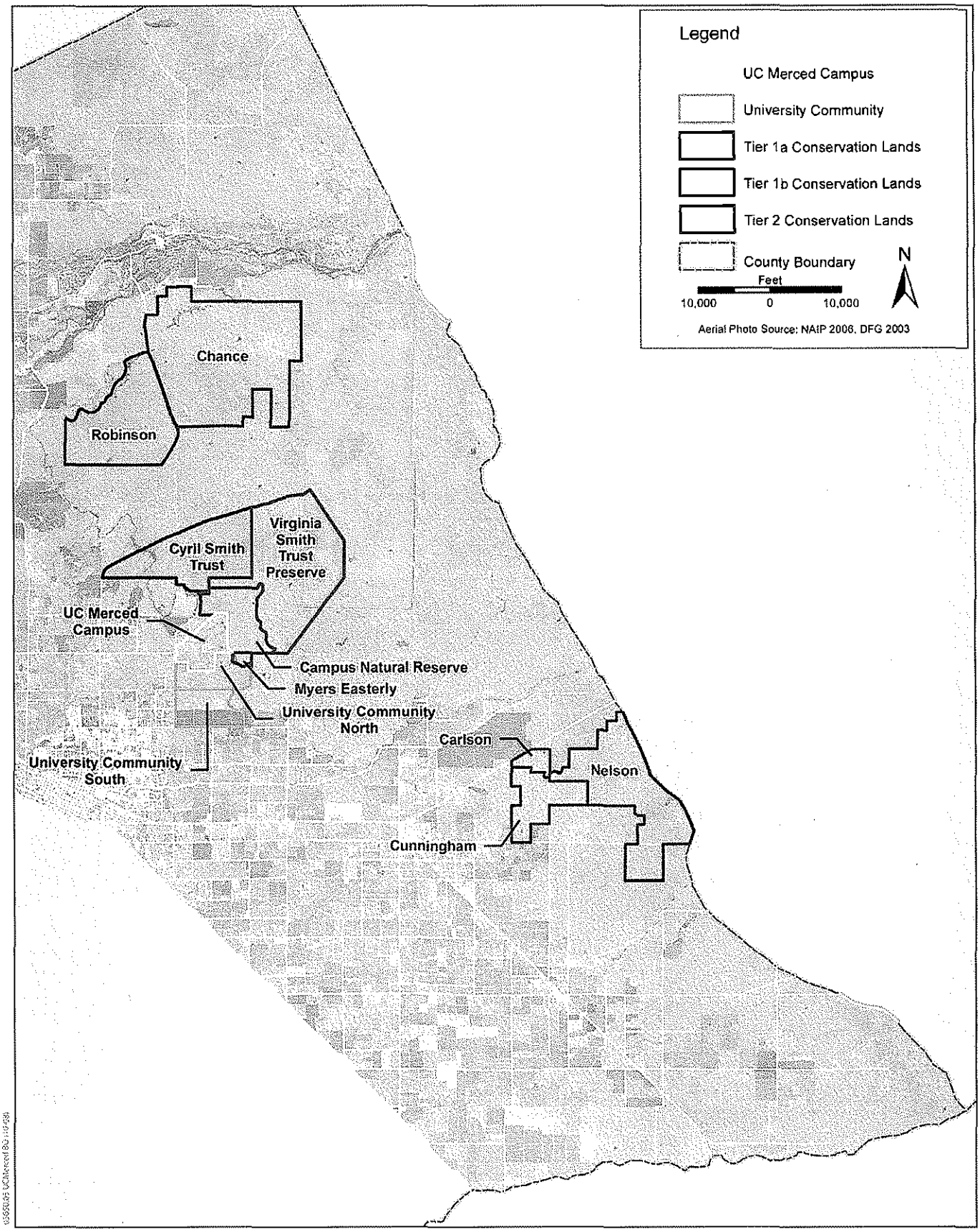
ICF Jones & Stokes
an ICF International Company

Figure 1
UC Merced Study Area and Project Components Addressed in the 2002 Biological Opinion



ICF Jones & Stokes
an ICF International Company

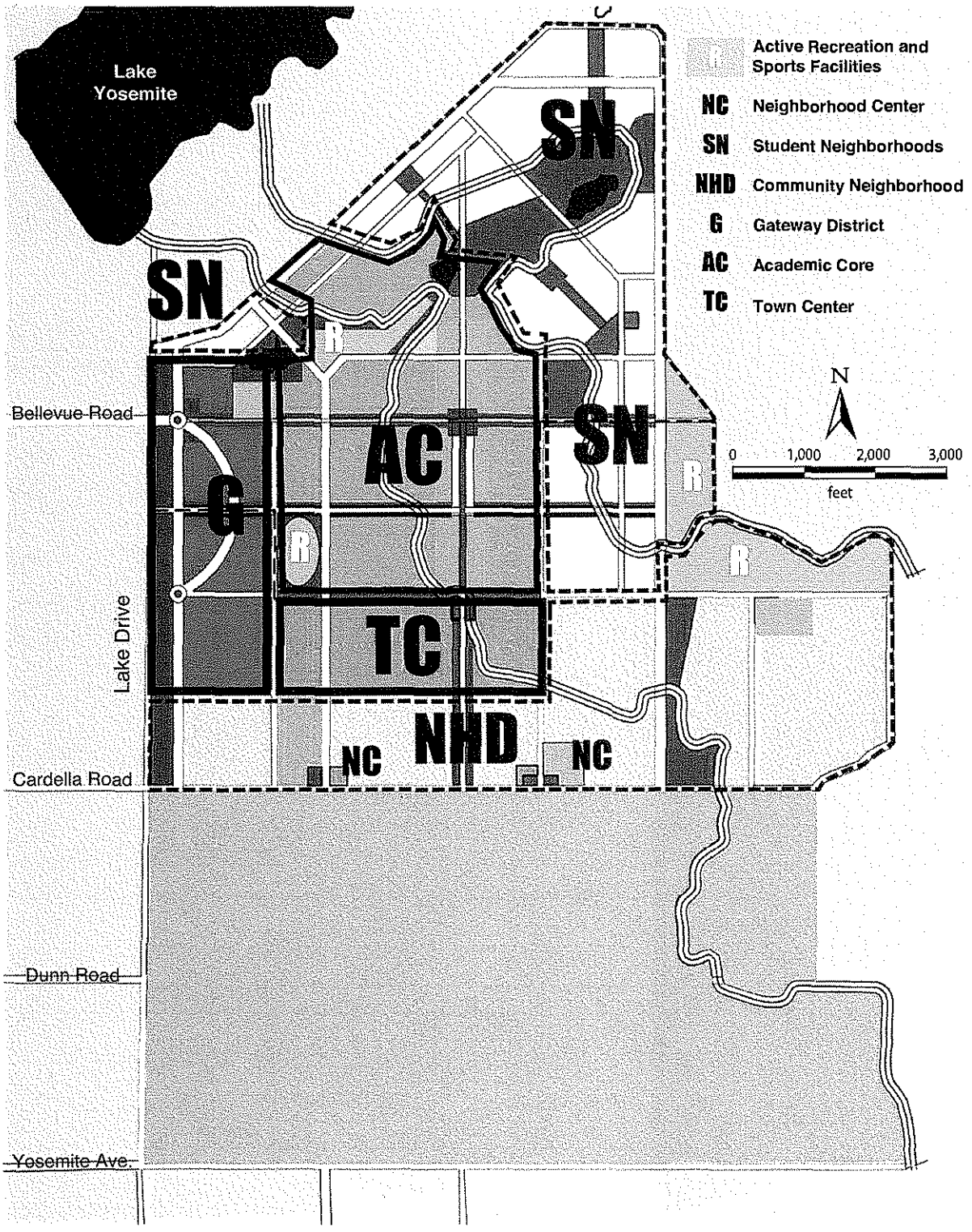
Figure 2
UC Merced Campus and University Community Project Lands



ICF Jones & Stokes
an ICF International Company

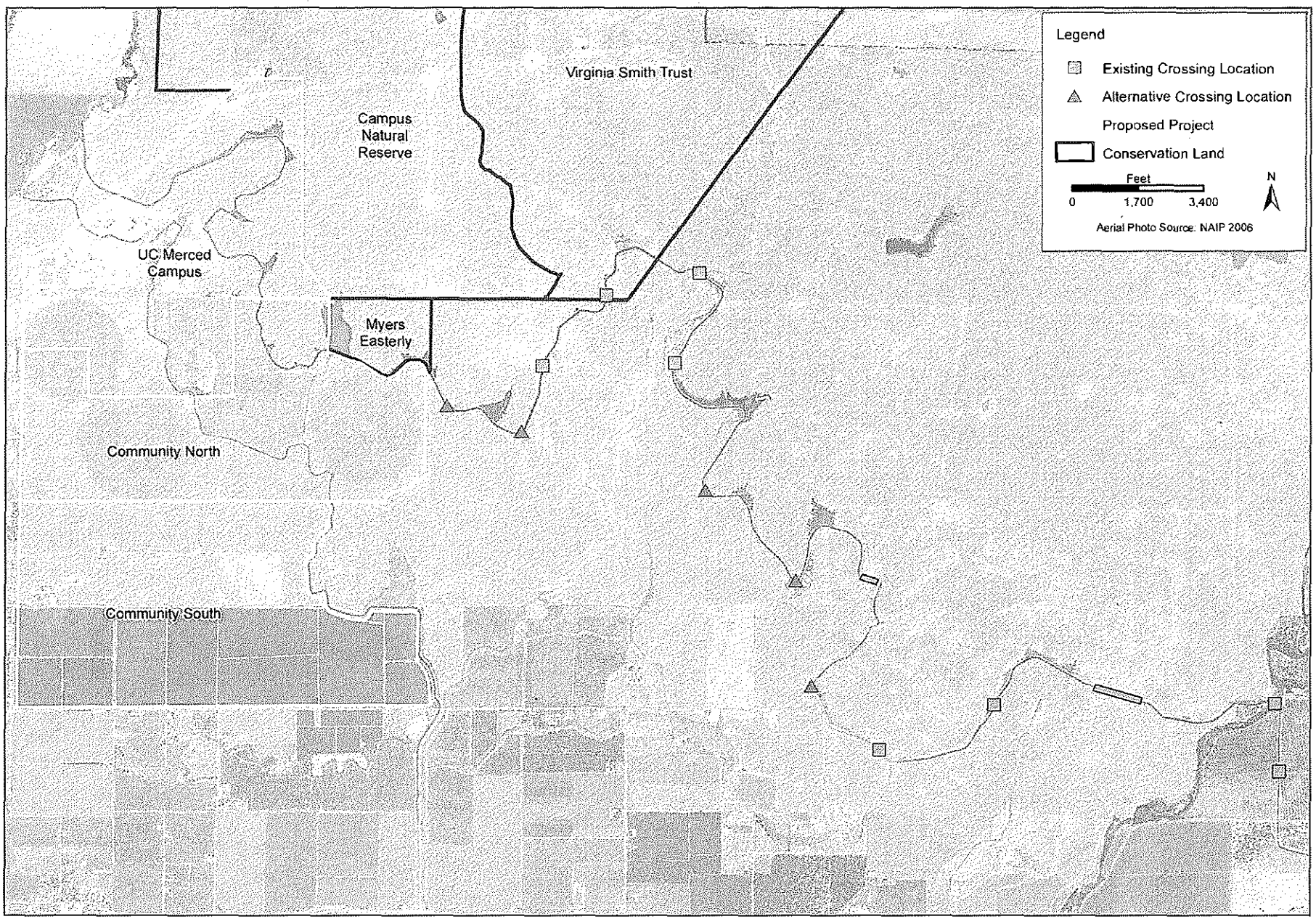
Figure 3
Conservation Lands for the UC Merced Project

Land Use Districts Key Map



ICF Jones & Stokes
an ICF International Company

Figure 4
Land Use Districts for the UC Merced Campus and Community North Areas



ICF Jones & Stokes
an ICF International Company

Figure 5
Alternative Locations under Consideration by UC for Placement of a Crossing over the LeGrande Canal to Enhance Kit Fox Movements

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY PERMIT

Permittee: Dr. Sung-Mo "Steve" Kang
Chancellor, University of California at Merced
Regents of the University of California
P.O. Box 2039
Merced, California 95344

Permit Number: SPK-1999-00203

Issuing Office: U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below. A notice of appeal options is enclosed.

Project Description:

To discharge 77.79 acres of dredged or fill material into waters of the United States, including wetlands for the University of California Merced Campus and Community North Project. The 77.79 acres of fill material will be discharged into 15.03 acres of vernal pool, 25.05 acres of swale wetlands, 0.33 acres of clay slope wetlands, 12.23 acres of irrigated wetlands and 25.15 acres of canal wetland. The Campus will occupy 815 acres including academic buildings, student housing, campus support, recreation facilities and infrastructure. The Community North will occupy 833 acres comprised of a town center, business park, residential neighborhoods, parks open space, schools and other amenities.

All work is to be completed in accordance with the attached plan(s).

Project Location:

The project is located in eastern Merced County, approximately two miles northeast of the corporate limits of the City of Merced, California. The project is east of Lake Yosemite and Lad Road. The project area occpies protions of Sections 26, 26, 34, and 35, Township 6 South, Range 14 East and Sections 3 and 2, Township 7 South, Range 14 East.

Permit Conditions:

General Conditions

1. The time limit for completing the work authorized ends on May 1, 2012. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions

1. This Department of the Army permit does not authorize the University to take any threatened or endangered species, in particular succulent owl's clover (*Castilleja campestris ssp. succulenta*), Colusa grass, (*Neostaphia colusa*), San Joaquin Valley Orcutt grass (*Orcuttia inequalis*), vernal pool fairy shrimp (*Branchinecta lynchi*), Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool tadpole shrimp (*Lepidurus packardi*), valley elderberry longhorn beetle (*Desmocerus californiense dimorphus*), California tiger salamander (*Ambystoma californiense*), and San Joaquin kit fox (*Vulpes macrotis mutica*). In order to legally take a listed species, the University must have separate authorization under Section 7 of the Endangered Species Act (i.e. Section 10 take permit or a Biological Opinion under Section 7 of the Endangered Species Act with incidental take provisions). The attached Fish and Wildlife Service's Amended Biological Opinion (No. 1-1-02-F-107 and 81420-2009-F-0639) dated April 28, 2009, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with incidental take that is also specified in the Amended Biological Opinion. The University's authorization under this Department of the Army permit is conditional upon the University's compliance with all of the mandatory terms and conditions associated with incidental take set forth in the Amended Biological Opinion, which terms and conditions are incorporated by reference into this permit. Failure to comply with the terms and conditions associated with incidental take in the Amended Biological Opinion, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with the University's Department of the Army permit. The Fish and Wildlife Service is the appropriate authority to determine compliance with the terms and conditions of its Amended Biological Opinion, and with the Endangered Species Act. The permittee must comply with all conditions of this Biological Opinion, including those ascribed to the Corps.

2. You shall implement all aspects of the Comprehensive Wetland Mitigation and Monitoring Plan (CWMMP), revised October 2008, which is expressly incorporated into this permit as though fully set forth herein.

3. You shall implement the off-site wetland restoration and creation component of the CWMMP in accordance with the following schedule.

a. Within one year of issuance of the permit, you will select, identify and characterize preferred restoration/creation sites and submit them to the Corps of Engineers, U.S. Fish and Wildlife Service and California Department of Fish and Game for approval. This site identification and evaluation may be accomplished all at one time or as a phased process. The intent is that the identification of potential restoration and creation sites be completed within one year of issuance of the permit.

b. Within six months after receiving agency approval of the potential restoration and creation site(s), you will secure the mitigation sites and prepare site-specific addendum(s) to the CWMMP and submit them to the Corps of Engineers, U.S. Fish and Service and California Department of Fish and Game for approval. The addendum(s) must address the design, construction and monitoring procedures for each specific site. The addendum(s) must also describe and provide for the long-term monitoring and management of the restoration and creation area(s) including establishment of conservation easements and a mechanism to fund the long-term maintenance of the restoration and creation site(s).

c. Within six months after receiving agency approval of the site specific addendum(s), you will record the conservation easement(s) and ensure that the endowment account (or other approved funding mechanism) is established and fully funded.

d. You will begin construction of the wetland restoration and creation in May immediately following agency approval of the site-specific addendum(s) to the CWMMP. This assumes that agency approval is received by at least January 1 of that year to allow sufficient time to prepare for mobilization of mitigation construction.

e. All wetland restoration and creation construction will be completed within two years of initiation of mitigation construction activities.

f. As-built drawings showing the restored and created wetlands shall be submitted to the Corps of Engineers within 90 days following completion of construction activities.

4. You shall allow representatives from the Corps of Engineers to inspect the authorized activity, the Tier 1a Conservation Lands, and the restoration and creation mitigation areas at any time deemed necessary to ensure that the authorized work and the required wetland mitigation is or has been accomplished in accordance with the terms and conditions of the permit.

5. Your responsibility to complete the required compensatory mitigation as set forth in Special Conditions 2 and 3 will not be considered fulfilled until mitigation success as set forth in the CWMMP and any subsequently approved addendums has been demonstrated and the University has received written verification from the U.S. Army Corps of Engineers.

6. All terms and conditions of the April 20, 2009 Water Quality Certification issued by the Central Valley Region Regional Water Quality Control Board are expressly incorporated as conditions of this permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant.

Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

B. M. King
Permittee

29 April 2009
Date

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

Thomas C. Chapman P.E.
Colonel, U.S. Army
District Engineer

29 Apr 09
Date

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

Transferee

Date

*NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

GENERAL PERMIT FOR
WASTE DISCHARGE REQUIREMENTS (WDRs)
FOR
STORM WATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s)

ORDER NO. 2013-0001-DWQ
NPDES NO. CAS000004

This Order was adopted by the State Water Resources Control Board on:	**February 5, 2013**
This Order shall become effective on:	**July 1, 2013**
This Order shall expire on:	**June 30, 2018**

IT IS HEREBY ORDERED that, as of July 1, 2013, this Order supersedes Order No. 2003-0005-DWQ.

I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order, with all attachments, is a full, true, and correct copy of an Order adopted by the State Water Resources Control Board, on **February 5, 2013.**

AYE: Chairman Charles R. Hoppin
Vice Chair Frances Spivy-Weber
Board Member Tam M. Doduc
Board Member Steven Moore
Board Member Felicia Marcus

NAY: None

ABSENT: None

ABSTAIN: None

Jeanine Townsend
Clerk to the Board

STATE WATER RESOURCES CONTROL BOARD
WATER QUALITY ORDER NO. 2013-0001-DWQ
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
GENERAL PERMIT NO. CAS000004

WASTE DISCHARGE REQUIREMENTS (WDRs) FOR STORM WATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) (GENERAL PERMIT)

Contents

STATE WATER RESOURCES CONTROL BOARD 1
WASTE DISCHARGE REQUIREMENTS (WDRS) 1
FINDINGS 5
A. APPLICATION REQUIREMENTS FOR ALL SMALL MS4 PERMITTEES 14
B. DISCHARGE PROHIBITIONS 17
C. EFFLUENT LIMITATIONS 18
D. RECEIVING WATER LIMITATIONS 19
E. PROVISIONS FOR ALL TRADITIONAL SMALL MS4 PERMITTEES 19
E.1. RENEWAL TRADITIONAL SMALL MS4 PERMITTEES 19
E.2. NEW TRADITIONAL SMALL MS4 PERMITTEES 19
E.3. NON-TRADITIONAL SMALL MS4S PERMITTEES 20
E.4. SMALL MS4 ASBS PERMITTEES 20
E.5. SEPARATE IMPLEMENTING ENTITY (SIE) 20
E.6. PROGRAM MANAGEMENT ELEMENT 20
E.7. EDUCATION AND OUTREACH PROGRAM 24
E.8. PUBLIC INVOLVEMENT AND PARTICIPATION PROGRAM 30
E.9. ILLICIT DISCHARGE DETECTION AND ELIMINATION 31
E.10. CONSTRUCTION SITE STORM WATER RUNOFF CONTROL PROGRAM 37
E.11. POLLUTION PREVENTION/GOOD HOUSEKEEPING 40
E.12. POST CONSTRUCTION STORM WATER MANAGEMENT PROGRAM 48
E.13. WATER QUALITY MONITORING 62
E.14. PROGRAM EFFECTIVENESS ASSESSMENT AND IMPROVEMENT 70
E.15. TOTAL MAXIMUM DAILY LOADS COMPLIANCE REQUIREMENTS 73
E.16. ANNUAL REPORTING PROGRAM 74
F. NON – TRADITIONAL SMALL MS4 PERMITTEE PROVISIONS 75
F.1 NON-TRADITIONAL SMALL MS4 CATEGORIES 75
F.2 SECURITY CONCERNS 75
F.3 MAXIMIZE EFFICIENCY 75
F.4 EQUIVALENT OR EXISTING DOCUMENT 75
F.5 PROVISIONS 76
G. REGIONAL WATER BOARD AUTHORITIES 103
H. DISPUTE RESOLUTION 103
I. PERMIT RE-OPENER 104
J. PERMIT EXPIRATION 105
CERTIFICATION 105

Attachment A – Traditional Small MS4 List
Attachment B – Non-traditional Small MS4 List
Attachment C – ASBS Specific Provisions
Attachment D – ASBS Dischargers List
Attachment E – CBSM Requirements
Attachment F – Standard Provisions
Attachment G – TMDLs
Attachment H – Acronyms
Attachment I – Glossary
Designation Flow Chart
Monitoring Flow Chart

FINDINGS

The State Water Resources Control Board (State Water Board) finds that:

1. Storm water is a resource and an asset and should not be treated as a waste product. Managing rainwater and storm water at the source is a more effective and sustainable alternative to augmenting water supply, preventing impacts from flooding, mitigating storm water pollution, creating green space, and enhancing fish and wildlife habitat. California encourages alternative, innovative, multi-objective solutions to help use and protect this valuable resource, while at the same time controlling pollution due to urban runoff.

2. As human population increases, urban development creates new pollution sources and brings with it proportionately higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, trash, etc. which can either be washed or directly dumped into the municipal separate storm sewer system (MS4). As a result, the runoff leaving the developed urban area is greater in pollutant load than the pre-development runoff from the same area. Also, when natural vegetated pervious ground cover is converted to impervious surfaces such as paved highways, streets, rooftops, walkways and parking lots, the natural absorption and infiltration abilities of the land are lost. Therefore, runoff leaving developed urban area is significantly greater in runoff volume, velocity, peak flow rate, and duration than pre-development runoff from the same area. The increased volume, velocity, rate, and duration of runoff greatly accelerate the erosion of downstream natural channels. In addition, the greater the impervious cover the greater the significance of the degradation.

3. Pollutants of concern found in urban runoff include sediments, non-sediment solids, nutrients, pathogens, oxygen-demanding substances, petroleum hydrocarbons, heavy metals, floatables, polycyclic aromatic hydrocarbons (PAHs), trash, pesticides and herbicides.

4. Trash and litter are a pervasive problem in California. Controlling trash is a priority, because trash adversely affects our use of California's waterways. Trash impacts aquatic life in streams, rivers, and the ocean as well as terrestrial species in adjacent riparian and shore areas. Trash, particularly plastics, persists for years. It concentrates organic toxins, entangles and ensnares wildlife, and disrupts feeding when animals mistake plastic for food and ingest it. Additionally, trash creates aesthetic impacts, impairing our ability to enjoy our waterways.

5. The State Water Resources Control Board (State Board) is developing a statewide policy for trash control in California's waterways. The draft Trash Policy will identify trash as a separate pollutant and establish methods to control trash pollution in waterways, statewide. Following adoption of the draft Trash Policy, the State Water Board may re-open this Order to incorporate water body trash pollution control methods and introduce Trash Reduction Program requirements.

6. A higher percentage of impervious area in urban areas correlates to a greater pollutant loading, resulting in turbid water, nutrient enrichment, bacterial contamination, organic matter loads, toxic compounds, temperature increases, and increases in trash or debris.

7. Conventional landscaping features large lawns, non-native plants, abundant irrigation, and heavy use of fertilizers, herbicides, and pesticides. It frequently requires significant mowing,

blowing, trimming, and removal of plants debris. Adopting more storm water-friendly landscape practices reduces pollutants and also provides tangible water conservation, wildlife habitat, and energy saving benefits.

8. The State Water Board recognizes that this Order affects varied and diverse entities, including agencies that are required to carry out water conservation regulations, wastewater discharge regulations, and land use regulations that may implement, all or in part, provisions of this Order. The State Water Board seeks to minimize duplicate efforts and maximize resources to achieve the greatest water quality benefit; thus the State Water Board recognizes specified related regulations, cited in the body of this Order, as equivalent to implementing designated provisions of this Order.

9. When water quality impacts are considered during the planning stages of a project, new development and many redevelopment projects can more efficiently incorporate measures to protect water quality.

10. In California, urban storm water is listed as the primary source of impairment for ten percent of all rivers, ten percent of all lakes and reservoirs, and 17 percent of all estuaries (2010 Integrated Report). Although these numbers may seem low, urban areas cover just six percent of the land mass of California and so their influence is disproportionately large. Urbanization causes changes in the landscape, including increased loads of chemical pollutants, increased toxicity, changes to flow magnitude, frequency, and seasonality of various discharges, physical changes to stream, lake, or wetland habitats, changes in the energy dynamics of food webs, sunlight, and temperature; and biotic interactions between native and exotic species. In addition to surface water impacts, urbanization can alter the amount and quality of storm water that infiltrates and recharges groundwater aquifers.

11. Education and awareness programs help change human behavior with respect to reducing the amount of pollution generated from storm water sources within the Permittee's MS4 system. In addition to education, encouraging public participation in local storm water programs can lead to program improvement as well as enabling people to identify and report a pollution-causing activity, such as spotting an illicit discharge.

12. Field experience in conducting outfall surveys indicates that illicit discharges may be present at 2 to 5 percent of all outfalls at any given time. Given that pollutants are being introduced into the receiving water during dry weather, illicit discharges may have an amplified effect on water quality and biological diversity.[1] Therefore, implementation of an effective Illicit Discharge and Detection Elimination program in conjunction with focused wet weather monitoring, as necessary, is an essential component of an effective municipal storm water program.

13. In 1990, the U.S. Environmental Protection Agency (U.S. EPA) promulgated rules establishing Phase I of the National Pollutant Discharge Elimination System (NPDES) storm water program. The Phase I program for MS4s requires operators of "medium" and "large" MS4s, that is, those that generally serve populations of 100,000 or greater, to implement a storm water management program as a means to control polluted discharges from these MS4s.

[1] Urban Stormwater Management in the United States, National Research Council, 2008

14. A MS4 is a conveyance or system of conveyances that is: 1) owned by a state, city, town, village, or other public entity that discharges to waters of the United States; 2) designed or used to collect or convey storm water (including storm drains, pipes, ditches, etc.); 3) not a combined sewer; and 4) not part of a Publicly Owned Treatment Works or sewage treatment plant.

15. On December 8, 1999, U.S. EPA promulgated Phase II storm water regulations under authority of the Clean Water Act section 402(p)(6). The Phase II Storm Water requires State Water Board to issue NPDES storm water permits to operators of Small MS4s.

16. On April 30, 2003, the State Water Board adopted Water Quality Order No. 2003-0005-DWQ, NPDES General Permit CAS000004 WDRs for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (General Permit) to comply with Clean Water Act section 402(p)(6).

17. Title 40 of the Code of Federal Regulations (40 C.F.R.) section122.26(b)(16) defines Small MS4s as those not defined as "large" or "medium" MS4s under section122.26(b)(4) or (b)(7) or designated under 40 Code of Federal Regulations section122.26(a)(1)(v). The term Small MS4s includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. (40 C.F.R. §122.26(b)(16)(iii).) These latter subsets of Small MS4s are referred to herein as Non-traditional Small MS4s. Non-traditional Small MS4s discharge the same types of pollutants that are typically associated with urban runoff. Separate storm sewers in very discrete areas, such as individual buildings, are not defined as Small MS4s.

18. Of the Small MS4s defined by federal regulations, only "Regulated Small MS4s" (also referred to as "Permittees" herein) must obtain an NPDES permit. Small MS4s are designated as Regulated Small MS4s in this Order in accordance with the criteria described in Findings 19-25.[2]

19. Under 40 Code of Federal Regulations section 122.32(a)(1) all Small MS4s located within an "urbanized area" as determined by the latest Decennial Census by the Bureau of the Census (Urbanized Area) are automatically designated as Regulated Small MS4s.

20. Under 40 Code of Federal Regulations sections 122.32(a)(2) and 123.35(b) the State Water Board is directed to develop a process, as well as criteria, to designate Small MS4s located outside of an Urbanized Area as Regulated Small MS4s. These criteria are to evaluate whether a storm water discharge results in or has the potential to result in exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts.

21. Under guidance provided in 40 Code of Federal Regulations secton123.35(b)(1)(ii), for determining other significant water quality impacts, U.S. EPA recommends a balanced consideration of the following designation criteria on a watershed or other local basis: discharge to sensitive waters, high growth or growth potential, high population density,

[2] In addition to the designation criteria specified in this Order, the State Water Board may designate a Small MS4 as a Regulated Small MS4 in response to a petition received under 40 Code of Federal Regulations section 122.26(f). Any person may petition the State Water Board to require an NPDES permit for a discharge composed entirely of storm water that contributes to a violation of a water quality standard or is a significant contributor of pollutants to the waters of the United States. (*Id.*). The State Water Board must make a final determination on any petition within 180 days after receiving the petition. (40 C.F.R. §123.35(c).)

contiguity to an urbanized area, significant contributor of pollutants to waters of the U.S., and ineffective protection of water quality by other programs.

22. The State Water Board is required to apply the designation criteria at a minimum to all Small MS4s located outside of Urbanized Areas serving jurisdictions with a population density of at least 1,000 people per square mile and a population of at least 10,000. (40 C.F.R. §123.35(b)(2).) The State Water Board has discretion to apply the criteria to jurisdictions with smaller population or lower density. All such jurisdictions are then Regulated Small MS4s.

23. In developing the designation criteria, the State Water Board included factors indicative of the potential to result in exceedances of water quality standards and other significant water quality impacts. The following criteria are used to designate Small MS4s outside of Urbanized Areas as Regulated Small MS4s in this Order.

    a. The Small MS4 has high population *and* high population density – High population means a population of 10,000 or more. High population density means a density of 1,000 residents per square mile or greater. Also to be considered in this definition is a high density created by a non-residential population, such as tourists or commuters.

    b. The Small MS4 discharges to Areas of Special Biological Significance (ASBS) as defined in the California Ocean Plan.

24. Designation of additional Small MS4s as Regulated Small MS4s may be made by the Regional Water Boards on a case by case basis. Case by case determinations of designation shall be based on the potential of a Small MS4's discharges to result in exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts. Where such case by case designations have been recommended by the Regional Water Boards prior to adoption of this Order, the designated Small MS4s are listed on the relevant Attachments to the Order and the reasons for designation are laid out in the Fact Sheet. The Regional Water Boards may continue to make case by case determinations of designation during the permit term. Such designations must be approved by the Regional Water Board after public review and comment.

25. 40 Code of Federal Regulations section 123.35(b)(4) requires designation as a Regulated Small MS4 of any Small MS4 outside an Urbanized Area that contributes substantially to the pollutant loadings of a physically interconnected MS4 regulated by the NPDES storm water program. A Small MS4 is interconnected with a separately permitted MS4 if storm water that has entered the Small MS4 is allowed to flow directly into a permitted MS4. In general, if the Small MS4 discharges more than ten percent of its storm water to the permitted MS4, or its discharge makes up more than ten percent of the permitted MS4's total storm water volume, it is a significant contributor of pollutants to the permitted MS4. In specific cases, the MS4s involved or third parties may show that the ten percent threshold is inappropriate for the MS4 in question.

26. Regulated Small MS4s may seek a waiver from Phase II requirements if they meet criteria specified in 40 Code of Federal Regulations sections 122.32(c)-(e).[3] The State

[3] Waiver criteria also found at 40 C.F.R. 123.35(d).

Water Board has additionally provided for a waiver for those communities outside of urbanized areas with a population of 20,000 or less with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI. (Wat. Code, § 79505.5, subd. (a)).

27. Small MS4s face highly variable conditions both in terms of threats to water quality from their storm water discharges and resources available to manage those discharges. Therefore, one set of prescriptive requirements is not an appropriate regulatory approach for all Regulated Small MS4s. This Order distinguishes between New and Renewal Traditional Small MS4 Permittees. Additionally, this Order addresses differences between Traditional and Non-traditional Small MS4s by detailing Non-traditional Small MS4 specific provisions in Section F Non-Traditional Small MS4 Provisions. Provisions are tailored to address the diverse program structures of Non-traditional Small MS4s to allow for an appropriate regulatory approach.

28. There are variable levels of resources available to Regulated Small MS4s for public outreach and education and water quality monitoring. Recognizing this, the Order gives Permittees numerous compliance options in these two program areas. However, all Regulated Small MS4s that discharge to ASBS or impaired water bodies[4] must conduct monitoring as specified in Attachment C and Attachment G, respectively. All Regulated Small MS4s with a population of 50,000 or more must conduct monitoring specified in Sections E.13.d.1. or E.13.d.2. of the Order or as approved by the Executive Officer of the applicable Regional Board. Additionally, for the public outreach program, the Regional Water Boards may require the Regulated Small MS4s to utilize the approach of Community-Based Social Marketing.

29. Renewal Traditional Small MS4 Permittees shall comply with Section E. Certain provisions within Section E contain compliance dates that are past the effective date of this Order, in these cases, the Permittee shall implement its existing program until that date.

30. This Order modifies the existing General Permit, Order 2003-0005-DWQ by establishing the storm water management program requirements in the Order and defining the minimum acceptable elements of the municipal storm water management program. Minimum permit requirements are known at the time of permit issuance and not left to be determined later through Regional Water Board review and approval of Storm Water Management Plans (SWMPs).

31. The State Water Board recognizes the necessity of a storm water program guidance document specific to each Permittee to provide planning and guidance for each program area and to identify responsible implementing parties. Permittees must develop and implement a storm water program guidance document and must submit the document during the application process.

32. The State Water Board recognizes that in some instances Renewal Permittees' SWMPs that were approved under the prior General Permit, Order 2003-0005-DWQ have incorporated BMPs designed to address locality-specific storm water issues and that in some cases these

[4] A waterbody that has been determined under state policy and federal law not meet water quality standards. An impaired water is a water that has been listed on the California 303(d) list or has not yet been listed but otherwise meets the criteria for listing. A water is a portion of a surface water of the state, including ocean, estuary, lake, river, creek, or wetland. The water currently may not be meeting state water quality standards or may be determined to be threatened and have the potential to not meet standards in the future. The State of California's 303(d) list can be found at http://www.swrcb.ca.gov/quality.html.

BMPs may, because of locality-specific factors, be more protective of water quality than the minimum requirements established by this Order. Renewal Permittees will additionally include in the guidance document the following: identification and brief description of each BMP and associated measurable goal included in the Permittee's previously approved SWMP under the prior General Permit, Order 2003-0005-DWQ, that constitutes a more specific local or tailored level of implementation that may be more protective of water quality than the minimum requirements of this Order; and identification of whether the Permittee proposes to maintain, reduce, or cease implementation for each more protective, locally-tailored BMP. In no instance may a BMP be reduced or ceased if it is required by the minimum standards set by this Order.

33. Minimum measures have been established in this Order to simplify assessment of compliance and allow the public to more easily assess each Permittee's compliance.

34. Each provision establishes the required task description, minimum implementation levels (i.e., escalating enforcement, reporting requirements for tracking projects, number of monitoring sites, etc.), and reporting elements to substantiate that the Permittee meets these implementation levels. Regional Water Board staff will be able to evaluate each individual Permittee's compliance through Annual Report review and the program evaluation (audit) process.

35. The provisions contained in this Order were derived from two main U.S. EPA documents: MS4 Program Evaluation Guide[5] and the MS4 Permit Improvement Guide[6] along with interviews and information gathered from a lengthy collaborative stakeholder process.

36. Consistent with Clean Water Act section 402(p)(3)(B)(iii), this Order requires controls to reduce pollutants from the MS4 to the maximum extent practicable (MEP). The MEP standard requires Permittees to apply Best Management Practices (BMPs) that are effective in reducing or eliminating the discharge of pollutants to the waters of the U.S. MEP emphasizes pollutant reduction and source control BMPs to prevent pollutants from entering storm water runoff. MEP may require treatment of the storm water runoff if it contains pollutants. The MEP standard is an ever-evolving, flexible, and advancing concept, which considers technical and economic feasibility. BMP development is a dynamic process and may require changes over time as the Permittees gain experience and/or the state of the science and art progresses. To do this, the Permittees must conduct and document evaluation and assessment of each relevant element of its program, and their program as a whole, and revise activities, control measures/BMPs, and measurable goals, as necessary to meet MEP. MEP is the cumulative result of implementing, evaluating, and creating corresponding changes to a variety of technically appropriate and economically feasible BMPs, ensuring that the most appropriate BMPs are implemented in the most effective manner.

37. The Order's Receiving Water Limitations language is consistent with State Water Board Order WQ 99-05 (*Orange County)* adopted by the State Water Board on June 17, 1999. Receiving Water Limitations apply to all Permittees subject to this Order. The State Water Board held a workshop on November 20, 2012, to hear comments on the receiving water limitations provisions in MS4 permits. This Order has a reopener clause that will allow the State Water Board to reopen the Order if the Board directs changes to the Receiving Water Limitations language based on comments received.

38. Non-storm water discharges consist of all discharges from an MS4 that do not originate from precipitation events. This Order effectively prohibits non-storm water discharges through an

[5] Municipal Separate Storm Sewer System (MS4) Program Evaluation Guidance, USEPA, EPA-833-R-07-003, January 1, 2007
[6] MS4 Permit Improvement Guide, USEPA, April 1, 2010

MS4 into waters of the U.S. Certain categories of non-storm water discharges are conditionally exempt as specified at 40 Code of Federal Regulations section 122.26(d)(2)(iv)(B)(1). Non-storm water discharges that are regulated by a separate NPDES permit are not subject to the discharge prohibition. Prohibited non-storm water discharges include conditionally exempt discharges that are found to be a significant source of pollutants to waters of the U.S.

39. Non-storm water discharges to ASBS are prohibited except as specified in the General Exception. Certain enumerated non-storm water discharges are allowed under the General Exception if essential for emergency response purposes, structural stability, slope stability, or if occur naturally. In addition, an NPDES permitting authority may authorize non-storm water discharges to an MS4 with a direct discharge to an ASBS to the extent the NPDES permitting authority finds that the discharge does not alter natural ocean water quality in the ASBS. This Order allows utility vault discharges to an MS4 with a direct discharge to an ASBS, provided the discharge is authorized by the General NPDES Permit for Discharges from Utility Vaults and Underground Structures to Surface Water, NPDES No. CAG 990002. The State Water Board is in the process of reissuing the General NPDES Permit for Utility Vaults. As part of the renewal, the State Water Board will require a study to characterize representative utility vault discharges to an MS4 with a direct discharge to an ASBS and will impose conditions on such discharges to ensure the discharges do not alter natural ocean water quality in the ASBS. Given the limited number and intermittent nature of utility vault discharges to MS4s that discharge directly to an ASBS, the State Water Board finds that discharges from utility vaults and underground structures to an MS4 with a direct discharge to an ASBS are not expected to result in a substantial alteration of natural ocean water quality in the ASBS in the interim period while the General NPDES Permit for Discharges from Utility Vaults is renewed and the study is completed. Other short-duration, intermittent non-storm water discharges related to LUPs (e.g. groundwater dewatering, potable water system flushing, hydrotest discharges) are regulated under NPDES permits issued by the Regional Water Boards. Although such discharges are not specifically enumerated in the General Exception as essential for emergency response purposes, structural stability, or slope stability, they may be required to ensure the safety and stability of the utility systems or for operations and maintenance and for extending these essential services. For this reason, and because the short-duration and intermittent nature of these discharges renders them unlikely to result in substantial alteration of natural ocean water quality in the ASBS, this Order permits such discharges to a segment of the MS4 with a direct discharge to an ASBS provided they are authorized by an NPDES permit issued by the State Water Board or relevant Regional Water Board. However, if a Regional Water Board determines a specific discharge from a utility vault or underground structure does alter the natural ocean water quality in an ASBS, the Regional Water Board may prohibit the discharge as specified in this Order.

40. Total Maximum Daily Loads (TMDL) are numerical calculations of the maximum amount of a pollutant that a water body can assimilate and still meet water quality standards. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point sources (waste load allocations) and non-point sources (load allocations), background contribution, plus a margin of safety. Discharges from Small MS4s are point source discharges subject to TMDLs. This Order requires Permittees to comply with all applicable TMDLs approved pursuant to 40 Code of Federal Regulations section 130.7 that assign a Waste Load Allocation to Permittee and that have been identified in Attachment G. The high variance in the level of detail and specificity of TMDLs necessitates the development of more specific permit requirements in many cases to provide clarity to the Permittees regarding responsibilities for compliance. The Regional Water Boards have submitted TMDL-specific permit requirements to the State Water Board, for applicable TMDLs, along with statements explaining how the requirements are designed to achieve the goals of the TMDLs (incorporated into the Fact Sheet). The TMDL-specific permit requirements are summarized

in Attachment G and are an enforceable component of this Order. The Regional Water Boards are additionally being directed through this Order to review the TMDL-specific permit requirements of Attachment G in consultation with the Permittees and the State Water Board staff and propose any revisions to the State Water Board within one year of the effective date of this Order. TMDLs applicable to non-traditional dischargers in the region of the Los Angeles Regional Water Board are listed in Attachment G without TMDL-specific permit requirements. The Los Angeles Water Board is being directed to develop and propose TMDL-specific permit requirements for Attachment G in consultation with the Permittees and the State Water Board staff within one year of the effective date of this Order. Any such revisions will be incorporated into the permit through a reopener.

41. Degraded watershed processes lead to degraded water quality. To fully protect beneficial uses, post-construction runoff retention and hydromodification control criteria for individual projects must be derived with a knowledge of dominant watershed processes. Watershed management zones will be delineated by the State Board during this permit term. The Watershed management zones will be used to identify applicable areas and appropriate criteria for runoff retention and hydromodification control to be incorporated into the next permit. Regional Water Boards that approve watershed process-based criteria for post-construction during this permit term will be permitted to require Permittees to implement these criteria.

42. The post-construction requirements and design standards contained in this Order are consistent with State Water Board Order WQ 2000-11 (*Bellflower)*.

43. State Water Board, California State Parks and the State Historic Preservation Officer may coordinate efforts to manage post-construction projects involving historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

44. Permittees will submit Annual Reports electronically using the State Water Board's Storm Water Multi-Application Reporting and Tracking System (SMARTS). The purpose of the Annual Report is to evaluate (1) the implementation of Permittees' storm water program; (2) the effectiveness of BMPs and Measurable Goals, (3) the Permittee's improvement opportunities to achieve MEP, and (4) any supplemental information required by a Regional Water Board in accordance with the Regional Water Board's specific requirements.

45. To apply for General Permit coverage authorizing storm water discharges to surface waters pursuant to this Order, the Permittees shall electronically file a Notice of Intent (NOI) using SMARTS and mail the appropriate permit fee to the State Water Board. The NOI represents the Permittee's commitment to comply with the BMPs specified in this Order to achieve compliance with the minimum control measures specified at 40 Code of Federal Regulations sections122.34 (b)(1) through (b)(6).

46. Under 40 Code of Federal Regulations section 122.35, a Separate Implementing Entity (SIE) can implement a storm water management program for another entity such as a municipality, agency, or special district. The SIE implements parts or all of a storm water program for a Permittee. Permittees relying on a SIE to implement their entire program must electronically file an NOI using SMARTS and mail appropriate fee to the State Water Board.

47. Each Permittee is individually responsible for adoption and enforcement of ordinances and/or policies, implementation of identified control measures/BMPs needed to prevent or reduce pollutants in storm water and operation and maintenance (O&M). Enforcement actions concerning this Order will be pursued only against the individual Permittee responsible for specific violations of this Order.

48. In accordance with 40 Code of Federal Regulations section122.28(b)(3), a Regional Water Board may issue an individual MS4 NPDES Permit to a Permittee otherwise subject to this Order, or adopt an alternative general permit that covers storm water discharges regulated by this Order. In accordance with Code of Federal Regulations section 122.34(b)(3), a Regulated Small MS4 in the same urbanized area as a medium or large MS4 may jointly with the medium or large MS4 seek a modification of the other MS4s permit to be added as a limited co-permittee. The applicability of this Order is automatically terminated on the effective date of the individual permit or joint permit or the date of approval for coverage under the alternative general permit.

49. Certain BMPs implemented or required by Permittees for urban runoff management may create a habitat for vectors (e.g., mosquitoes and rodents) if not properly designed or maintained. Close collaboration and cooperation among the Permittees, local vector control agencies, Regional Water Board staff, and the California Department of Public Health is necessary to identify and implement appropriate vector control measures that minimize potential nuisances and public health impacts resulting from vector breeding.

50. 40 Code of Federal Regulations section 131.12 requires that state water quality standards include an anti-degradation policy consistent with the federal policy. The State Water Board established California's anti-degradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal anti-degradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Water Quality Control Plans (Basin Plans) implement, and incorporate by reference, both the State and federal anti-degradation policies.

51. This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code § 21100, et seq.) in accordance with Water Code section13389. (*County of Los Angeles v. Cal. Water Boards*, (2006), 143 Cal.App.4th 985.)

52. Following public notice in accordance with State and federal laws and regulations, the State Water Board, in a public hearing on August 8, 2012, heard and considered all comments. The State Water Board has prepared written responses to all significant comments.

53. The State Water Board has considered the costs of complying with this Order and whether the required BMPs meet the minimum MEP Standard required by federal law. Further discussion of cost of compliance is included in the Fact Sheet.

54. This Order shall serve and become effective as an NPDES permit and the Permitees shall comply with all its requirements pursuant to the timeframes identified within the permit.

IT IS HEREBY ORDERED that operators of Small MS4s subject to this Order shall comply with the following:

A. APPLICATION REQUIREMENTS FOR ALL SMALL MS4 PERMITTEES

Any Small MS4s designated under this Order that chooses to apply for an individual permit or request to join the permit of a Phase I Permittee must notify the Regional Water Board of its intent to do so by July 1, 2013. Census Designated Places (CDPs) listed on Attachment A that are located within an existing NPDES permit area are not required to file for separate coverage and pay separate fees.

A.1. Small MS4 Permittees (Except for Department of Defense and Department of Corrections and Rehabilitation Permittees)

a. New Permittees shall electronically file an NOI via SMARTS and mail the appropriate fee to the State Water Board by July 1, 2013. Renewal Permittees shall electronically file an NOI via SMARTS and pay the appropriate application fee to the State Water Board. Any Renewal Permittees with paid 2013 application fee invoices shall receive a prorated refund. If the Permittee is designated as a Regulated Small MS4 by a Regional Water Board after adoption of this Order, the Permittee shall file the NOI and mail the appropriate fee within six months of the date of designation.

b. General Permit coverage will be in effect upon receipt of the following:
   1) NOI via SMARTS
   2) Appropriate Fee (in accordance with the most recent fee schedule[7])
   3) Permit boundary map delineating permit jurisdiction: At a minimum the map shall include the following:

      (a) Phase II MS4 permit boundary based on 2010 Census data. For cities, the permit area boundary is the city boundary. For Counties, permit boundaries must include urbanized areas and places identified in Attachment A located within their jurisdictions. The boundaries must be proposed in the permit boundary map and may be developed in conjunction with the applicable Regional Water Board
      (b) City/County Boundaries
      (c) Main Arterial Streets
      (d) Highways
      (e) Waterways
      (f) Phase I MS4 Permit Boundary (if applicable)

   4) Guidance document: The document shall at least include the following:

      New Permittees:
      (a) Overall program planning
      (b) Identifification of all permit requirements and responsible implementing parties

      Renewal Permittees:
      (a) Overall program planning
      (b) Identification of all permit requirements and responsible implementing parties

[7] California Code of Regulations. Title 23. Division 3. Chapter 9 Waste Discharge Reports and Requirements. Article 1 Fees.

(c) Identification and brief description of each BMP and associated measurable goal included in the Permittee's most current SWMP that constitutes a more specific local or tailored level of implementation that may be more protective of water quality than the minimum requirements of this Order.
(d) Identification of whether the Permittee will maintain, reduce, or cease implementation for each more protective, locally-tailored BMP.
(e) For any more protective, locally-tailored BMP and associated measurable goal for which the Renewal Permittee will reduce or cease implementation, the Renewal Permittee shall demonstrate to the Executive Officer of the relevant Regional Water Board that the reduction or cessation is in compliance with this Order and the maximum extent practicable standard, and will not result in increased pollutant discharges. The demonstration by the Permittee will be subject to public comment before any approval by the Executive Officer of reduction or cessation of BMPs In no instance may the Renewal Permittee reduce or cease a BMP if it is required by the minimum standards set by this Order.

The guidance document may be in spreadsheet, tabular or narrative format.

A.2. Department of Defense and Department of Corrections and Rehabilitation Permittees

a. Permittee shall electronically file an NOI via SMARTS and mail the appropriate fee to the State Water Board by July 1, 2013. If the Permittee is designated as a Regulated Small MS4 by a Regional Water Board after adoption of this Order, the Permittee shall file the NOI and mail the appropriate fee within six months of the date of designation.

b. General Permit coverage will be in effect upon receipt of the following:
   1) NOI via SMARTS
   2) Appropriate fee (in accordance with the most recent fee schedule[8])
   3) Permit boundary map as developed by the Permittee

Renewal MS4s must continue implementing their current storm water management programs until submittal of a NOI via SMARTS.

A.3. Waiver Certification

Regulated Small MS4s may seek a waiver from the General Permit requirements if they meet criteria specified in 40 C.F.R. §122.32(c)-(e) or additional criteria specified in A.3.b.(3) below.

In order for a Regional Water Board to waive requirements for a Regulated Small MS4, (1) the Regulated Small MS4 must certify that its discharges do not cause or contribute to, or have the potential to cause or contribute to, a water quality impairment, and (2) the Regulated Small MS4 must meet one of the waiver options in Section b below:

a. Waiver Certification Application Requirements - A Waiver Certification will only be in effect upon completion of the following:

[8] California Code of Regulations. Title 23. Division 3. Chapter 9 Waste Discharge Reports and Requirements. Article 1 Fees.

1) Annual Waiver Certification submitted via SMARTS.
2) Annual Waiver Certification renewal fee of $200 plus any applicable surcharge.
3) Letter via SMARTS from Regional Water Board or its Executive Officer waiving requirements.

Requirements are automatically waived if the Regional Water Board does not respond within six months.

b. Waiver Criteria

(1) Option 1

(a) The jurisdiction served by the system is less than 1,000 people;
(b) The system is not contributing substantially (as defined in Finding 25) to the pollutant loadings of a physically interconnected regulated MS4; and
(c) If the small MS4 discharges any pollutants identified as a cause of impairment of any water body to which it discharges, storm water controls are not needed based on WLAs that are part of a U.S.EPA approved or established TMDL that addresses the pollutant(s) of concern.

(2) Option 2

(a) The jurisdiction served by the system is less than 10,000 people;
(b) The Regional Water Board has evaluated all waters of the U.S. that receive a discharge from the system;
(c) The Regional Water Board has determined that storm water BMPs are not needed based on WLAs that are part of a U.S. EPA approved or established TMDL that addresses the pollutant(s) of concern or an equivalent analysis; and
(d) The Regional Water Board has determined that future discharges from the Regulated Small MS4 do not have the potential to result in exceedances of water quality standards.

(3) Option 3 (applicable to Small MS4s outside an Urbanized Area only)

Small Disadvantaged Community – The Regulated Small MS4 certifies that it is a community with a population of 20,000 or less with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI. (Wat. Code, § 79505.5 , subd.(a)).

If the Waiver Certification Application Requirements or conditions of any waiver option are not met by the Regulated Small MS4, then the Regulated Small MS4 must submit a NOI via SMARTS and appropriate fee for coverage under this General Permit or apply for an individual NPDES permit.

The State Water Board or a Regional Water Board can, at any time, require a previously waived Regulated Small MS4 to comply with this General Permit or an individual NPDES permit if circumstances change so that the conditions of the waiver are no longer met. Changed circumstances can also allow a Regulated Small MS4 to request a waiver at any time.

B. DISCHARGE PROHIBITIONS

1. Discharges of waste from the MS4 that are prohibited by Statewide Water Quality Control Plans or applicable Regional Water Quality Control Plans (Basin Plans) are prohibited.

2. Discharges of storm water from the MS4 to waters of the U.S. in a manner causing or threatening to cause a condition of pollution or nuisance as defined in Water Code § 13050 are prohibited.

3. Discharges through the MS4 of material other than storm water to waters of the U.S. shall be effectively prohibited, except as allowed under this Provision or as otherwise authorized by a separate NPDES permit. The following non-storm water discharges are not prohibited provided any pollutant discharges are identified and appropriate control measures to minimize the impacts of such discharges, are developed and implemented under the Permittee's storm water program. This provision does not obviate the need to obtain any other appropriate permits for such discharges.

    a. water line flushing;
    b. individual residential car washing;
    c. diverted stream flows;
    d. rising ground waters;
    e. uncontaminated ground water infiltration (as defined at 40 C.F.R. §35.2005(20)) to separate storm sewers;
    f. uncontaminated pumped ground water;
    g. discharges from potable water sources;
    h. foundation drains;
    i. air conditioning condensation;
    j. springs;
    k. water from crawl space pumps;
    l. footing drains;
    m. flows from riparian habitats and wetlands;
    n. dechlorinated swimming pool discharges; and
    o. incidental runoff from landscaped areas(as defined and in accordance with Section B.4 of this Order).

    Discharges or flows from fire-fighting activities are excluded from the effective prohibition against non-storm water and need only be addressed where they are identified as significant sources of pollutants to waters of the U.S.

    If a Permittee or a Regional Water Board Executive Officer determines that any individual or class of non-storm water discharge(s) listed above may be a significant source of pollutants to waters of the U.S. or physically interconnected MS4, or poses a threat to water quality standards (beneficial uses), the Regional Water Board Executive Officer may require the appropriate Permittee to monitor and submit a report and to implement BMPs on the discharge.

4. Discharges in excess of an amount deemed to be incidental runoff shall be controlled. Regulated Small MS4s shall require parties responsible for such to implement Sections B.4.a-d below. Incidental runoff is defined as unintended amounts (volume) of runoff,

such as unintended, minimal over-spray from sprinklers that escapes the area of intended use. Water leaving an intended use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence.

Parties responsible for controlling runoff in excess of incidental runoff shall:

a. Detect leaks (for example, from broken sprinkler heads) and correct the leaks within 72 hours of learning of the leak;

b. Properly design and aim sprinkler heads;

c. Not irrigate during precipitation events; and

d. Manage pond containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and the appropriate Regional Water Board is notified by email no later than 24 hours after the discharge. The notification is to include identifying information, including the Permittee's name and permit identification number.

Non-storm water runoff discharge that is not incidental is prohibited, unless otherwise specified in Section B.3 above.

Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a NPDES permit, including MS4 permits.

5. Discharge to Areas of Special Biological Significance (ASBS) is prohibited except in compliance with the ASBS Special Protection Provisions in Attachment C. Regulated Small MS4s that discharge to an ASBS are listed in Attachment D and are subject to the ASBS Special Protection Provisions.

C. EFFLUENT LIMITATIONS

1. Permittees shall implement controls as required by this Order to reduce the discharge of pollutants from their MS4s to waters of the U. S. to the MEP. Permittees shall additionally reduce the discharge of pollutants (1) to achieve TMDL waste load allocations (WLAs) established for discharges by the MS4s and (2) to comply with the Special Protections for discharges to ASBS.

2. Storm water discharges regulated by this Order shall not contain a hazardous substance in amounts equal to or in excess of a reportable quantity listed in 40 C.F.R. Part 117 or 40 C.F.R. Part 302.

D. RECEIVING WATER LIMITATIONS

Discharges shall not cause or contribute to an exceedance of water quality standards contained in a Statewide Water Quality Control Plan, the California Toxics Rule (CTR), or in the applicable Regional Water Board Basin Plan.

The Permittee shall comply with Receiving Water Limitations through timely implementation of control measures/BMPs and other actions to reduce pollutants in the discharges and other requirements of this Order including any modifications. The storm water program shall be designed to achieve compliance with Receiving Water Limitations. If exceedance(s) of water quality objectives or water quality standards persist notwithstanding implementation of other storm water program requirements of this Order, the Permittee shall assure compliance with Receiving Water Limitations by complying with the following procedure:

1. Upon a determination by either the Permittee or the Regional Water Board that MS4 discharges are causing or contributing to an exceedance of an applicable water quality standard, the Permittee shall promptly notify and thereafter submit a report to the Regional Water Board that describes BMPs that are currently being implemented and additional BMPs that will be implemented to prevent or reduce any pollutants that are causing or contributing to the exceedance of water quality standards. The report shall include an implementation schedule. The Regional Board may require modifications to the report;

2. Submit any modifications to the report required by the Regional Water Board within 30 days of notification;

3. Implement the actions specified in the report in accordance with the approved schedule;

4. So long as the Permittee has complied with the procedure set forth above and is implementing the actions, the Permittee does not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed by the State Water Board or the Regional Water Board to develop additional BMPs.

E. PROVISIONS FOR ALL TRADITIONAL SMALL MS4 PERMITTEES

E.1. RENEWAL TRADITIONAL SMALL MS4 PERMITTEES

All Renewal Traditional Small MS4s Permittees shall comply with this Section. Where the requirements of a certain subsection provide a compliance date that is past the effective date of this Order, the Renewal Traditional Small MS4 shall implement its existing program until that date.

E.2. NEW TRADITIONAL SMALL MS4 PERMITTEES

New Traditional Small MS4s shall comply with this Section.

E.3. NON-TRADITIONAL SMALL MS4S PERMITTEES

E.3.a. All Renewal Non-Traditional Small MS4 Permittees shall comply with Section F of this Order. Where the requirements of a certain subsection provide a compliance date that is past the effective date of this Order, the Renewal Non-Traditional Small MS4 shall implement its existing program until that date.

E.3.b. New Non-Traditional Small MS4s Permittees shall comply with Section F of this Order.

E.4. SMALL MS4 ASBS PERMITTEES

Both Traditional and Non-traditional Small MS4s Permittees that discharge to ASBS as listed on Attachment D shall comply with Attachment C in addition to all other applicable provisions of this Order.

E.5. SEPARATE IMPLEMENTING ENTITY (SIE)

Permittees, both Traditional and Non-traditional Small MS4s, may rely on a SIE to satisfy one or more of the permit obligations, if the SIE can appropriately and adequately address the storm water issues of the Permittee. The SIE must agree to implement the BMPs, or components thereof, to achieve compliance with this Order. If the SIE fails to implement the BMPs, the Permittee remains responsible for compliance with this Order.

E.6. PROGRAM MANAGEMENT ELEMENT

To effectively implement a coordinated storm water program, the Permittee shall have an overarching Program Management element in its storm water management program. The Program Management element shall include the following:

E.6.a. Legal Authority

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall review and revise relevant ordinances or other regulatory mechanisms, or adopt any new ordinances or other regulatory mechanisms, to obtain adequate legal authority, to the extent allowable under state or local law, to control pollutant discharges into and from, as applicable, its MS4, and to meet the requirements of this Order.

(ii) **Implementation Level** –At a minimum, the Permittee shall have adequate legal authority to:

(a) Effectively prohibit non-storm water discharges through the MS4. Exceptions to this prohibition are NPDES-permitted discharges of non-storm water and non-storm water discharges in B.3 that are considered non-significant contributors of pollutants. Where the non-storm water discharge is to a segment of an MS4 that discharges directly to an ASBS, exceptions to the non-storm water prohibition are specified in Attachment C.

(b) Detect and eliminate illicit discharges and illegal connections to the MS4. Illicit connections include pipes, drains, open channels, or other conveyances that have the potential to allow an illicit discharge to enter the MS4. Illicit discharges include all non-storm water discharges not otherwise authorized in this Order, including discharges from organized car washes, mobile cleaning and pressure wash operations,

(c) Respond to the discharge of spills, and prohibit dumping or disposal of materials other than storm water into the MS4.

(d) Require parties responsible for runoff in excess of incidental runoff to implement Discharge Prohibition B.4.a-e.

(e) Require operators of construction sites, new or redeveloped land; and industrial and commercial facilities to minimize the discharge of pollutants to the MS4 through the installation, implementation, or maintenance of BMPs consistent with the California Storm Water Quality Association (CASQA) Best Management Practice Handbooks or equivalent.

(f) Require information deemed necessary to assess compliance with this Order. The Permittee shall only require information in compliance with the Homeland Security Act or any other federal law that concerns security in the United States. The Permittee shall also have the authority to review designs and proposals for new development and redevelopment to determine whether adequate BMPs will be installed, implemented, and maintained during construction and after final stabilization (post-construction).

(g) Enter private property for the purpose of inspecting, at reasonable times, any facilities, equipment, practices, or operations for active or potential storm water discharges, or non-compliance with local ordinances/standards or requirements in this Order, as consistent with any applicable state and federal laws.

(h) Require that dischargers promptly cease and desist discharging and/or cleanup and abate a discharge, including the ability to:

1) Effectively require the discharger to abate and clean up their discharge, spill, or pollutant release within 72 hours of notification; high risk spill should be cleaned up as soon as possible.

2) Require abatement within 30 days of notification, for uncontrolled sources of pollutants that could pose an environmental threat;

3) Perform the clean-up and abatement work and bill the responsible party, if necessary;

4) Provide the option to order the cessation of activities until such problems are adequately addressed if a situation persists where pollutant-causing sources or activities are not abated;

5) Require a new timeframe and notify the appropriate Regional Water Board when all parties agree that clean-up activities cannot be completed within the original timeframe and notify the appropriate Regional Water Board in writing within five business days of the determination that the timeframe requires revision.

(i) When warranted, have the ability to:

1) Levy citations or administrative fines against responsible parties either immediately at the site, or within a few days.

2) Require recovery and remediation costs from responsible parties.

(j) Impose more substantial civil or criminal sanctions (including referral to a city or district attorney) and escalate corrective response, consistent with its Enforcement Response Plan developed pursuant to Section E.6.c., for persistent non-compliance, repeat or escalating violations, or incidents of major environmental harm.

E.6.b. Certification

(i) **Task Description –** Within the second year of the effective date of the permit, the Permittee shall certify by its Principal Executive Officer, Ranking Elected Official, or Duly Authorized Representative as described in 40 Code of Federal Regulations section 122.22(b) that the Permittee has and will maintain full legal authority to implement and enforce each of the requirements contained in this Order.

(ii) **Implementation Level** – The Permittee's certification statement shall include the following:

(a) Identification of all departments within the Permittee's jurisdiction that conduct storm water-related activities and their roles and responsibilities under this Order.

(b) Citation of storm water runoff related ordinances, identification of the topics each ordinance addresses;

(c) Identification of the local administrative and legal procedures and ordinances available to mandate compliance with storm water-related ordinances and therefore with the conditions of this Order.

(d) A description of how storm water related-ordinances are reviewed and implemented.

(e) A statement that the municipality will implement enforcement actions consistent with its Enforcement Response Plan developed pursuant to Section E.6.c.

(iii) **Reporting** – All Permittees shall submit in the second year online Annual Report, a statement signed by an authorized signatory certifying the Permittee has adequate legal authority to comply with all Order requirements.

E.6.c. Enforcement Measures and Tracking

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and implement an Enforcement Response Plan. The Enforcement Response Plan shall contain enforcement procedures and actions and identify the Permittee's responses to violations and describe how the Permittee will address repeat and continuing violations by implementing progressively stricter responses as needed to achieve compliance.

(ii) **Implementation Level -** The Enforcement Response Plan shall describe how the Permittee will use each of the following types of enforcement responses based on the type of violation:

(a) Verbal Warnings – Verbal warnings are primarily consultative in nature. At a minimum, verbal warnings shall specify the nature of the violation and required corrective action.

(b) Written Notices – Written notices shall include nature of the violation and the required corrective action, with deadlines for taking such action.

(c) Escalated Enforcement Measures – The Permittee shall establish legal authority to employ any combination of the enforcement actions below (or their functional equivalent), and to escalate enforcement responses where necessary to correct persistent non-compliance, repeat or escalating violations, or incidents of major environmental harm:

1) Citations (with Fines) – The Enforcement Response Plan shall describe when the Permittee will assess monetary fines, which may include civil and administrative penalties.

2) Stop Work Orders – The Enforcement Response Plan shall describe when the Permittee will issue stop work orders that require construction activities to be halted, except for those activities directed at cleaning up, abating discharge, and installing appropriate BMPs.

3) Withholding of Plan Approvals or Other Authorizations – Where a facility is in non-compliance, the Enforcement Response Plan shall describe how the Permittee's own approval or authorization processes that affect the facility's ability to discharge to the MS4 can be used to abate the violation.

4) Additional Measures – The Enforcement Response Plan may also describe other escalated measures the Permittee has under its local legal authorities. For example, the Permittee may need to improve erosion control measures and collect the funds to pay for work and materials from the responsible party by either collecting against the project's bond or directly billing the responsible party.

(d) NPDES Permit Referrals–For those construction projects or industrial facilities subject to the State's Construction General Permit (CGP) or Industrial General Permit (IGP), the Permittee shall:

1) Refer non-filers (i.e., those facilities that cannot demonstrate that they obtained permit coverage) to the appropriate Regional Water Board within 30 days of making that determination, or file a complaint on the State Water Board's website: http://www.dtsc.ca.gov/database/CalEPA_Complaint/index.cfm. In making such referrals, at a minimum include the following documentation:

a) Construction project or industrial facility location.

b) Name of owner or operator.

c) Estimated construction project size or type of industrial activity (including the Standard Industrial or the North American Industry Classification, if known).

d) Records of communication with the owner or operator regarding filing requirements.

2) Refer ongoing violations to the appropriate Regional Water Board provided that the Permittee has made a good faith effort of progressive enforcement to achieve compliance with its own ordinances. At a minimum, the Permittee's good faith effort shall include documentation

of two follow-up inspections and two warning letters or notices of violation. In making such referrals, the Permittee shall include, at a minimum, the following information:

a) Construction project or industrial facility location

b) Name of owner or operator

c) Estimated construction project size or type of industrial activity (including Standard Industrial Classification or North American Industry Classification System if known)

d) Records of communication with the owner or operator regarding the violation, including at least two follow-up inspections, two warning letters or notices of violation, and any response from the owner or operator

e) Enforcement Tracking –Track instances of non-compliance via hard-copy files or electronically. The enforcement tracking documentation shall include, at a minimum, the following:

(1) Name of owner/operator

(2) Location of construction project or industrial facility

(3) Description of violation

(4) Required schedule for returning to compliance

(5) Description of enforcement response used, including escalated responses if repeat violations occur or violations are not resolved within the time specified in the enforcement action.

(6) Accompanying documentation of enforcement response (e.g., notices of noncompliance, notices of violations, etc.)

(7) Any referrals to different departments or agencies

f) Recidivism Reduction – The Permittee shall identify chronic violators of any provision of this Order or of any related local ordinance or regulation and reduce the rate of noncompliance recidivism. The Permittee shall develop incentives, disincentives, or increase inspection frequency at the operator's sites to prevent chronic violations.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.7. EDUCATION AND OUTREACH PROGRAM

Traditional Small MS4 Permittees may be required to implement Community-Based Social Marketing (CBSM) requirements as detailed in Attachment E upon determination by a Regional Board Executive Officer. The Regional Board Executive Officer shall notify Permittees within

three months of the permit adoption date of their determination to require CBSM.[9] The notification shall include a statement of reasons why the Executive Officer finds that implementation of CBSM is appropriate. If the Permittee disagrees with the Executive Officer determination, the Permittee may bring the dispute to the State Water Board Executive Director or his designee as specified under the Dispute Resolution provision of this Order.

E.7.a. Public Education and Outreach

Within the first year of the effective date of the permit, all Permittees shall comply with the requirements in this Section by selecting one or more of the following Public Education and Outreach options:

1) Contributing to a countywide storm water program, as determined appropriate by the Permittee members, so that the countywide storm water program conducts outreach and education on behalf of its members; or
2) Contributing to a regional outreach and education collaborative effort (a regional outreach and education collaborative effort occurs when all or a majority of the Permittees collaborate to conduct regional outreach and education. Regional outreach and education collaboration includes Permittees defining a uniform and consistent message, deciding how best to communicate the message, and how to facilitate behavioral changes, then collaboratively apply what is learned through local jurisdiction groups, pooling resources and skills.); or
3) Fulfilling outreach and education requirements within their jurisdictional boundaries on their own; or
4) A combination of the previous options, so that all requirements are fulfilled.

Reporting – By the first year Annual Report, the Permittee shall submit information indicating which Public Education and Outreach option(s) it will use to comply with this Section. For each option involving a contribution to a countywide storm water program or regional outreach and education collaborative effort, the Permittee shall complete and have available in the first year Annual Report documentation, such as a written agreement, letter or similar document, which confirms the collaboration with other MS4s.

(i)**Task Description** – Within the second year of the effective date of the permit, the Permittee shall develop and implement a comprehensive storm water public education and outreach program. The public education and outreach program shall be designed to reduce pollutant discharges in storm water runoff and non-storm water discharges to the MS4 through increased storm water knowledge and awareness in target communities. The Public Education and Outreach Program shall be designed to measurably increase the knowledge and awareness of targeted audience regarding the municipal storm drain system, impacts of urban runoff and non-storm water discharges on receiving waters, and potential BMP solutions for the target audiences, thereby reducing pollutant releases to the MS4 and the environment.

[9] Getting in Step, A Guide to, Conducting Watershed Outreach Campaigns, 3rd Edition, November 2010, EPA 841-B-10-002, USEPA, Office of Water.

(ii) **Implementation Level** –The Permittee shall, at a minimum:

(a) Develop and implement a public education strategy that establishes education tasks based on water quality problems, target audiences, and anticipated task effectiveness. The strategy must include identification of who is responsible for implementing specific tasks and a schedule for task implementation. The strategy must demonstrate how specific high priority storm water quality issues in the community or local pollutants of concern are addressed.

(b) Implement surveys at least twice during the permit term to gauge the level of awareness in target audiences and effectiveness of education tasks.

(c) Develop and convey a specific storm water message that focuses on the following:
1) Local pollutants of concern
2) Target audience
3) Regional water quality issues

(d) Develop and disseminate appropriate educational materials to target audiences and translate into applicable languages when appropriate (e.g. the materials can utilize various media such as printed materials, billboard and mass transit advertisements, signage at select locations, stenciling at storm drain inlets, radio advertisements, television advertisements, and websites);
(e) Utilize public input (e.g., the opportunity for public comment, or public meetings) in the development of the program;
(f) Distribute the educational materials, using whichever methods and procedures determined appropriate during development of the public education strategy;
(g) Convey messages to explain the benefits of water-efficient and storm water-friendly landscaping[10], using existing information if available;
(h) Develop and convey messages specific to reducing illicit discharges with information about how the public can report incidents to the appropriate authorities. The Permittee must promote, publicize, and facilitate public reporting of illicit discharges or water quality impacts associated with discharges into or from MS4s through a central contact point, including phone numbers for complaints and spill reporting, and publicize to both internal Permittee staff and the public. If 911 is selected, the Permittee must also create, maintain, and publicize a staffed, nonemergency phone number with voicemail, which is checked daily;
(i) Develop and convey messages specific to proper application of pesticides, herbicides, and fertilizers;
(j) Within the Permittee's jurisdiction, provide independent, parochial, and public schools with materials to effectively educate school –age children about storm water runoff and how they can help protect water quality habitat in their local watershed (s). The Permittee is encouraged to use environmental and place-based, experiential learning materials that are integrated into school curricula and school facility management[11]. In the case that an environmental and place-

[10] For example, Surfrider's Ocean Friendly Garden Program (http://www.surfrider.org/programs/entry/ocean-friendly-gardens) and the Water Efficient Landscape Ordinance (WELO)
[11] For example, Splash (*www.sac**splash**.org/*),Effie Yeaw Nature Center (www.sacnature.net) or Yolo Basin (www. yolobasin.org)

based, experiential learning local program does not exist, the Permittee may use California's Education and Environment Initiative Curriculum[12] or equivalent.

(k) Develop (or coordinate with existing, effective programs) and convey messages specific to reducing discharges from organized car washes, mobile cleaning and pressure washing operations, and landscape irrigation.

(l) Conduct storm water-friendly education for organized car wash participants and provide information pertaining to car wash discharge reduction. The Permittee may use the Sacramento Stormwater Quality Partnership's River Friendly Carwash Program[13], or equivalent, for guidance.

(m) Develop and convey messages specific to mobile cleaning and pressure wash businesses.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.7.b. Staff and Site Operator Training and Education

E.7.b.1. Illicit Discharge Detection and Elimination Training

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and implement a training program for all Permittee staff who, as part of their normal job responsibilities, may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection to the storm drain system.

(ii) **Implementation Level** – The training program shall include at a minimum:

(a) Identification of an illicit discharge or illegal connection.

(b) Proper procedures for reporting and responding to the illicit discharge or illegal connection.

(c) Follow-up training shall be provided as needed to address changes in procedures, techniques, or staffing.

(d) An annual assessment of their trained staff's knowledge of illicit discharge response and refresher training as needed.

(e) Training for new staff who, as part of their normal job responsibilities may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection shall be trained no later than six months after the start of employment.

(f) Contact information, including the procedure for reporting an illicit discharge, shall be included in each of the Permittee's fleet vehicles that are used by field staff.

(g) Focused education on identified illicit discharges and associated illicit discharge locations.

[12] http://www.californiaeei.org/
[13] http://www.beriverfriendly.net/riverfriendlycarwashing/

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.7.b.2. Construction Outreach and Education

(a) Permittee Staff Training

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall ensure that all staff implementing the construction site storm water runoff control program are adequately trained.

(ii) **Implementation Level** – The Permittee may conduct in-house training or contract with consultants. Training shall be provided to the following staff positions of the MS4:

(a) Plan Reviewers and Permitting Staff - The Permittee shall ensure plan reviewers and permitting staff are qualified individuals, knowledgeable in the technical review of local erosion and sediment control plans, (including proper control measure selection, installation, implementation, and maintenance, as well as administrative requirements such as inspection reporting/tracking and the use of the Permittee's enforcement responses), and are certified pursuant to a State Water Board sponsored program as a Qualified Storm Water Pollution Prevention Plan (SWPPP) Developer (QSD), or a designated person on staff possesses the QSD credential.

(b) Erosion Sediment Control/Storm Water Inspectors - The Permittee shall ensure inspectors are qualified individuals, knowledgeable in inspection procedures, and are certified pursuant to a State Water Board sponsored program as either (1) a Qualified SWPPP Developer (QSD); (2) a Qualified SWPPP Practitioner (QSP); or (3) a designated person on staff possesses each credential (QSD to supervise plan review, QSP to supervise inspection operations).

(c) Third-Party Plan Reviewers, Permitting Staff, and Inspectors - If the Permittee utilizes outside parties to review plans and/or conduct inspections, the Permittee shall ensure these staff are trained.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

(b) Construction Site Operator Education

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and distribute educational materials to construction site operators.

(ii) **Implementation Level** – The Permittee shall do the following:

(a) Each year, provide information on training opportunities for construction operators on BMP selection, installation, implementation, and maintenance as well as overall program compliance.

(b) Develop or utilize existing outreach tools (i.e. brochures, posters, etc.) aimed at educating construction operators on appropriate selection, installation, implementation, and maintenance of storm water BMPs, as well as overall program compliance.

(c) Distribute appropriate outreach materials to all construction operators who will be disturbing land within the MS4 boundary. The Permittee's contact information and website shall be included in these materials.

(d) Update the existing storm water website, as necessary, to include information on appropriate selection, installation, implementation, and maintenance of BMPs.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element . The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.7.b.3. Pollution Prevention and Good Housekeeping Staff Training

The Permittee shall train employees on how to incorporate pollution prevention/good housekeeping techniques into Permittee operations.

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall develop a biennial employee training program for appropriate employees involved in implementing pollution prevention and good housekeeping practices as specified in Section E.11. Pollution Prevention/Good Housekeeping for Permittee Operations of this Order. The Permittee shall determine the need for interim training during alternate years when training is not conducted, through an evaluation of employee Pollution Prevention/Good Housekeeping knowledge. All new hires whose jobs include implementation of pollution prevention and good housekeeping practices must receive this training within the first year of their hire date.

(ii) **Implementation Level** – The training program shall include the following:

(a) Biennial training for all employees implementing this program element. This biennual training shall include a general storm water education component, any new technologies, operations, or responsibilities that arise during the year, and the permit requirements that apply to the staff being trained. Employees shall

receive clear guidance on appropriate storm water BMPs to use at municipal facilities and during typical O&M activities.

(b) A biennual assessment of trained staff's knowledge of pollution prevention and good housekeeping and shall revise the training as needed.

(c) A requirement that any contractors hired by the Permittee to perform O&M activities shall be contractually required to comply with all of the storm water BMPs, good housekeeping practices, and standard operating procedures described above.

(d) The Permittee shall provide oversight of contractor activities to ensure that contractors are using appropriate BMPs, good housekeeping practices and following standard operating procedures.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.8. PUBLIC INVOLVEMENT AND PARTICIPATION PROGRAM

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall involve the public in the development and implementation of activities related to the program. The public participation and involvement program shall encourage volunteerism, public comment and input on policy, and activism in the community. The Permittee shall also be involved in their Integrated Regional Water Management Plan (IRWMP) or other watershed-level planning effort, if applicable.

(ii) **Implementation Level** – At a minimum, the Permittee shall:

(a) Develop a public involvement and participation strategy that establishes who is responsible for specific tasks and goals.
(b) Consider development of a citizen advisory group (either a stand-alone group or utilize an existing group or process). The advisory group may consist of a balanced representation of all affected parties, including residents, business owners, and environmental organizations in the MS4 service area and/or affected watershed. The Permittee may invite the citizen advisory group to participate in the development and implementation of all parts of the community's storm water program.
(c) Create opportunities for citizens to participate in the implementation of BMPs through sponsoring activities (e.g., stream/beach/lake clean-ups, storm drain stenciling, volunteer monitoring and educational activities).
(d) Ensure the public can easily find information about the Permittee's storm water program.
(e) Actively engage in the Permittee's IRWMP or other watershed-level planning effort.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.9. ILLICIT DISCHARGE DETECTION AND ELIMINATION

The Permittee shall develop an Illicit Discharge Detection and Elimination program to detect, investigate, and eliminate illicit discharges, including illegal dumping, into its system, to the extent allowable under law.[14] The Permittee may utilize the CWP's guide on Illicit Discharge Detection and Elimination as guidance.

E.9.a. Outfall Mapping

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall create and maintain an up-to-date and accurate outfall map[15]. The map may be in hard copy and/or electronic form or within a geographic information system (GIS) the development of the outfall map shall include a visual outfall inventory involving a site visit to each outfall. Renewal Permittees that have an existing up-to-date outfall map that includes the minimum requirements specified in Section E.9.a.(ii)(a-e) are not required to re-create the outfall map. This does not exempt Renewal Permittees with an existing outfall map from conducting the field sampling specified in Section E.9.c.

(ii) **Implementation Level** - The outfall map shall at a minimum show:

(a) The location of all outfalls[16] that are operated by the Permittee within the urbanized area, drainage areas, and land use(s) contributing to those outfalls that are operated by the Permittee, and that discharge within the Permittee's jurisdiction to a receiving water. Each mapped outfall shall be located using coordinates obtained from a global positioning system (GPS) and given an individual alphanumeric identifier, which shall be noted on the map. Photographs or an electronic database shall be utilized to provide baseline information and track operation and maintenance needs over time.

(b) The location (and name, where known to the Permittee) of all water bodies receiving direct discharges from those outfall pipes.

(c) Priority areas, including, but not limited to the following:

[14] The Permittee shall use the Center for Watershed Protection's guide on Illicit Discharge Detection and Elimination (IDDE): A Guidance Manual for Program Development and Technical Assistance (available at www.cwp.org) or equivalent when developing an IDDE program. Guidance can also be found at: http://cfpub.epa.gov/npdes/stormwater/idde.cfm.

[15] The Permittee may utilize existing forms such as the CWP Outfall Reconnaissance Inventory/Sample Collection Field Sheet while conducting the mapping inventory and Field Sampling as specified below, in Section E.9.c.(http://cfpub.epa.gov/npdes/stormwater/idde.cfm).

[16] Submerged outfalls or other outfalls that may pose a threat to public safety and/or that are inaccessible are not required to be inventoried.

1) Areas with older infrastructure that are more likely to have illegal connections and a history of sewer overflows or cross-connections
2) Industrial, commercial, or mixed use areas;
3) Areas with a history of past illicit discharges;
4) Areas with a history of illegal dumping;
5) Areas with onsite sewage disposal systems;
6) Areas upstream of sensitive water bodies;
7) Areas that drain to outfalls greater than 36 inches that directly discharge to the ocean; and
8) Other areas that are likely to have illicit discharges

The priority area list shall be updated annually.

(d) Field sampling stations

(e) The permit boundary

Submerged outfalls or other outfalls that may pose a threat to public safety and/or that are inaccessible are not required to be inventoried.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.9.b. Illicit Discharge Source/Facility Inventory

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall maintain an inventory of all industrial/commercial facilities/sources within the Permittee's jurisdiction (regardless of ownership) that could discharge pollutants in storm water to the MS4. The Permittee shall utilize the inventory to identify facilities for inspections of potential illicit discharges.

(ii) **Implementation Level** - The inventory shall include the following:
(a) Minimum information for each industrial facility/source:
- Facility name;
- Address;
- Nature of business or activity;
- Physical location (decimal latitude-longitude) of storm drain receiving discharge;
- Name of receiving water and if the facility/source is tributary to a Clean Water Act Section 303(d) listed water body segment or water body segment subject to a TMDL;
- Incorporation of facility information into GIS is optional.

(b) At a minimum, the following industrial and commercial facilities/sources shall be included in the inventory.

- Vehicle salvage yards
- Metal and other recycled materials collection facilities
- Waste transfer facilities
- Vehicle mechanical repair, maintenance or cleaning
- Building trade central facilities or yards
- Corporation yards
- Landscape nurseries and greenhouses
- Building material retailers and storage
- Plastic manufacturers
- Other facilities designated by the Permittees or Regional Water Boards to have reasonable potential to contribute to pollution of storm water runoff

(c) The Permittee shall determine if the facilities that are required to be covered under the Statewide Industrial General Permit have done so. Upon discovering any facilities requiring permit coverage but are not yet permitted, the Permittee shall notify the appropriate Regional Water Board, and include copies of the notification in the online Annual Report.

(d) The Permittee shall update the inventory annually. The update shall be accomplished through collection of new information obtained during inspections and contacts with commercial and industrial facility operators and owners, or through other readily available intra-agency informational databases (e.g., business licenses, pretreatment permits, sanitary sewer hook-up permits, and SMARTS database.

(e) The Permittee shall develop and implement procedures to proactively identify illicit discharges originating from priority areas identified in Section E.9.a.(ii).(c). The Permittee shall implement the procedures to assess priority areas for the presence of illicit discharges at least once over the length of the permit term. The procedures shall include field observations, field screening, inspections, and any other appropriate and effective survey methods. Alternatively, Permittees may establish a self--certification program where Permittees require reports from authorized parties demonstrating the prevention and elimination of illicit discharges at their facilities in priority areas at least once over the length of the permit term.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.9.c. Field Sampling to Detect Illicit Discharges

(i) **Task Description** – Within the second year of the effective date of the permit (e.g. while conducting the outfall inventory under Section E.9.a.), the Permittee shall sample

any outfalls that are flowing or ponding more than 72 hours after the last rain event. The Permittee shall also conduct dry weather sampling (more than 72 hours since the last rain event) of outfalls annually identified as priority areas.

(ii) **Implementation Level** – The Permittee shall:

(a) Conduct monitoring[17] for the following indicator parameters identified in Table 1 to help determine the source of the discharge. Alternatively, the Permittee may select parameters based on local knowledge of pollutants of concern in lieu of sampling for the parameters listed in Table 1. Modifications and associated justifications shall be identified within SMARTS prior to conducting field sampling as specified in Section E.9.c.(i).

Table 1. Indicator Parameters

Indicator Parameters Used to Detect Illicit Discharges					
Parameter	**Discharge Types It Can Detect**				
	Sewage	**Washwater**	**Tap Water**	**Industrial or Commercial Liquid Wastes**	**Laboratory/Analytical Challenges**
Ammonia	●	◉	○	◉	Can change into other nitrogen forms as the flow travels to the outfall
Color	◉	◉	○	◉	
Conductivity	◉	◉	○	◉	Ineffective in saline waters
Detergents – Surfactants	●	●	○	◉	Reagent is a hazardous waste
Fluoride*	○	○	●	◉	Reagent is a hazardous waste Exception for communities that do not fluoridate their tap water
Hardness	◉	◉	◉	◉	
pH	○	◉	○	◉	
Potassium	◉	○	○	●	May need to use two separate analytical techniques, depending on the concentration
Turbidity	◉	◉	○	◉	

● Can almost always (>80% of samples) distinguish this discharge from clean flow types (e.g., tap water or natural water). For tap water, can distinguish from natural water.
◉ Can sometimes (>50% of samples) distinguish this discharge from clean flow types depending on regional characteristics, or can be helpful in combination with another parameter
○ Poor indicator. Cannot reliably detect illicit discharges, or cannot detect tap water
N/A: Data are not available to assess the utility of this parameter for this purpose.
Data sources: Pitt (
*Fluoride is a poor indicator when used as a single parameter, but when combined with additional parameters (such as detergents, ammonia and potassium), it can almost always distinguish between sewage and wash water.

[17] A description of indicator parameter sampling equipment is described in Chapter 12: Indicator Monitoring in the CWP IDDE: Guidance Manual found at: http://www.epa.gov/npdes/pubs/idde_manualwithappendices.pdf. Sampling may be conducted using field test kits.

(b) Verify that indicator parameters, as specified in Table 2. Action Level Concentrations for Indicator Parameters are not exceeded. Alternatively, the Permittee may tailor Table 2 to align with parameters based on local knowledge of pollutants of concern. Modifications and associated justifications shall be identified within SMARTS prior to conducting field sampling as specified in Section E.9.c.(i).

Table 2. Action Level Concentrations for Indicator Parameters

Indicator Parameter	Action Level Concentration
Ammonia	>= 50 mg/L
Color	>= 500 units
Conductivity	>= 2,000 µS/cm
Hardness	<= 10 mg/L as CaCO3 or >= 2,000 mg/L as CaCO3
pH	<= 5 or >=9
Potassium	>= 20 mg/L
Turbidity	>= 1,000 NTU

(c) Conduct follow up investigations per Section E.9.d. if the action level concentrations are exceeded.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.9.d. Illicit Discharge Detection and Elimination Source Investigations and Corrective Actions

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall develop written procedures for conducting investigations into the source of all non-storm water discharges suspected to be illicit discharges, including approaches to requiring such discharges to be eliminated, and procedures to implement corrective actions (e.g., BMPs). These procedures shall be included as part of the Illicit Discharge Detection and Elimination program. The Permittee may leverage existing inspection procedures and personnel to conduct illicit discharge detection and elimination source investigations and corrective actions.

(ii) **Implementation Level -** At a minimum, the Permittee shall conduct an investigation(s) to identify and locate the source of any suspected illicit discharge within 72 hours of becoming aware of the suspected illicit discharge. For investigations that require more than 72 hours, the Permittee shall identify the actions being taken to identify and locate the source of the suspected illicit discharge.

(a) Non-storm water discharges suspected of being sanitary sewage and/or significantly contaminated shall be investigated within 24 hours.

(b) The Permittee shall prioritize investigations of suspected sanitary sewage and/or significantly contaminated discharges over investigations of non-storm water discharges suspected of being cooling water, wash water, or natural flows.

(c) Report immediately the occurrence of any flows believed to be an immediate threat to human health or the environment to local Health Department.

(d) Determine and document through its investigations the source of all non-storm water discharges. If the source of the non-storm water discharge is found to be a discharge authorized under this General Permit, or authorized under another NPDES permit, no further action is required.

(e) Corrective Action to Eliminate Illicit Discharge – Once the source of the illicit discharge has been determined, the Permittee shall immediately notify the responsible party of the problem, and require the responsible party to conduct all necessary corrective actions to eliminate the non-storm water discharge within 72 hours of notification. Upon being notified that the discharge has been eliminated, conduct a follow-up investigation and field screening to verify that the discharge has been eliminated using BMPs or some other corrective action. The Permittee shall document its follow-up investigation. The Permittee may seek recovery and remediation costs from responsible parties or require compensation for the cost of field screening and investigations. Resulting enforcement actions shall follow the program's Enforcement Response Plan as specified in E.6.c.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.9.e. Spill Response Plan

(i) **Task Description** – Within the first year of the effective date of the permit, the Permittee shall develop and implement a spill response plan.

(ii) **Implementation Level** - At a minimum, the spill response plan will incorporate the information from Section E.9.c. and outline the following:

(a) Agency roles and responsibilities (e.g. County Department of Environmental Health, local police department, local fire department, etc.)
(b) The procedures for responding to complaints
(c) How investigations are to be conducted
(d) How clean up is initiated or conducted
(e) How reporting is completed and what information is required

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this

program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.10. CONSTRUCTION SITE STORM WATER RUNOFF CONTROL PROGRAM

The Permittee shall develop, implement, and enforce a program to prevent construction site discharges of pollutants and impacts on beneficial uses of receiving waters. The program shall include the development of an enforceable construction site storm water runoff control ordinance for all projects that disturb less than one acre of soil. The construction site storm water runoff control ordinance shall include, at a minimum, requirements for erosion and sediment controls, soil stabilization, dewatering, source controls, pollution prevention measures and prohibited discharges.

Projects that disturb one acre or more of soil or disturb less than one acre but are part of a larger common plan or development or sale are subject to the CGP in addition to the construction site storm water runoff control ordinance.

E.10.a. Construction Site Inventory

(i) **Task Description -** Within the first year of the effective date of the permit, the Permittee shall maintain an inventory of all projects subject to the local construction site storm water runoff control ordinance within its jurisdiction.

(ii) **Implementation Level** –The Permittee shall maintain an inventory of all construction projects and continuously update as new projects are permitted and projects are completed. The inventory shall address all projects subject to the local construction site storm water runoff control ordinance. For projects subject to the CGP the Permittee may obtain the inventory from the SMARTS database and shall supplement as needed by the Permittee.

The inventory shall contain, at a minimum:
(a) Relevant contact information for each project (e.g., name, address, phone, email, etc. for the owner and contractor);
(b) The basic site information including location, status, size of the project and area of disturbance;
(c) The location of the project with respect to all waterbodies, waterbodies listed as impaired by sediment-related pollutants, and waterbodies listed as impaired for sediment or turbidity under the CWA Section 303(d) and approved by U.S. EPA;
(d) Project threat to water quality;
(e) Current construction phase;
(f) The required inspection frequency per the local construction site storm water runoff control ordinance;
(g) The project start and anticipated completion dates; and
(h) The date the Permittee approved the erosion and sediment control plan in accordance with this Section.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.10.b. Construction Plan Review and Approval Procedures

(i) **Task Description** – Within the first year of the effective date of the permit, the Permittee shall develop procedures to review and approve relevant construction plan documents.

(ii) **Implementation Level** – The review procedures shall meet the following minimum requirements:

(a) Prior to issuing a grading or building permit, the Permittee shall require each operator of a construction activity within its jurisdiction to prepare and submit an erosion and sediment control plan for the Permittee's review and written approval. The Permittee shall not approve any erosion and sediment control plan unless it contains appropriate site-specific construction site BMPs that meet the minimum requirements of the Permittee's construction site storm water runoff control ordinance. If the erosion and sediment control plan is revised, the Permittee shall review and approve those revisions.

(b) Require that the erosion and sediment control plan include the rationale used for selecting BMPs including supporting soil loss calculations, if necessary.

(c) Require that the erosion and sediment control plan list applicable permits directly associated with the grading activity, including, but not limited to the State Water Board's CGP, State Water Board 401 Water Quality Certification, U.S. Army Corps 404 permit, and California Department of Fish and Game 1600 Agreement. Include as a condition of the grading permit that the operator submit evidence to the MS4 that all permits directly associated with the grading activity have been obtained prior to commencing the soil disturbing activities authorized by the grading permit.

(d) Conduct and document review of each erosion and sediment control plan using a checklist or similar process.

(e) The SWPPP developed pursuant to the CGP may substitute for the erosion and sediment control plan for projects where a SWPPP is developed. The Permittee is responsible for reviewing applicable portions of the SWPPP for compliance with the Permittee's construction site storm water runoff control ordinance and this Order.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.10.c. Construction Site Inspection and Enforcement

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall use legal authority to implement procedures for inspecting public and private construction projects and conduct enforcement if necessary. The Permittee may leverage existing inspection procedures and personnel to conduct construction site inspections and enforcement.

(ii) **Implementation Level –** The inspection procedures shall be implemented to verify compliance with the Permittee's construction site storm water control ordinance. At a minimum, inspections must be conducted at priority construction sites (defined below) prior to land disturbance (during the rainy season), during active construction and following active construction. Construction site inspections shall include assessment of compliance with the Permittee's construction site storm water runoff control ordinance, and other applicable ordinances. A Permittee may propose, for Regional Water Board Executive Officer approval, an alternative approach for construction site oversight, provided the Permittee demonstrates the approach will be equally effective at reducing the discharge of pollutants from construction sites to the maximum extent practicable.

Prior to allowing an operator to commence land disturbance during the rainy season, the Permittee must perform an inspection, to ensure all necessary sediment controls are in place. During active construction, the Permittee shall conduct inspections, based on prioritization of construction sites. Active construction inspections shall include at a minimum: inspection of maintenance of BMPs, effectiveness of BMPs installed and verification that pollutants of concern are not discharged into receiving water bodies.

Prioritization criteria shall be based on project threat to water quality. Project threat to water quality includes soil erosion potential, site slope, projects size and type, sensitivity of receiving water bodies, proximity to receiving water bodies, non-storm water discharges, projects more than one acre that are not subject to the CGP (sites that have obtained an Erosivity Waiver) and past record of non-compliance by the operator of the construction site. Inspection frequencies shall be conducted based on the prioritization criteria described above.

At the conclusion of the project, the Permittee must inspect to ensure that all disturbed areas have been stabilized and that all temporary erosion and sediment control measures that are no longer needed have been removed as required by the local construction site storm water control ordinance.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11. POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR PERMITTEE OPERATIONS PROGRAM

The Permittee shall develop and implement a program to prevent or reduce the amount of pollutant runoff from Permittee operations. The Permittee shall implement appropriate BMPs for preventing or reducing the amount of storm water pollution generated by Permittee operations.

E.11.a. Inventory of Permittee-Owned and Operated Facilities

(i) **Task Description** - Within the second year of the effective date of the permit, the Permittee shall develop and maintain an inventory of Permittee-owned or operated facilities within their jurisdiction that are a threat to water quality, if applicable.

(ii) **Implementation Level** - The inventory shall include all Permittee-owned or operated facilities within their jurisdiction that are potential significant sources of pollution in storm water, including the following if applicable:

- Airports
- Animal control facilities
- Chemical storage facilities
- Composting facilities
- Equipment storage and maintenance facilities (including landscape-related operations)
- Fuel farms
- Hazardous waste disposal facilities
- Hazardous waste handling and transfer facilities
- Incinerators
- Landfills
- Materials storage yards
- Pesticide storage facilities
- Public buildings, including schools, libraries, police stations, fire stations, Permittee (municipal) buildings, restrooms, and similar buildings (i.e., buildings with a similar potential to be sources of storm water pollution as the examples provided)
- Public parking lots
- Public golf courses
- Public swimming pools
- Public parks
- Public works yards
- Public marinas
- Recycling facilities
- Salt or de-icing storage facilities
- Solid waste handling and transfer facilities
- Transportation hubs (e.g. bus transfer stations)
- Vehicle storage and maintenance areas
- Vehicle fueling facilities
- Other (as directed by appropriate Regional Water Board)

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.b. Map of Permittee-Owned or Operated Facilities

(i) **Task Description –** Within the second year of the effective date of the permit, submit a map of the area within the permit boundary and identify where the inventoried Permittee-owned or operated facilities are located.

(ii) **Implementation Level** - The map identifying the location of the inventoried Permittee-owned or operated facilities shall identify the storm water drainage system (e.g., storm water outfalls or other mechanisms in which storm water leaves the site) corresponding to each of the facilities as well as the receiving waters to which these facilities discharge. The map shall also show the facility and the manager of each facility, including contact information.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.c. Facility Assessment

(i) **Task Description** – Within the third year of the effective date of the permit, for all the inventoried Permittee-owned or operated facilities, the Permittee shall conduct a comprehensive inspection and assessment of pollutant discharge potential and identification of pollutant hotspots using the Center for Watershed Protection's (CWP) guide on Urban Subwatershed and Site Reconnaissance, or equivalent.[18]

(ii) **Implementation Levels** - Conduct an annual review and assessment of all municipally owned or operated facilities to determine their potential to impact surface waters. The assessment shall include the following:

(a) Identification of pollutant hotspots:

Based on the annual assessment, the Permittee shall identify those facilities that have a high potential to generate storm water and non-storm water pollutants as pollutant hotspots and assign them a high priority. Among the factors to be considered are the type and volume of pollutants stored at the site, the presence of improperly stored materials,

[18] The Permittee shall use the Center for Watershed Protection's Restoration Manual Series guide on Urban Subwatershed and Site Reconnaissance: a User's Manual (available as a free download at www.cwp.org) or equivalent when identifying priority areas. Hotspots are specific operations in a subwatershed that may generate high storm water pollution.

activities that should not be performed outside (e.g., changing automotive fluids, vehicle washing), proximity to water bodies, poor housekeeping practices, and the discharge of pollutant(s) of concern to receiving water(s). Pollutant hotspots shall include, at a minimum, the Permittee's maintenance yards, hazardous waste facilities, fuel storage and/or dispensing locations, airports marinas, and any other facilities at which chemicals or other materials have a high potential to be discharged in storm water.

(b) Documentation of the comprehensive assessment procedures and results:

The Permittee shall document the procedures it uses for conducting the comprehensive assessment along with a copy of any site evaluation checklists used to conduct the comprehensive assessment.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.d. Storm Water Pollution Prevention Plans

(i) **Task Description** – Within the fourth year of the effective date of the permit, the Permittee shall develop and implement SWPPPs for pollutant hotspots. If a Permittee has an existing document such as Hazardous Materials Business Plan, Spill Prevention Plan, or other equivalent document the Permittee is not required to develop a SWPPP.

(ii) **Implementation Level** – The Permittee shall implement the following:

(a) The Permittee shall develop and implement a site-specific SWPPP that identifies existing storm water BMPs and a set of storm water BMPs to be installed, implemented, and maintained to minimize the discharge of pollutants to protect water quality. The Permittee may utilize the CWP guide on Urban Subwatershed and Site Reconnaissance, or equivalent, as guidance.

(b) The SWPPP(s) shall be kept on-site at each of the Permittee-owned or operated facilities' offices for which it was completed. The SWPPP shall be updated as necessary.

(c) At a minimum the SWPPP will address the following:

1) Facility specific information (location, owner, address, etc.)
2) Purpose of the document
3) Key staff/contacts at the facility
4) Site map with drainage identified

5) Identification of significant materials that are handled and stored at the facility that may be exposed to storm water
6) Description of potential pollutant sources
7) Facility BMPs
8) Spill control and cleanup – response to spills
9) Inspection schedule
10) Inspection procedures and checklist for inspections conducted to ensure proper selection, implementation, and maintenance of all BMPs

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.e. Inspections, Visual Monitoring and Remedial Action

(i) **Task Description** – Within the fifth year of the effective date of the Permit, the Permittee shall conduct regular inspections of Permittee-owned and operated facilities.

(ii) **Implementation Level** – Inspections shall be conducted as follows:

(a) Quarterly visual hotspot inspections – Perform quarterly visual inspections, in accordance with the inspection procedures and inspection checklist developed for each Permittee-owned or operated hotspot, to ensure materials and equipment are clean and orderly; to minimize the potential for pollutant discharge; and to ensure effective selection, implementation, and maintenance of BMPs. The Permittee shall look for evidence of spills and immediately clean them up to prevent contact with precipitation or runoff. The quarterly inspections shall be tracked in a log for every facility, and records kept with the SWPPP (records may be kept electronically). The inspection report shall also include any identified deficiencies and the corrective actions taken to correct the deficiencies.

(b) Annual Hotspot comprehensive inspections – At least once per year, the Permittee shall conduct a comprehensive inspection of each hotspot facility, including all storm water BMPs, in accordance with the facility-specific inspection procedures and inspection checklist. The Permittee shall pay specific attention, without limiting its attention, to: waste storage areas, dumpsters, vehicle and equipment maintenance/fueling areas, material handling areas, and similar potential pollutant-generating areas. The annual inspection results shall be documented and records kept with the SWPPP. The inspection report shall also include any identified deficiencies and the corrective actions taken to correct deficiencies.

(c) Quarterly Hotspot visual observation of storm water and non-storm water discharges – At least once per quarter visually observe discharge locations from hotspot facilities. Where discharges are observed identify any observed

problems (e.g., color, foam, sheen, turbidity) associated with pollutant sources or BMPs shall be remedied as soon as practicable or before the next storm event, whichever is sooner. Visual observations shall be documented, and records kept with the SWPPP. This inspection shall be done in accordance with the developed standard operating procedures. The inspection report shall also include any identified deficiencies and the corrective actions taken to correct the deficiencies.

(d) Non-Hotspot Inspection – At a minimum, inspect each inventoried municipal facility that is not a hotspot, once per permit term.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.f. Storm Drain System Assessment and Prioritization

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall develop and implement procedures to assess and prioritize MS4 storm drain system maintenance, including but not limited to, catch basins, pipe and pump infrastructure, above-ground conveyances, including receiving water bodies within the Permittee's urbanized area and detention basins.

If flood conveyance maintenance is undertaken by another entity, the Permittee shall coordinate with the flood conveyance management entity by year three to assess and prioritize maintenance of the MS4 storm drain system.

(ii) **Implementation Level** – The Permittee shall:

Assess/prioritize storm drain system facilities for cleanout – Assign a priority to MS4 storm drain facilities within the Permittee's urbanized areas based on accumulation of sediment, trash and/or debris. In particular, assign high priority to catch basin meeting any of the following criteria:

1) Catch basins known to accumulate a significant amount of sediment, trash, and/or debris;
2) Catch basins collecting large volumes of runoff;
3) Catch basin collecting runoff from area that do not receive regular sweet sweeping;
4) Catch basins collecting runoff from drainage areas with exposed or disturbed soil; or
5) Catch basins that receive citizen complaints/reports.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment

and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.g. Maintenance of Storm Drain System

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall begin maintenance of all high priority storm drain systems on an ongoing schedule.

(ii) **Implementation Level** – The Permittee shall begin maintenance of storm drain systems according to the procedures and priorities developed according to this Section. At a minimum the Permittee shall:

(a) Inspect storm drain systems – Based on the priorities assigned above in Section E.11.f.(ii)(a), develop and implement a strategy to inspect storm drain systems within the Permittee's jurisdiction. At a minimum, inspect all high priority catch basins and systems annually.

(b) Clean storm drains – Develop and implement a schedule to clean high priority catch basins and other systems. Cleaning frequencies shall be based on priority areas, with higher priority areas receiving more frequent maintenance.

(c) Labeling catch basins – Ensure that each catch basin in high foot traffic areas includes a legible storm water awareness message (e.g., a label, stencil, marker, or pre-cast message such as “drains to the creek” or “only rain in the drain”). Catch basins with illegible or missing labels shall be recorded and re-labeled within one month of inspection.

(d) Maintain surface drainage structures – High priority facilities, such as those with recurrent illegal dumping, shall be reviewed and maintained annually as needed. Non-priority facilities shall be reviewed as needed. Removal of trash and debris from high priority areas shall occur annually prior to the rainy season.

(e) Dispose of waste materials – Develop and implement a procedure to dewater and dispose of materials extracted from catch basins. This procedure shall ensure that water removed during the catch basin cleaning process and waste material will not reenter the MS4.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.h. Permittee Operations and Maintenance Activities (O&M)

(i) **Task Description –** Within the third year of the effective date of the permit, the Permittee shall assess their O&M activities for potential to discharge pollutants in storm water and inspect all O&M BMPs on a quarterly basis.

(ii) **Implementation Level** - The Permittee shall:

(a) Develop and implement a program to assess O&M activities and subsequently develop applicable BMPs. The following Permittee O&M activities shall be included in the assessment for their potential to discharge pollutants in storm water:

1) Road and parking lot maintenance, including sidewalk repair, curb and gutter repair, pothole repair, pavement marking, sealing, and re-paving
2) Bridge maintenance, including re-chipping, grinding, saw cutting, and painting
3) Cold weather operations, including plowing, sanding, and application of deicing compounds and maintenance of snow disposal areas
4) Right-of-way maintenance, including mowing, herbicide and pesticide application, and planting vegetation
5) Storm water relevant Permittee-sponsored or sanctioned events such as large outdoor festivals, parades, or street fairs (eg. Earth Day, Coastal Cleanup Day, Creek Week)
6) Green waste deposited in the street
7) Graffiti removal
8) Hydrant flushing

(b) Identify all materials that could be discharged from each of these O&M activities, and which materials contain pollutants. Typical pollutants associated with these activities include metals, chlorides, hydrocarbons (e.g. benzene, toluene, ethylbenzene, and xylene), sediment, green waste, herbicide, pesticide, dried paint, and trash.

(c) Develop and implement a set of BMPs that, when applied during Permittee O&M activities, will reduce pollutants in storm water and non-storm water discharges. The Permittee shall use the CASQA Municipal Handbook or equivalent.

(d) Evaluate BMPs – All BMPs implemented during O&M activities shall be evaluated quarterly.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.i. Incorporation of Water Quality and Habitat Enhancement Features in New Flood Management Facilities

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and implement a process for incorporating water quality and habitat enhancement features into new and rehabilitated flood management facilities.

(ii) **Implementation Level** – The Permittee shall develop and implement a process to incorporate water quality and habitat enhancement features in the design of all new

and rehabilitated flood management projects that are associated with the MS4 or that discharge to the MS4.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.11.j. Landscape Design and Maintenance

(i) **Task Description** – Within the second year of the effective date of the permit**,** the Permittee shall implement a landscape design and maintenance program to reduce the amount of water, pesticides, herbicides and fertilizers used during Permittee operations and activities[19].

(ii) **Implementation Tasks** – At a minimum, the Permittee shall:

(a) Evaluate pesticides, herbicides and fertilizers used and application activities performed and identify pollution prevention and source control opportunities.

(b) Implement practices that reduce the discharge of pesticides, herbicides and fertilizers. At a minimum the Permittee shall:

1) Implement educational activities for municipal applicators and distributors.

2) Implement landscape management measures that rely on non-chemical solutions, including:

a) Create drought-resistant soils by amending soils with compost;
b) Create soil microbial community through the use of compost, compost tea, or inoculation;
c) Use native and/or climate appropriate plants to reduce the amount of water, pesticides, herbicides and fertilizers used;
d) Practice grasscycling on decorative turf landscapes to reduce water use and the need for fertilizers;
e) Keeping grass clippings and leaves away from waterways and out of the street using mulching, composting, or landfilling;
f) Preventing application of pesticides, herbicides and fertilizers during irrigation or within 48 hours of predicted rainfall with greater than 50% probability as predicted by National Oceanic and Atmospheric Administration (NOAA)[20];
g) Limiting or replacing herbicide and pesticide use (e.g., conducting manual weed and insect removal);
h) Prohibiting application of pesticides, herbicides and fertilizers as required by the regulations DPR 11-004 Prevention of Surface Water Contamination by Pesticides enacted by the Department of Pesticide Regulation;

[19] Water Efficient Landscape Ordinance can be found at: http://www.water.ca.gov/wateruseefficiency/docs/MWELO09-10-09.pdf
[20] www.srh.noaa.gov/forecast

i) Reducing mowing of grass to allow for greater pollutant removal, but not jeopardizing public safety.

3) Collect and properly dispose of unused pesticides, herbicides, and fertilizers.

4) Minimize irrigation run-off by using an evapotranspiration-based irrigation schedule and rain sensors.

(c) Record the types and amounts of pesticides, herbicides and fertilizers used in the permit area.

(iii) **Reporting** - The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12. POST CONSTRUCTION STORM WATER MANAGEMENT PROGRAM

E.12.a. Post-Construction Measures

Permittees shall regulate development to comply with the following Sections:

- E.12.b Site Design Measures
- E.12.c. Regulated Projects
- E.12.d. Source Control Measures
- E.12.e. Low Impact Development (LID) Design Standards
- E.12.f. Hydromodification Measures
- E.12.g. Enforceable Mechanisms
- E.12.h. Operation and Maintenance of Storm Water Control Measures
- E.12.i. Post-Construction Best Management Practice Condition Assessment
- E.12.j. Planning and Development Review Process
- E.12.k. Post-Construction Storm Water Management Requirements Based on Assessment and Maintenance of Watershed Processes
- E.12.l. Alternative Post-Construction Storm Water Management Program

E.12.b. Site Design Measures

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall require implementation of site design measures for all projects that create and/or replace (including projects with no net increase in impervious footprint) between 2,500 square feet and 5,000 square feet of impervious surface, including detached single family homes that create and/or replace 2,500 square feet or more of impervious surface and are not part of a larger plan of development. Site design measures as specified in this section are not applicable to linear underground/overhead projects (LUPs).

(ii) **Implementation Level** - Projects shall implement one or more of the following site design measures to reduce project site runoff:

(a) Stream Setbacks and Buffers - a vegetated area including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake reservoir, or coastal estuarine area;
(b) Soil Quality Improvement and Maintenance - improvement and maintenance soil through soil amendments and creation of microbial community;
(c) Tree Planting and Preservation - planting and preservation of healthy, established trees that include both evergreens and deciduous, as applicable;
(d) Rooftop and Impervious Area Disconnection - rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer;
(e) Porous Pavement - pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants;
(f) Green Roofs - a vegetative layer grown on a roof (rooftop garden);
(g) Vegetated Swales - a vegetated, open-channel management practice designed specifically to treat and attenuate storm water runoff;
(h) Rain Barrels and Cisterns - system that collects and stores storm water runoff from a roof or other impervious surface.

Project proponents shall use the State Water Board SMARTS Post-Construction Calculator[21], or equivalent to quantify the runoff reduction resulting from implementation of site design measures.

(iii) **Reporting** - The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.c. Regulated Projects

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall implement standards to effectively reduce runoff and pollutants associated with runoff from Regulated Projects as defined below.

(ii) **Implementation Level** - The Permittee shall regulate all projects that create and/or replace 5,000 square feet or more of impervious surface (Regulated Projects). The Permittee shall require these Regulated Projects to implement measures for site design, source control, runoff reduction, storm water treatment and baseline hydromodification management as defined in this Order.

Regulated Projects do not include:

- Detached single family home projects that are not part of a larger plan of development;
- Interior remodels;

[21] The State Water Board SMARTS Post-Construction Calculator can be found at: https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

- Routine maintenance or repair such as: exterior wall surface replacement, pavement resurfacing within the existing footprint.
- LUPs - Unless the LUP has a discrete location that has 5,000 square feet or more of newly constructed contiguous impervious surface. When the LUP has a discrete location that has 5,000 sq-ft or more of new contiguous impervious surface, only that specific discrete location is subject to Section E.12.c.

Regulated Projects include development projects. Development includes new and redevelopment projects on public or private land that fall under the planning and permitting authority of a Permittee. Redevelopment is any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. Redevelopment does not include trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway. The following (a-c) describe specific Regulated Project requirements for redevelopment, road projects and LUPs:

(a) Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.

(b) Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.

(c) Road Projects and LUPs - Any of the following types of road projects and LUPs that create 5,000 square feet or more of newly constructed contiguous impervious surface and that are public road projects and/or fall under the building and planning authority of a Permittee shall comply with Section E.12.e. Low Impact Development Standards except that treatment of runoff of the 85th percentile that cannot be infiltrated onsite shall follow U.S. EPA guidance regarding green infrastructure to the extent feasible. Types of projects include:

1) Construction of new streets or roads, including sidewalks and bicycle lanes built as part of the new streets or roads.
2) Widening of existing streets or roads with additional traffic lanes.
    a) Where the addition of traffic lanes results in an alteration of more than 50 percent of the impervious surface of an existing street or road, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design.
    b) Where the addition of traffic lanes results in an alteration of less than 50 percent (but 5,000 square feet or more) of the impervious surface

of an existing street or road, only the runoff from new and/or replaced impervious surface of the project must be included in the treatment system design.

3) Construction of linear underground/overhead projects (LUPs)
4) Specific exclusions are:
   a) Sidewalks built as part of new streets or roads and built to direct storm water runoff to adjacent vegetated areas.
   b) Bicycle lanes that are built as part of new streets or roads that direct storm water runoff to adjacent vegetated areas.
   c) Impervious trails built to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas, preferably away from creeks or towards the outboard side of levees.
   d) Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.
   e) Trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways and parking lots; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.

Effective Date for Applicability of Low Impact Development Runoff Standards to Regulated Projects: By the second year of the effective date of the permit, the Permittee shall require these Post-Construction Standards be applied on applicable new and redevelopment Regulated Projects, both private development requiring municipal permits and public projects, to the extent allowable by applicable law. These include discretionary permit projects that have not been deemed complete for processing and discretionary permit projects without vesting tentative maps that have not requested and received an extension of previously granted approvals. Discretionary projects that have been deemed complete prior to the second year of the effective date of this Order are not subject to the Post-Construction Standards herein. For the Permittee's Regulated Projects, the effective date shall be the date their governing body or designee approves initiation of the project design.

Permittee's Development Projects - The Permittee shall develop and implement an equivalent approach, to the approach used for private development projects, to apply the most current version of the low impact development runoff standards to applicable public development projects, to the extent allowable by applicable law.

E.12.d. Source Control Measures

(i) **Task Description** – Regulated Projects with pollutant-generating activities and sources shall be required to implement standard permanent and/or operation source control measures as applicable.

(ii) **Implementation Level** - Measures for the following pollutant generating activities and sources shall be designed consistent with recommendations from the CASQA

Stormwater BMP Handbook for New Development and Redevelopment or equivalent manual, and include:

(a) Accidental spills or leaks
(b) Interior floor drains
(c) Parking/storage areas and maintenance
(d) Indoor and structural pest control
(e) Landscape/outdoor pesticide use
(f) Pools, spas, ponds, decorative fountains, and other water features
(g) Restaurants, grocery stores, and other food service operations
(h) Refuse areas
(i) Industrial processes
(j) Outdoor storage of equipment or materials
(k) Vehicle and equipment cleaning
(l) Vehicle and equipment repair and maintenance
(m) Fuel dispensing areas
(n) Loading docks
(o) Fire sprinkler test water
(p) Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
(q) Unauthorized non-storm water discharges
(r) Building and grounds maintenance

E.12.e. Low Impact Development (LID) Design Standards

(i) **Task Description –** The Permittee shall require all Regulated Projects to implement low impact development (LID) standards designed to reduce runoff, treat storm water, and provide baseline hydromodification management to the extent feasible, to meet the Numeric Sizing Criteria for Storm Water Retention and Treatment under Section E.12.e(ii)(c).

(ii) **Implementation Level –** The Permittee shall adopt and implement requirements and standards to ensure design and construction of development projects achieve the following LID Design Standards.

(a) **Site Assessment**

At the earliest planning stages, the Permittee shall require Regulated Projects to assess and evaluate how site conditions, such as soils, vegetation, and flow paths, will influence the placement of buildings and paved surfaces. The evaluation will be used to meet the goals of capturing and treating runoff and assuring these goals are incorporated into the project design. The Permittee may adopt or reference an existing LID site assessment methodology[22]Permittees shall require Regulated Projects to consider optimizing the site layout through the following methods:

1) Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.

[22] Low Impact Development Manual for Southern California (Low Impact Development Center – See CASQA's LID website at: http://www.casqa.org/LID/tabid/240/Default.aspx.

2) Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.
3) Limit overall impervious coverage of the site with paving and roofs.
4) Set back development from creeks, wetlands, and riparian habitats.
5) Preserve significant trees.
6) Conform the site layout along natural landforms.
7) Avoid excessive grading and disturbance of vegetation and soils.
8) Replicate the site's natural drainage patterns.
9) Detain and retain runoff throughout the site.

(b) **Drainage Management Areas**

The Permittee shall require each Regulated Project to provide a map or diagram dividing the developed portions of the project site into discrete Drainage Management Areas (DMAs), and to manage runoff from each DMA using Site Design Measures, Source Controls and/or Storm Water Treatment and Baseline Hydromodification Measures.

(c) **Numeric Sizing Criteria for Storm Water Retention and Treatment**

The Permittees shall require facilities designed to evapotranspire, infiltrate, harvest/use, and biotreat storm water to meet at least one of the following hydraulic sizing design criteria:

1) Volumetric Criteria:

   a) The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or

   b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of the CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

2) Flow-based Criteria:

   a) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or

   b) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records.

(d) **Site Design Measures**

The Permittee shall implement Site Design Measures (as defined in Section E.12.b. Site Design Measures and Section E.12.e(ii)(a) Site Assessment), site layout and design measures, based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile 24-hour storm runoff event. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required . Any remaining runoff from impervious DMAs may then be directed to one or more bioretention facilities as specified in Section E.12.e.(ii)(f), below.

(e) **Source Controls**

The Permittee shall implement Source Controls as defined in Section E.12.d. Source Control Measures.

(f) **Storm Water Treatment Measures and Baseline Hydromodification Management Measures**

After implementation of Site Design Measures, remaining runoff from impervious DMAs must be directed to one or more facilities designed to infiltrate, evapotranspire, and/or bioretain the amount of runoff specified in Section E.12.e(ii)(c) Numeric Sizing Criteria for Storm Water Retention and Treatment. The facilities must be demonstrated to be at least as effective as a bioretention system with the following design parameters:

1) Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
2) Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
3) Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
4) Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
5) Underdrain with discharge elevation at top of gravel layer.
6) No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
7) No liners or other barriers interfering with infiltration.
8) Appropriate plant palette for the specified soil mix and maximum available water use.

(g) **Alternative Designs —** Facilities, or a combination of facilities, of a different design than in Section E.12.e.(ii)(f) may be permitted if all of the following

measures of equivalent effectiveness are demonstrated:

1) Equal or greater amount of runoff infiltrated or evapotranspired;
2) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;
3) Equal or greater protection against shock loadings and spills;
4) Equal or greater accessibility and ease of inspection and maintenance.

(h) **Allowed Variations for Special Site Conditions** - The bioretention system design parameters in Section E.12.e.(ii)(f) may be adjusted for the following special site conditions:

1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
2) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).
3) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.
4) Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide additional treatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with little chance of spill migration.

(i) **Exceptions to Requirements for Bioretention Facilities** - Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following categories of Regulated Projects:

1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
2) Facilities receiving runoff solely from existing (pre-project) impervious areas;and
3) Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

By the second year of the effective date of the permit, each Permittee shall adopt or reference appropriate performance criteria for such biotreatment and media filters.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.f. Hydromodification Management

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and implement Hydromodification Management procedures. Hydromodification management projects are Regulated Projects that create and/or replace one acre or more of impervious surface. A project that does not increase impervious surface area over the pre-project condition is not a hydromodification management project.

(ii) **Implementation Level** - The Permittee shall implement the following Hydromodification Standard:

(a) Post-project runoff shall not exceed estimated pre-project flow rate for the 2-year, 24-hour storm in the following geomorphic provinces (Figure 1):

- Coast Ranges
- Klamath Mountains
- Cascade Range
- Modoc Plateau
- Basin and Range
- Sierra Nevada
- Great Valley

(b) Post-project runoff shall not exceed estimated pre-project flow rate for the 10-year, 24-hour storm in the following geomorphic provinces (Figure 1):

- Transverse Ranges
- Peninsular Ranges
- Mojave Desert
- Colorado Desert



Figure 1. California Geomorphic Provinces

Alternatively, the Permittee may use a geomorphically based hydromodification standard or set of standards and analysis procedures designed to ensure that Regulated Projects do not cause a decrease in lateral (bank) and vertical (channel bed) stability in receiving stream channels. The alternative hydromodification standard or set of standards and analysis procedures must be reviewed and approved by the Regional Board Executive Officer.

(iii) **Reporting** –The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.g. Enforceable Mechanisms

(i) **Task Description** - Within the third year of the effective date of the permit, the Permittee shall develop and/or modify enforceable mechanisms that will effectively implement the requirements in Section E.12.b through f (if necessary).

(ii) **Implementation Level** - The Permittee shall develop and/or modify enforceable mechanisms that will effectively implement the requirements in Section E.12.b through E.12.f and may include municipal codes, regulations, standards, and specifications. The Permittee shall:

(a) Conduct an analysis of all applicable codes, regulations, standards, and/or specifications to identify modifications and/or additions necessary to fill gaps and remove impediments to effective implementation of project-scale development requirements.
(b) Approve new and/or modified enforceable mechanisms that effectively resolve regulatory conflicts and implement the requirements in Sections E.12.b through E.12.f (if necessary)
(c) Apply new and/or modified enforceable mechanisms to all applicable new and redevelopment projects. Develop and make available specific guidance for LID BMP design
(d) Complete a Tracking Report indicating the Permittee's accomplishments in education and outreach supporting implementation of LID requirements for new and redevelopment projects.

E.12.h. Operation and Maintenance of Post-Construction Storm Water Management Measures

(i) **Task Description** –Within the second year of the effective date of the permit, the Permittee shall implement an O&M Verification Program for storm water treatment and baseline hydromodification management structural control measures defined in Section E.12.e(ii)(f). Storm Water Treatment Measures and Baseline Hydromodification Management Measures on all Regulated Projects.

(ii) **Implementation Level** – At a minimum, the O&M Verification Program shall include the following elements:

(a) All Regulated Projects shall at a minimum, require at least one of the following from all project proponents and their successors in control of the Project or successors in fee title:

1) The project proponent's signed statement accepting responsibility for the O&M of structural control measure(s) until such responsibility is legally transferred to another entity;
2) Written conditions in the sales or lease agreements or deed for the project that requires the buyer or lessee to assume responsibility for the O&M of the installed treatment system(s) and hydromodification control(s) (if any) until such responsibility is legally transferred to another entity;

3) Written text in project deeds, or conditions, covenants and restrictions for multi-unit residential projects that require the homeowners association or, if there is no association, each individual owner to assume responsibility for the O&M of the installed treatment system(s) and hydromodification control(s) (if any) until such responsibility is legally transferred to another entity; or

4) Any other legally enforceable agreement or mechanism, such as recordation in the property deed, that assigns the O&M responsibility for the installed treatment system(s) and hydromodification control(s) (if any) to the project owner(s) or the Permittee.

(b) Coordination with the appropriate mosquito[23] and vector control agency with jurisdiction to establish a protocol for notification of installed treatment systems and hydromodification management controls. On an annual basis, before the wet season, prepare a list of newly installed (installed within the reporting period) storm water treatment systems and hydromodification management controls to the local mosquito and vector control agency and the appropriate Regional Water Board. The Permittee may submit the list of Regulated Projects as described in Section E.12.h.(ii)(e). This list shall include the facility locations and a description of the storm water treatment measures and hydromodification management controls installed.

(c) Conditions of approval or other legally enforceable agreements or mechanisms for all Regulated Projects that require the granting of site access to all representatives of the Permittee for the sole purpose of performing O&M inspections of the installed treatment system(s) and hydromodification control(s) (if any).

(d) A written implementation plan that describes O&M (including inspection) of all Regional Projects and regional controls that are Permittee-owned and/or operated.

(e) A database or equivalent tabular format of all Regulated Projects (public and private) that have installed treatment systems. This database or equivalent tabular format shall include the following information for each Regulated Project:

1) Name and address of the Regulated Project;
2) Specific description of the location (or a map showing the location) of the installed treatment system(s) and hydromodification control(s) (if any);
3) Date(s) that the treatment system(s) and hydromodification controls (if any) is/are installed;
4) Description of the type and size of the treatment system(s) and hydromodification control(s) (if any) installed;
5) Responsible operator(s) of each treatment system and hydromodification control (if any);
6) Dates and findings of inspections (routine and follow-up) of the treatment system(s) and hydromodification control(s) (if any) by the Permittee; and
7) Any problems and corrective or enforcement actions taken.

[23] California Department of Public Health. (2012). Best Management Practices for Mosquito Control in California. Retrieved on July 20, 2012 from http://www.westnile.ca.gov/resources.php

8) Maintenance Approvals: The Permittee shall ensure that systems and hydromodification controls installed at Regulated Projects are properly operated and maintained for the life of the projects. In cases where the responsible party for a treatment system or hydromodification control has worked diligently and in good faith with the appropriate state and federal agencies and the Permittee to obtain approvals necessary to complete maintenance activities for the treatment system or hydromodification management control, but these approvals are not granted, the Permittee shall be deemed to be in compliance with this Provision.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.i. Post-Construction Best Management Practice Condition Assessment

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall inventory and assess the maintenance condition of structural post-construction BMPs (including BMPs used for flood control) within the Permittee's jurisdiction.

(ii) **Implementation Level** – The Permittee shall develop and implement a plan to inventory, map, and determine the relative maintenance condition of structural post-construction BMPs. Maintenance condition shall be determined through a self-certification program where Permittees require annual reports from authorized parties demonstrating proper maintenance and operations. The plan shall include:

(a) An inventory and map of existing structural post-construction BMPs, in GIS if available.
(b) Assessments of the self-certification program annual reports. Assessment shall include a ranking of structural BMPs and verification that BMPs are operating to remove pollutants as designed. Regional BMPs should receive higher priority than lot-scale BMPs, and BMPs designed to remove pollutants for which receiving water is impaired should receive priority attention over other BMPs.
(c) Appropriate escalating enforcement based on the Permittee Enforcement Response Plan to ensure proper maintenance of BMPs and submittal of self-certification annual reports.
(d) Self-Certification Annual Reports. At a minimum, the self-certification annual reports shall include:

1) Field observations to determine the effectiveness of the structural post construction BMPs in removing pollutants of concern from storm water runoff and/or reducing hydromodification impacts as designed.

2) Long-term plan for conducting regular maintenance of BMPs, including the frequency of such maintenance.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section E.16.a.for compliance directions.

E.12.j. Planning and Development Review Process

(i) **Task Description** – The Permittee shall review their planning and permitting process to assess any gaps or impediments impacting effective implementation of these post-construction requirements specified in Section E.12, and where these are found to exist, seek solutions to promote implementation of these requirements within the context of public safety and community goals for land use. The Permittee shall prioritize review of the landscape code (code detailing landscaping requirements and considerations which should be implemented to protect environmental quality) to correct gaps and impediments impacting effective implementation of post-construction requirements.

(ii) **Implementation Level** – During years 1 – 3, the Permittee shall conduct the review using an existing guide or template already developed for MS4s (such as the Municipal Regulatory Update Assistance Program (MRUAP)[24] conducted by AHBL, Inc. for the Low Impact Development Initiative (LIDI) on the Central Coast). By the fourth year of the effective date of the permit, any changes to the planning and permitting process will be completed to effectively administer these provisions. Priority shall be placed on review of the landscape code, with the following implementation level.

(a) Within the first year of the effective date of this permit, the Permittee shall conduct an analysis of the landscape code to correct gaps and impediments impacting effective implementation of post-construction requirements.

(b) Within the second year of the effective date of the permit, the Permittee shall complete any changes to the landscape code to effectively administer post-construction requirements.

(iii) **Reporting** – By the second year Annual Report and annually thereafter, complete and have available a summary of the review process, and any proposed or completed changes to the Permittee's program.

[24] http://www.casqa.org/LIDDemo/LIDTraining/tabid/246/Default.aspx

E.12.k. Post-Construction Storm Water Management Requirements Based on Assessment and Maintenance of Watershed Processes

Small MS4s subject to Section E of this Order, in place of complying with the requirements set forth in Section E.12, except for Sections E.12.j. Planning and Development Review Process and E.12.e(ii)(e) Source Control Requirements, shall comply with post-construction storm water management requirements based on a watershed-process approach developed by Regional Water Board that include the following:

- Completion of a comprehensive assessment of dominant watershed processes affected by urban storm water
- LID site design and runoff reduction measures, numeric runoff treatment and retention controls, and hydromodification controls that will maintain watershed processes and protect water quality and beneficial uses.
- A process by which Regional Board staff will actively engage Permittees to adaptively manage requirements as determined by the assessment of watershed processes.
- An annual reporting program that involves Regional Board staff and State Board staff to inform statewide watershed process based criteria.

The regional watershed-process based approach must be approved by the Regional Water Board following a public process.

E.12.l. Alternative Post-Construction Storm Water Management Program

A Permittee may propose alternative post-construction measures in lieu of some or all of Section E.12. requirements for multiple benefit projects. Multiple-benefit projects include projects that may address any of the following, in addition to water quality: water supply, flood control, habitat enhancement, open space preservation, recreation, climate change. Multiple-benefit projects may be applied at various scales including project site, municipal or sub-watershed level. Multiple-benefit projects may include, but are not limited to, projects developed under Watershed Improvement Plans (Water Code §16100 et seq.), IRWMP implementation and green infrastructure projects. Multiple benefit projects must be equally or more protective of water quality than Section E.12. requirements.

The Regional Water Board or the Executive Officer, may approve alternative post-construction measures for multiple-benefit projects, as described above, after an opportunity for public comment, if the Regional Water Board or Executive Officer finds that the alternative measures are consistent with the MEP standard.

E.13. WATER QUALITY MONITORING

Traditional Small MS4 Permittees that are required to conduct monitoring of discharges to ASBS, TMDL, or 303(d) impaired water bodies, as described in Sections E.13.(a)-(c), are not required to perform additional monitoring as specified in Sections E.13.d.1. and E.13.d.2.

Permittees are encouraged to participate in a regional monitoring program in order to cost-effectively combine resources and water quality information. Regional monitoring is the

collaboration of local and regional monitoring programs that are designed to create a more comprehensive picture of water quality conditions within a watershed. The following management questions may be used to assist in guiding the development of a regional monitoring program, as applicable[25]:

1) Are water quality standards being met in receiving waters?
2) What is the extent and magnitude of the current or potential receiving water problems[26]?
3) What is the relative urban runoff contribution to the receiving water problem(s)?
4) What are the sources to urban runoff that contribute to the receiving water problem(s)?
5) Are conditions in receiving waters getting better or worse?

Regional monitoring programs shall be reviewed and approved by the Executive Officer of the applicable Regional Water Board[27].

Where a regional monitoring group has initiated plans, before the effective date of this Order, to conduct monitoring that achieves Section E.13. compliance, the Permittee may request the Executive Officer of the applicable Regional Board tailor compliance dates to synchronize with such efforts. Additionally, existing regional water monitoring efforts shall be reviewed and approved by a Regional Water Board Executive Officer.

Where a Permittee receives grant funding to conduct monitoring that achieves Section E.13. compliance, the Permittee may request the Regional Water Board Executive Officer tailor compliance dates to synchronize with such efforts.

E.13.a. ASBS Monitoring

All Permittees that discharge to an ASBS and are covered by an Ocean Plan exception shall comply with the monitoring requirements described in the terms, prohibitions and special conditions in Attachment C.

E.13.b. TMDL Monitoring

All Permittees that are assigned a wasteload allocation or identified as a responsible party in a TMDL approved by the U.S. EPA where urban runoff is listed as the source, shall comply with the monitoring requirements included in Attachment G and consult with the Regional Water Board within one year of the effective date of the permit to determine the monitoring study design and a monitoring implementation schedule. Where a TMDL is limited to a single

[25] The five core management questions are based on the Stormwater Monitoring Coalition's Model Monitoring Technical Committee Technical Report # 419: Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California.
[26] Water quality problems include exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts.
[27] The regional monitoring programs may deviate from the specific requirements in Section E.13.a. to the extent approved by the Executive Officer, except that the regional monitoring program shall be SWAMP comparable and that all data shall be placed in the California Environmental Data Exchange Network (CEDEN).

constituent within a single reach of the watershed, the Regional Water Board Executive Officer may require additional monitoring, per Water Code § 13383. Permittees shall implement TMDL monitoring as specified by the Regional Water Board Executive Officer.

E.13.c. 303(d) Monitoring

All Permittees that discharge to waterbodies listed as impaired on the 303(d)[28] list where urban runoff is listed as the source, shall consult with the Regional Water Board within one year of the effective date of the permit to assess whether monitoring is necessary and if so, determine the monitoring study design and a monitoring implementation schedule. Permittees shall implement monitoring of 303(d) impaired water bodies as specified by the Regional Water Board Executive Officer.

E.13.d. Receiving Water Monitoring and Special Studies

Traditional Small MS4 Permittees with a population greater than 50,000 listed in Attachment A that are not already conducting ASBS, TMDL or 303(d) monitoring efforts shall participate in one of the following monitoring programs, subject to Regional Water Board Executive Officer approval:

- E.13.d.1. Receiving Water Monitoring
- E.13.d.2. Special Studies

E.13.d.1. Receiving Water Monitoring

(i) **Task Description –** Within the second year of the effective date of the permit, the Permittee shall develop and implement a receiving water monitoring program to (1) Monitor receiving water quality at upstream location in an area undergoing development and evaluate changes in receiving water quality over time, and (2) Monitor receiving water quality at a downstream location in an urban area and evaluate changes in receiving water quality over time. Permittees may, to the extent allowed by law, establish a monitoring fund into which all new development contributes on a proportional basis (% development fee, size/number of lots, etc.). Monitoring funding may be overseen by municipalities or coalition of municipalities.

(ii) **Implementation Level -** By the first year of the permit, the Permittee shall select one (1) urban/rural interface monitoring site to monitor receiving water quality at an upstream location in an area undergoing development and evaluate changes in receiving water quality over time, and; one (1) urban area monitoring site to monitor receiving water quality at a downstream location in an urban area and evaluate changes in receiving water quality over time. Site selection shall include the following:

(a) Urban/Rural Interface. Identify one characteristic waterway at the top, or upstream, of a HUC 12 level watershed planned for development in the near future that traverses an urban/rural interface, using the 2010 Census Data and urban area maps, and establish a permanent monitoring location at the

[28] http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

identified urban/rural interface[29]. Monitoring at the urban/rural interface shall address the question: Does receiving water quality change as LID BMPs are integrated into new development?

(b) Urban Downstream. Identify one characteristic waterway at the bottom, or downstream, of the same HUC 12 watershed as the urban/rural interface monitoring location and within an urbanized area and establish a permanent monitoring location at the identified urbanized area waterway. Monitoring at the urban area site shall address the question: Does receiving water quality improve as a result of efforts to control the sources of pollution and educate the public?

By the second year of the permit term and after establishment of site selection, the Permittee shall monitor the urban/rural interface site to address the hypothesis that receiving water quality will remain the same as new development proceeds, and the urban area site to address the hypothesis that receiving water quality will improve over time as storm water and other water quality programmatic efforts are implemented. Monitoring shall be implemented in accordance with Table 3. Receiving Water Monitoring Parameters and Protocols.

Table 3: Receiving Water Monitoring Parameters and Protocol

Urban/Rural Interface:

Objective: Monitor receiving water quality at upstream location in an area undergoing development. Evaluate changes in receiving water quality over time.

Question: Does receiving water quality change as LID BMPs are integrated into new development?

Hypothesis: Receiving water quality will remain the same as new development proceeds.

Urban Downstream:

Objective: Monitor receiving water quality at a downstream location in an urban area. Evaluate changes in receiving water quality over time.

Question: Does receiving water quality improve as a result of efforts to control the sources of pollution and educate the public?

Hypothesis: Receiving water quality will improve over time as storm water and other water quality programmatic efforts are implemented.

PARAMETER	ENDPOINT	BENEFICIAL USED PROTECTED	JUSTIFICATION	PROTOCOL
Water Quality	Pyrethroids* (sediment)	Aquatic Life	Pyrethroids** among the most ubiquitous urban contaminant in storm water. Highly toxic to aquatic life.	Method with detection limit of 1 pptr (5 pptr for permethrin only) such as the GC-MS-MS method of Water Pollution Control Lab. Yearly in spring at urban/rural interface only. Refer to pending SWAMP guidelines.
	Dissolved oxygen (DO)	Aquatic life, recreation	DO reports on presence of excessive nutrients (N, P) and effects of organic matter loading into a waterbody. High DO during day, low DO at night suggests algae overgrowth.	Option 1: One week of evening grab samples (a minimum of 2 hours after dusk or 2 hours before sunrise) in spring (as soon as safe to get into waterway), summer, & fall. OR Option 2: Continuous sampling. 1

[29] The urban/rural interface is identified as the geographical location at which urban land use and rural land use interact

				week in spring summer, fall. In rivers or lakes, 2 samplers to obtain depth-integrated values.
	Temperature	Aquatic life	Aquatic life can survive within a temperature window, exceedances lethal. If loggers are deployed, DO probes often also measure temperature.	Option 1: Daytime measurement between noon – 5 pm, at the same time of day, for 2 weeks in the spring, summer, and fall. Option 2: Continuous sample. Same as for dissolved oxygen.
	Bacteria	Recreation	Increase cell count linked to poor management practices, high bacteria levels limit recreational use of waterways.	Once yearly in later summer or fall. Collect 1 sample weekly x 4 weeks. Calculate geometric mean. Measure e. coli.
	Nutrients	Aquatic life Recreation Other	Excess nutrients can cause eutrophication of waterways leading to low dissolved oxygen which harms aquatic life. Algal overgrowth can also impair flows, adversely affect aesthetics, limiting recreation.	Benthic algal biomass and % cover (benthic chlorophyll a) from sediment in wadeable and non-wadeable streams or planktonic algal biomass (water column chlorophyll) from non-wadeable rivers and lakes. 3 times per year at beginning, middle, and end of growing season. Use SWAMP protocol.
Physical Habitat	PHAB assessment	Aquatic life	Expect to see few changes in habitat with effective LID implementation	Once yearly in spring. Use SWAMP protocol.
	Channel cross sections	Aquatic life	Reports on stability of creek/river channel	Once yearly in spring.
	Flow	Aquatic life	Expect minimal changes in flow rate if LID practices minimizes changes in hydrograph usually seen with urbanization	Option 1: Pressure transducer. Use channel cross sections put in same time as DO probe. Measure spring, summer, and fall Option 2: Install stage gage, develop rating curve. Evaluate spring, summer, and fall for 2 weeks.
	Photo documentation	Overall conditions	Pictures and flood prone area will aid in the interpretation of the data	Once yearly in spring.
Aquatic Life	Bioassessment	Aquatic life	BMIs integrate the sum of all conditions. Use early measurements as the baseline. In some cases, expect improved BMIs, depending on previous use of land.	In spring as soon as safe to enter water, use SWAMP protocol

* Pyrethroid monitoring is required at the urban/rural interface site only.

**Currently, pyrethroids are the pesticide of greatest concern and abundance in urban/suburban waterways. However, new regulations enacted by the Dept. of Pesticide Regulation restrict how pyrethroids may be applied. Initial models by UC Davis researchers suggest that this could result in a runoff reduction of 80-90%, depending on the amount of impervious cover in the watershed. In the future, other pesticides may become more of a threat to aquatic life in urban waterways. One pesticide that is being used with greater frequency is fipronil, a phenylpyrazole insecticide, that is more water soluble than pyrethroids. In order to use the resources of the permittees most efficiently, the State Water Resource Control Board reserves the right to modify the terms and conditions of the permit based on new information on pesticide use and toxicity. This could include substituting another pesticide for monitoring or eliminating this endpoint.

(iii) **Reporting –** By the second year Annual Report, the Permittee shall complete and have available a report (50 page maximum) that includes a summary of baseline data collections and discussion of monitoring program results;

By the fifth year Annual Report, the Permittee shall complete and have available a report (50 page maximum) that includes a comparison of data collection to baseline data, and discussion of monitoring program results.

At a minimum, the second and fifth year Annual Reports shall include the following information:

(a) The purpose of the monitoring, brief contextual background and a brief description of the study design and rationale.
(b) Sampling site(s) locations, including latitude and longitude coordinates, water body name and water body segment if applicable. Sampling design, including sampling protocol, time of year, sampling frequency and length of sampling.
(c) Methods used for sample collection: list methods used for sample collection, sample or data collection identification, collection date, and media if applicable.
(d) Results of data collection, including concentration detected, measurement units, and detection limits if applicable.
(e) Quantifiable assessment, analysis and interpretation of data for each monitoring parameter.
(f) Comparison to reference sites (if applicable), guidelines or targets
(g) Discussion of whether data collected addresses the objective(s) or question(s) of study design
(h) Quantifiable discussion of program/study pollutant reduction effectiveness.

Where applicable, the Permittee shall prepare, maintain, and implement a Quality Assurance Project Plan (QAPP) in accordance with the Surface Water Ambient Monitoring Program. All monitoring samples shall be collected and analyzed according to the Program QAPP developed for the purpose of compliance with this Order. SWAMP Quality Assurance Program Plan (2008) is available at:

http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/qapp/qaprp082209.pdf

A formatted Microsoft Word document that includes guidelines and boilerplate language for developing the permit QAPP is available at:

http://www.waterboards.ca.gov/water_issues/programs/swamp/tools.shtml#qa

Water quality data shall be uploaded to SMARTS and must conform to California Environmental Data Exchange Network (CEDEN) Minimum Data Templates format. CEDEN Minimum Data Templates are also available at: http://ceden.org/

E.13.d.2. Special Studies

(i) **Task Description –** Within the first year of the effective date of the permit, the Permittee, as an alternative to Section E.13.d.1. Receiving Water Monitoring, may develop and implement a special study monitoring program to assess and evaluate the effectiveness of water quality projects or storm water program elements designed to reduce specific water quality pollutants that are causing or contributing to beneficial use impairment. The special studies must demonstrate the nexus between storm water program implementation, water quality protection and pollutant reduction effectiveness and may include, but are not limited to:

(a) Assessment of effectiveness of habitat enhancement efforts and assessment of effectiveness of stream restoration projects (i.e., stream channel restoration as related to implementation of hydromodification standards);
(b) Assessment of effectiveness of low impact development pilot projects, and assessment of storm water program components through pollutant load reduction quantification and/or discharge water quality monitoring (i.e., reduction of impervious surface related to implementation of Post-Construction Storm Water Management Program).

(ii) **Implementation Level** – By the first year of the permit, the Permittee shall develop and implement a special study plan and shall submit to an applicable Regional Board for review and approval. Within the second year of the effective date of the permit, the Permittee shall begin implementation of the approved special study plan. The study plan shall include, at a minimum:

(a) Purpose/objective of the monitoring (sampling rationale), including reasoning to implement a special study in lieu of the Receiving Water Monitoring described in Section E.13.d.1.
(b) Brief project background information and overall study design (i.e., surrounding land uses, reference monitoring data, if applicable, and site conditions)
(c) Parameters that are being measured, how parameters are measured and rationale for parameter selection.
(d) Frequency that parameters are being measured (sampling frequency)
(e) Sampling site location
(f) Description of how the data will be managed, analyzed (including statistical analysis) and reported
(g) Expected results based on study plan design and hypothesis

(iii) **Reporting –** By the second year Annual Report, the Permittee shall complete and have available a report (50 page maximum) that includes a summary of baseline data collections and discussion of monitoring program results.

By the fifth year Annual Report, the Permittee shall complete and have available a report (50 page maximum) that includes a comparison of data collection to baseline data, and discussion of monitoring program results.

At a minimum, the second and fifth year Annual Reports shall include the following information:

(a) The purpose of the monitoring, contextual background and a description of the study design and rationale.
(b) Sampling site(s) locations, including latitude and longitude coordinates, water body name and water body segment if applicable. Sampling design, including sampling protocol, time of year, sampling frequency and length of sampling.
(c) Methods used for sample collection: list methods used for sample collection, sample or data collection identification, collection date, and media if applicable.
(d) Results of data collection, including concentration detected, measurement units, and detection limits if applicable.
(e) Quantifiable assessment analysis and interpretation of data for each monitoring parameter or other data type.
(f) Comparison to reference sites (if applicable), guidelines or targets
(g) Discussion of whether data collected addresses the objective(s) or question(s) in the study plan
(h) Quantifiable discussion of program/study pollutant reduction effectiveness.

Where applicable, the Permittee shall prepare, maintain, and implement a QAPP in accordance with SWAMP. All monitoring samples shall be collected and analyzed according to the Program QAPP developed for the purpose of compliance with this Order. SWAMP Quality Assurance Program Plan (2008) is available at:

http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/qapp/qaprp082209.pdf

A formatted Microsoft Word document that includes guidelines and boilerplate language for developing the permit QAPP is available at:

http://www.waterboards.ca.gov/water_issues/programs/swamp/tools.shtml#qa

Water quality data shall be uploaded to the Storm Water Multi-Application Reporting and Tracking System (SMARTS) and must conform to "CEDEN Minimum Data Templates" format. CEDEN Minimum Data Templates are also available at: http://ceden.org/

E.14. PROGRAM EFFECTIVENESS ASSESSMENT AND IMPROVEMENT

E.14.a. Program Effectiveness Assessment and improvement Plan

(i) **Task Description -** The Permittee shall develop and implement a Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. The Program Effectiveness Assessment and Improvement Plan will assist the Permittee to document compliance with permit conditions and to adaptively manage its storm water program and make necessary modifications to the program to improve program effectiveness at reducing pollutants of concern, achieving the MEP standard, and protecting water quality. The Program Effectiveness Assessment and Improvement Plan shall identify the strategy used to gauge the effectiveness of prioritized BMPs and program implementation as a whole. Prioritized BMPs include BMPs implemented based on pollutants of concern. Where pollutants of concern are unidentified, prioritized BMPs are based on common urban pollutants (i.e., sediment, bacteria, trash, nutrients). The annual effectiveness assessments will help identify potential modifications to the program to ensure long-term effectiveness.

(ii) **Implementation Level** - The Program Effectiveness Assessment and Improvement Plan may be modeled upon the most recent version (if applicable) Municipal Storm Water Program Effectiveness Assessment Guidance (CASQA, May 2007) or equivalent.

(a) The Program Effectiveness Assessment and Improvement Plan shall include the following elements, at a minimum as applicable:

1) Identification of overall program goals including pollutants of concern and prioritized BMPs
2) Documentation of the level of implementation of storm water program elements
3) Identification and targeting of target audience(s)
4) Assessment of BMP performance at achieving outcome levels
5) Assessment of pollutant source reductions achieved by individual BMPs
6) Quantification of pollutant loads and pollutant load reductions achieved by the program as a whole
7) MS4 discharge quality, where available, including analysis of the data
8) Receiving water quality data, including analysis of the data
9) Identification of long-term effectiveness assessment, to be implemented beyond the permit term

(b) The Program Effectiveness Assessment and Improvement Plan shall assess BMP and program effectiveness in terms of the following Outcome Levels:

1) Storm water program activities
2) Awareness
3) Behavior
4) Pollutant load reductions
5) MS4 discharge quality (where assessment is supported by MS4 discharge quality data)

6) Receiving water conditions

(c) The Program Effectiveness Assessment and Improvement Plan shall identify assessment methods for privately owned BMPs.

(d) The Program Effectiveness Assessment and Improvement Plan shall identify assessment methods the Permittee will use to quantitatively assess BMP performance at reducing pollutant loads wherever feasible, using the following or equivalent methods:

1) Direct quantitative measurement of pollutant load removal for BMPs that lend themselves to such measurement (e.g., measuring sediment collected through street-sweeping activities);
2) Science-based estimates of pollutant load removal for BMPs where direct measurement of pollutant removal is overly challenging (e.g., removal of heavy metals through a bioswale);
3) Direct quantitative measurement of behaviors that serve as proxies of pollutant removal or reduction (e.g., the percentage of construction sites demonstrated by inspection to be in compliance with permit conditions); or
4) Visual comparison (e.g., using photographs to compare the amount of trash in a creek between one year and the next).

(e) The Program Effectiveness Assessment and Improvement Plan shall ask and answer the following Management Questions for prioritized BMPs for which answers to management questions can be based on quantitative data appropriate to the question being answered.

1) Were prioritized BMPs or group of BMPs implemented in accordance with the permit requirements? The Permittee shall develop quantitative data using the following or equivalent methods:
   a) Confirmation – Documenting whether an activity or task has been completed, expressed as positive or negative outcome (i.e., yes or no)
   b) Tabulation – Simple accounting expressed in absolute (e.g., number of people participating), or relative terms (e.g. percent increase in recycled household hazardous waste)
2) To what extent did prioritized BMPs or group of BMPs change the target audience's behavior? The Permittee shall develop quantitative data using the following or equivalent methods:
   a) Surveys or interviews to discern knowledge, attitudes, awareness, behavior of specific population, etc.
   b) Interviews of site personnel to discern awareness and behavior
   c) Inspections or site visits to directly observe or assess a practice.
3) To what extent did prioritized BMPs or group of BMPs reduce pollutant loads from their sources to the storm drain system?

(f) The Program Effectiveness Assessment and Improvement Plan shall include water quality monitoring data, where available, to answer the following long-term management questions, effectiveness of BMPs and the overall storm water program will be assessed in future permit terms.

1) To what extent did implementation of the BMP, group of BMPs, or storm water program enhance or change the urban runoff and discharge quality?
2) To what extent did implementation of the BMP, group of BMPs, or storm water program enhance or change receiving water quality?
3) Did exceedance(s) of water quality objectives or water quality standards persist notwithstanding implementation of the storm water program?

The Program Effectiveness Assessment and Improvement Plan shall include documentation of the effectiveness of BMPs implemented to reduce the discharge of pollutants to the MS4 to the MEP and protect water quality.

(iii) **Reporting** – By the second year Annual Report complete and submit the Program Effectiveness Assessment and Improvement Plan. The Plan shall include the strategy the Permittee will use to assess the effectiveness of the program, the specific measures the Permittee will use to assess the effectiveness of BMPs and/or groups of BMPs, and how the Permittee will use the information obtained through effectiveness assessment to modify individual BMPs and the program as a whole to increase short and long-term effectiveness. In subsequent Annual Reports, describe implementation of the Program Effectiveness Assessment and Improvement Plan, summarize data obtained through effectiveness assessment measures and the short and long-term progress of the storm water program, and provide an analysis of the data to improve program effectiveness, to achieve the MEP standard, protect water quality, and to document the Permittee's compliance with permit conditions. Permittees that have a Program Effectiveness Assessment and Improvement Plans, or equivalent, approved by the applicable Regional Board, or that have a schedule approved by the applicable Regional Board to develop and implement such a Plan, shall adhere to the Plan and/or schedule approved by the Regional Board unless otherwise directed by the Regional Board. By the fifth year annual report, complete and submit an analysis of the effectiveness of modifications made at improving BMP and/or program effectiveness.

E.14.b. Storm Water Program Modifications

(i) **Task Description** –The Permittee shall modify BMPs and/or the program as a whole to improve compliance with permit conditions and improve program effectiveness at reducing pollutant loads, achieving the MEP standard, and protecting water quality. The Permittee shall use information gained through effectiveness assessment and MS4 discharge and receiving water monitoring to identify priority areas for program improvement. In addition, the Permittee shall identify and make modifications to BMPs, including new BMPs or modification to existing BMPs, to improve effectiveness in each priority area. The Permittee shall consult with the applicable Regional Water Board in setting expectations for the scope, timing, and frequency of BMP modifications.

(ii) **Implementation Level** – Within the fifth year of the effective date of the permit, the Permittee shall identify and summarize BMP and/or program modifications identified in priority program areas. Modifications shall include:

(a) Improving upon BMPs that are underperforming

(b) Continuing and expanding upon BMPs that proved to be effective, including identifying new BMPs or modifications to existing BMPs designed to increase pollutant load reductions;
(c) Discontinuing BMPs that may no longer be productive and replacing with more effective BMPs; and
(d) Shifting priorities to make more effective use of resources

(iii) **Reporting –** By the fifth year Annual Report, complete and submit the list of BMP and/or program modifications, as specified in E.14.c(ii), the Permittee will make for priority program areas, including identification of priority program areas and the schedule the Permittee will follow to complete identified modifications during the next permit term. The modifications shall be aimed at the goal of reducing pollutant loads, achieving the MEP standard and protecting water quality.

E.15. TOTAL MAXIMUM DAILY LOADS COMPLIANCE REQUIREMENTS

E.15.a. The Permittee shall comply with all applicable TMDLs approved pursuant to 40 Code of Federal Regulations section 130.7 that assign a Waste Load Allocation to the Permittee and that have been identified in Attachment G.

E.15.b. WLA, Load Allocations (LA), effluent limitations, implementation requirements, and monitoring requirements are specified in the adopted and approved Regional Water Board Basin Plans and authorizing resolutions which are incorporated herein by reference as enforceable parts of this Order. Applicable Basin Plan amendments and resolutions are identified in Attachment G. Attachment G additionally contains a list of TMDL-specific permit requirements developed by the Regional Water Boards for compliance with the implementation requirements of the relevant TMDLs. These requirements are an enforceable component of this Order. In some cases, dates are given that fall outside the term of this Order. Compliance dates that have already passed are enforceable on the effective date of this Order. Compliance dates that exceed the term of this Order are included for reference, and become enforceable in the event that this Order is administratively extended.

E.15.c. The Regional Water Boards are directed to review, within one year of the effective date of this Order, the TMDL-specific permit requirements contained in Attachment G and to develop or propose revisions, as appropriate, to TMDL-specific permit requirements to the State Water Board after consultation with the Permittees and State Water Board staff. Any proposed revisions by the Regional Water Boards shall be supported by an explanation of how the proposed TMDL-specific permit requirements are consistent with the assumptions and requirements of applicable WLAs and with the goals of the TMDL. Where a TMDL is limited to a single constituent within a single reach of the watershed, the Regional Water Board Executive Officer may require additional monitoring, per Water Code § 13383. The State Water Board will incorporate any necessary revisions through a reopener. The State Water Board may additionally revise this Order through a reopener to incorporate any modifications or revisions to the TMDLs in Attachment G, or to incorporate any new TMDLs adopted during the term of this Order that assign a WLA to a Regulated Small MS4 or that identify a Regulated Small MS4 as a responsible

party. In revising Attachment G, the State Water Board will allow adequate notice and public review.

E.15.d. The Permittee shall complete and report the status of their implementation of the specific TMDL implementation requirements that have been incorporated into the permit with each Annual Report via SMARTS. Reporting on TMDL implementation shall include the following information:

(i) A description of BMPs implemented, including types, number, and locations
(ii) An assessment of the effectiveness of implemented BMPs in progressing towards attainment of wasteload allocations within the TMDLs' specified timeframes
(iii) All monitoring data, including a statistical analysis of the data to assess progress towards attainment of wasteload allocations within the TMDLs' specified timeframes
(iv) Based on results of the effectiveness assessment and monitoring, a description of the additional BMPs that will be implemented to attain wasteload allocations within the TMDLs specified timeframes

E.15.e. The Permittee shall comply with implementation requirements specified in Category 4b demonstrations associated with Clean Water Act Sections 303d, 306b, and 314 Integrated Reporting and Listing Decisions. Implementation requirements described in Category 4b demonstrations are effective upon Regional Water Board approval of that region's Integrated Reporting and Listing Decisions and associated Category 4b demonstrations. The most recent Integrated Reporting and Listing Decisions and associated Category 4b demonstrations are available at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

E.16. ANNUAL REPORTING PROGRAM

E.16.a. The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities for each program element and certify compliance with all requirements of this permit. If a Permittee is unable to certify compliance with a requirement, the Permittee must submit in SMARTS the reason for failure to comply, a description and schedule of tasks necessary to achieve compliance, and an estimated date for achieving full compliance.

E.16.b. Permittees shall complete and retain all Annual Report information on the previous fiscal year beginning July 1 and ending June 30. The Annual Reporting requirements are set forth in Provisions E. The Permittee shall retain documentation as necessary to support their Annual Report. The Permittee shall make this supporting information available during normal business hours, unless agreed to by the applicable Regional Water Board's Executive Officer.

E.16.c. The Permittee shall submit when requested by the Executive Officer of the applicable Regional Water Board a detailed written online annual report or in-

person presentation of the annual report that addresses the activities described in Provision E. The detailed Annual Report must clearly refer to the permit requirements and describe in quantifiable terms, the status of activities undertaken to comply with each requirement.

E.16.d. Permittees involved in regional programs may coordinate with the members to identify reporting responsibility. The one report submitted on behalf of Permittees involved in a regional program must include a summary of the past year activities for each program element and certification of compliance with all requirements of this Order for each of the Permittees in the regional program.

F. NON – TRADITIONAL SMALL MS4 PERMITTEE PROVISIONS

F.1. Non-Traditional Small MS4 Categories

The Non-Traditional Small MS4s identified in Attachment B or by a Regional Water Board Executive Officer shall comply with the specific provisions in this Section. For military installations, this permit applies to areas, where the activities and population density resemble that of a traditional small MS4, as defined in the permit boundary map in Section A.2.b.(3). For Department of Corrections and Rehabilitation Permittees, this permit applies to facilities that are in active operation (i.e., does not apply to closed facilities lacking management oversight).

F.2. Security Concerns

Department of Defense, Department of Corrections and Rehabilitation Permittees, ports and transportation agencies are exempt from Annual Reporting of any provision in this section that could pose a security risk and/or compromise facility security.

F.3. Maximize Efficiency

Permittees may incorporate the required storm water provisions into already existing programs and leverage existing staff to implement BMPs during its day to day business and operations.

F.4. Equivalent or Existing Document

A Permittee may utilize an equivalent or existing document such as a Standard Operations and Procedures manual, Operation and Maintenance Plan, or Spill Response Plan if that document includes the necessary information required to comply with the provisions of this section.

F.5. PROVISIONS

F.5.a. PROGRAM MANAGEMENT ELEMENT

F.5.a.1. Legal Authority

(i) **Task Description** - Permittee shall have adequate legal authority to meet the requirements of this Order

(ii) **Implementation Level** – Within the second year of the effective date of the permit, the Permittee shall review, revise or adopt new relevant policies, contractual provisions, base orders, resolutions or other regulatory mechanisms, to the extent allowable under state or local law, to ensure it has at a minimum the legal authority to:

(a) Effectively prohibit non-storm water discharges through the MS4. Exceptions to this prohibition are NPDES-permitted discharges of non-storm water and non-storm water discharges from B.3 that are considered non-significant contributors of pollutants. Where the non-storm water discharge is to a segment of an MS4 that discharges directly to an ASBS, exceptions to the non-storm water prohibition are specified in Attachment C.

(b) Detect and eliminate illicit discharges and illegal connections to the MS4. Illicit connections include pipes, drains, open channels, or other conveyances that have the potential to allow an illicit discharge to enter the MS4. Illicit discharges include all non-storm water discharges not otherwise authorized in this Order, including, but not limited to discharges from mobile cleaning and pressure washing operations.

(c) Respond to spills, and prohibit dumping or disposal of materials other than storm water into the MS4.

(d) Require vendors, contractors and operators of commercial facilities to minimize the discharge of pollutants to the MS4 through the installation, implementation, and maintenance of BMPs consistent with the CASQA Best Management Practice Handbooks or equivalent.

(e) Ensure construction site or industrial facility operators provide a Waste Discharge Identification Number for coverage under the CGP and IGP and comply with the appropriate permit.

(f) Review designs and proposals for new development and redevelopment to determine whether adequate BMPs will be installed, implemented, and maintained during construction and after final stabilization (post-construction).

(g) Promptly cease and desist discharges and/or cleanup and abate a discharge, including the ability to:

1) Effectively require the discharger to abate and clean up their discharge, spill, or pollutant release within 72 hours of notification;

2) Require abatement, within 30 days of notification, for uncontrolled sources of pollutants that could pose an environmental threat;

3) Perform the cleanup and abatement work and bill the responsible party, if necessary;
4) Provide the option to order the cessation of activities until such problems are adequately addressed if a situation persists where pollutant-causing sources or activities are not abated;
5) Require a new timeframe and notify the appropriate Regional Water Board when all parties agree that clean-up activities cannot be completed within the original timeframe and notify the appropriate Regional Water Board in writing within five business days of the determination that the timeframe requires revision.

(iii) **Reporting** – All Permittees shall submit by the second year online Annual Report, a statement signed by both the Permittee's legal counsel and an authorized signatory certifying the Permittee has adequate legal authority to comply with all Order requirements.

F.5.b. EDUCATION AND OUTREACH PROGRAM

F.5.b.1. Compliance Participation Options

All Permittees shall comply with the requirements in this Section by participating in one or more of the following:

(a) Contributing to a countywide storm water program, as determined appropriate by the Permittee members, so that the countywide storm water program conducts education and outreach on behalf of its members; or
(b) Contributing to a regional education and outreach collaborative effort (a regional education and outreach collaborative effort occurs when all or a majority of the Permittees collaborate to conduct regional education and outreach. Regional education and outreach collaboration includes Permittees defining a uniform and consistent message, deciding how best to communicate the message, and how to facilitate behavioral changes. Then collaboratively apply what is learned through local jurisdiction groups, pooling resources and skills.); or
(c) Fulfilling education and outreach requirements within their jurisdictional boundaries on their own. Some level of coordination of education and outreach efforts with an adjacent Phase I MS4 Permittee is recommended/anticipated for watershed/region-wide consistency.; or
(d) A combination of the previous options, so that all requirements are fulfilled.

Reporting – By the first year online Annual Report, the Permittee shall submit information indicating which compliance participation option it will use to comply with the public education and outreach requirements in this Section. For each public education and outreach requirement in this Section that the Permittee will comply with through contribution to a countywide storm water program or regional education and outreach collaborative effort, the Permittee shall include in the first year online Annual Report documentation, such as a written agreement, letter or similar document, which confirms the collaboration with other MS4s.

F.5.b.2. Public Education and Outreach

The public for a Non-traditional MS4 Permittee is considered the following, if applicable:

- Faculty
- Inmates
- Military personnel
- Residents
- Students
- Staff
- Visitors

(i) **Task Description –** Within the second year of the effective date of the permit, the Permittee shall develop and implement a comprehensive storm water public education and outreach program. The public education and outreach program shall be designed to inform the public about storm water pollution and steps that can be taken to reduce storm water pollution. The Public Education and Outreach Program shall measurably increase the public's knowledge regarding the storm drain system, impacts of urban runoff and illicit discharges on receiving waters, and potential BMP solutions for the target audiences.

(ii) **Implementation Level** –The Permittee shall, at a minimum:

(a) Develop and implement a public education strategy that establishes education tasks based on water quality problems, target audiences, and anticipated task effectiveness. The strategy must include identification of who is responsible for implementing specific tasks and a schedule for task implementation. The strategy must demonstrate how specific high priority storm water quality issues in their jurisdiction or local pollutants of concern are addressed.
(b) Implement BMPs that gauge level of awareness in target audiences and effectiveness of education tasks.
(c) Develop and convey a specific storm water message that focuses on the following:
1) Local pollutants of concern
2) Target audience
3) Regional water quality issues

(d) Develop and disseminate appropriate educational materials to target audiences and translate into applicable languages when appropriate (e.g. the materials can utilize various media such as printed materials, billboard and mass transit advertisements, signage at select locations, stenciling at storm drain inlets, radio advertisements, television advertisements, and websites);
(e) Distribute educational materials, using whichever methods and procedures determined appropriate during development of the public education strategy;
(f) Develop and convey messages to explain the benefits of water-efficient landscaping (if appropriate);
(g) Utilize information from storm water-friendly landscaping[30] programs (if appropriate);

[30] For example, Surfrider's Ocean Friendly Garden Program (http://www.surfrider.org/programs/entry/ocean-friendly-gardens)

(h) Develop and convey messages specific to reducing illicit discharges with information about how the public can report incidents to the appropriate authorities;
(i) Develop and convey of messages specific to proper application of pesticides, herbicides, and fertilizers;
(j) Within the Permittee's jurisdiction, provide independent, parochial and public schools with materials to effectively educate school-age children, if applicable, about storm water and how they can help to protect water quality habitat in their local watersheds. The Permittee is encouraged to use environmental and place-based, experiential learning materials that are integrated into school curricula and school facility management[31]. In the case that a local program does not exist, the Permittee may use California's Education and Environment Initiative Curriculum[32] or equivalent;
(k) Develop (or coordinate with existing effective programs) and convey messages specific to reducing discharges from pressure washing operations and landscape irrigation;
(l) If applicable, utilize storm water-friendly education for organized car wash participants and provide information pertaining to car wash discharge reduction. The Permittee may use the Sacramento Stormwater Quality Partnership's River Friendly Carwash Program[33], or equivalent, for guidance;
(m) The Permittee shall conduct focused education in identified illicit discharge flow areas based on identified illicit discharge(s).

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance directions.

F.5.b.3. Staff and Site Operator Training and Education: Illicit Discharge Detection and Elimination Training

(i) **Task Description** – Permittees shall develop and implement a training program for all Permittee staff, who, as part of their normal job responsibilities, may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection to the storm drain system.

(ii) **Implementation Level** – Within the third year of the effective date of the permit, the Permittee shall develop the training program. The training program shall include at a minimum:

(a) Identification of an illicit discharge or illegal connection;
(b) Proper procedures for reporting and responding to the illicit discharge or illegal connection;
(c) Follow-up training provided as needed to address changes in procedures, techniques, or staffing;

[31] For example, Splash (*www.sac**splash**.org/*),Effie Yeaw Nature Center (www.sacnature.net) or Yolo Basin (www.yolobasin.org)
[32] http://www.californiaeei.org/
[33] http://www.beriverfriendly.net/riverfriendlycarwashing/

(d) Annual assessment of their trained staff's knowledge of illicit discharge response and shall provide refresher training as needed;
(e) Training of new staff who, as part of their normal job responsibilities may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection;
(f) Contact information, including the procedure for reporting an illicit discharge, shall be included in each of the Permittee's fleet vehicles that are used by field staff.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance directions.

F.5.b.4. Staff Pollution Prevention and Good Housekeeping

The Permittee shall train employees on how to incorporate pollution prevention/good housekeeping techniques into Permittee operations.

(i) **Task Description** – The Permittee shall provide a biennial training program for appropriate employees involved in implementing pollution prevention and good housekeeping practices in the Pollution Prevention/Good Housekeeping for Permittee Operations sections of this permit. The Permittee shall determine the need for interim training during alternate years when training is not conducted, through an evaluation of employee Pollution Prevention/Good Housekeeping knowledge.

(ii) **Implementation Level** – The biennial training program shall include the following:

(a) General storm water education component, any new technologies, operations, or responsibilities that arise during the year and the permit requirements which apply to the staff being trained. Clear guidance on appropriate storm water BMPs to use at Permittee owned facilities and during typical Operation and Maintenance activities.

(b) An assessment of trained staff's knowledge of pollution prevention and good housekeeping and shall revise the training as needed.

(c) A requirement that any contractors hired by the Permittee to perform Operation and Maintenance activities shall be contractually required to comply with all of the storm water BMPs, good housekeeping practices, and standard operating procedures described above.

(d) The Permittee shall provide oversight of contractor activities to ensure that contractors are using appropriate BMPs, good housekeeping practices and following standard operating procedures.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of

this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance directions.

F.5.c. PUBLIC INVOLVEMENT AND PARTICIPATION PROGRAM

(i) **Task Description -** Within the third year of the effective date of the permit, the Permittee shall involve its public in the development and implementation of activities related to the program. The public participation and involvement program shall encourage volunteerism, public comment and input on policy, and activism in the community.

(ii) **Implementation Level** – The Permittee shall, at a minimum:

(a) Ensure that high priority storm drain inlets include a labeled, stenciled or other effective method (e.g., clearly visible sign strategically placed in area of high pedestrian activity) of communicating a storm water awareness message such as “drains to creek” or “only rain in the drain”.
(b) Integrate storm water awareness messages and information on a publicly accessible website

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance

F.5.d. ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

The Permittee shall develop an Illicit Discharge Detection and Elimination program to detect, investigate, and eliminate illicit discharges, including illegal dumping, into its system or coordinate with an adjacent Phase I MS4 Permittees existing program. The existing program, at a minimum, must include the provisions in this section.

F.5.d.1 Outfall Mapping

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall maintain an up-to-date and accurate outfall map. The map may be in hard copy and/or electronic form or within a geographic information system (GIS). The development of the outfall map shall include a visual outfall inventory involving a site visit to each outfall. It is recommended the Permittee coordinate with an adjacent Phase I MS4 Permittee to collect outfall data for which they may discharge to. Renewal Permittees that have an existing and up-to-date outfall map that includes the minimum requirements specified in Section F.5.d.1.(ii)(a-b) are not required to re-create the outfall map. This does not exempt renewal Permittees with an existing outfall map from conducting the field sampling specified in Section F.5.d.2.

(ii) **Implementation Level** - The outfall map shall at a minimum show:

(a) The location of all outfalls and drainage areas within the urbanized area, contributing to those outfalls that are operated by the Permittee, and that directly discharge within the Permittee's jurisdiction to a receiving water. Each mapped outfall shall be given an individual alphanumeric identifier, which shall be noted on the map. Photographs shall be taken or an electronic database shall be utilized to provide baseline information and track operation and maintenance needs over time.

(b) The location (and name, where known to the Permittee) of all water bodies receiving direct discharges from those outfall pipes.

Submerged outfalls or other outfalls that may pose a threat to public safety are not required to be inventoried.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.d.2. Field Sampling to Detect Illicit Discharges

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall conduct field sampling to detect potential illicit discharges while conducting the outfall inventory specified in Section F.5.d. Outfall Inventory. If while conducting the outfall inventory specified in Section F.5.d., an outfall is flowing or ponding and it has been more than 72 hours since the last rain event, then the Permittee shall sample the discharge.

(ii) **Implementation Level** – If an outfall is flowing or ponding and it has been more than 72 hours since the last rain event, the Permittee shall:

(a) Conduct monitoring for the following indicator parameters identified in Table 1. Field Sampling Indicator Parameters (following page) to help determine the source and identification of the discharge. Alternatively, the Permittee may select parameters based on local knowledge of pollutants of concern in lieu of sampling for the parameters listed in Table 1. Modifications and associated justifications shall be identified within SMARTS prior to conducting field sampling as specified in Section F.5.d.2.

Table 1. Field Sampling Indicator Parameters

Indicator Parameters Used to Detect Illicit Discharges					
Parameter	**Discharge Types It Can Detect**				
	Sewage	**Washwater**	**Tap Water**	**Industrial or Commercial Liquid Wastes**	**Laboratory/Analytical Challenges**
Ammonia	●	◉	○	◉	Can change into other nitrogen forms as the flow travels to the outfall
Color	◉	◉	○	◉	
Conductivity	◉	◉	○	◉	Ineffective in saline waters
Detergents – Surfactants	●	●	○	◉	Reagent is a hazardous waste
Fluoride*	○	○	●	◉	Reagent is a hazardous waste Exception for communities that do not fluoridate their tap water
Hardness	◉	◉	◉	◉	
pH	○	◉	○	◉	
Potassium	◉	○	○	●	May need to use two separate analytical techniques, depending on the concentration
Turbidity	◉	◉	○	◉	

● Can almost always (>80% of samples) distinguish this discharge from clean flow types (e.g., tap water or natural water). For tap water, can distinguish from natural water.
◉ Can sometimes (>50% of samples) distinguish this discharge from clean flow types depending on regional characteristics, or can be helpful in combination with another parameter
○ Poor indicator. Cannot reliably detect illicit discharges, or cannot detect tap water
N/A: Data are not available to assess the utility of this parameter for this purpose.
Data sources: Pitt (this study)
*Fluoride is a poor indicator when used as a single parameter, but when combined with additional parameters (such as detergents, ammonia and potassium), it can almost always distinguish between sewage and wash water.

(c) Verify that indicator parameters with the following action level concentrations specified in Table 2. Action Level Concentrations for Indicator Parameters are not exceeded. Alternatively, the Permittee may tailor Table 2 to align with parameters based on local knowledge of pollutants of concern. Modifications and associated justifications shall be identified within SMARTS prior to conducting field sampling as specified in Section F.5.d.2.:

Table 2. Action Level Concentrations for Indicator Parameters

Indicator Parameter	**Action Level Concentration**
Ammonia	>= 50 mg/L
Color	>= 500 units
Conductivity	>= 2,000 µS/cm
Hardness	<= 10 mg/L as CaCO3 or >= 2,000 mg/L as CaCO3
pH	<= 5 or >=9
Potassium	>= 20 mg/L
Turbidity	>= 1,000 NTU

(d) Conduct follow up investigations per Section F.5.d.3. if the action level concentrations are exceeded.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance

F.5.d.3. Illicit Discharge Detection and Elimination Source Investigations and Corrective Actions

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall develop written procedures for conducting investigations into the source of all non-storm water discharges suspected to be illicit discharges, including approaches to requiring such discharges to be eliminated, and procedures to implement corrective actions (e.g., BMPs). These procedures shall be included as part of the Illicit Discharge Detection and Elimination program.

(ii) **Implementation Level -** At a minimum, the Permittee shall conduct an investigation(s) to identify and locate the source of any suspected illicit discharge within 72 hours of becoming aware of the suspected illicit discharge. For investigations that require more than 72 hours, the Permittee shall identify the actions being taken to identify and locate the source of the suspected illicit discharge. The Permittee shall prioritize investigations of suspected sanitary sewage and/or significant contributors over investigations of non-storm water discharges suspected of being cooling water, wash water, or natural flows.

(a) Report immediately the occurrence of any dry weather flows believed to be an immediate threat to human health or the environment to local Health Department.

(b) Determine and document through its investigations the source of all non-storm water discharges. If the source of the non-storm water discharge is found to be a discharge authorized under this permit, or authorized under another NPDES permit, no further action is required.

(c) Corrective Action to Eliminate Illicit Discharge – Once the source of the illicit discharge has been determined, the Permittee shall immediately notify the responsible party of the problem.

(d) Report immediately to the owners/operators of the downstream MS4 a non-storm water discharge suspected of being sanitary sewage and/or significantly contaminated.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of

this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance

F.5.e. CONSTRUCTION SITE RUNOFF CONTROL PROGRAM

The Permittee shall develop, implement, and enforce a program to prevent Construction site discharges of pollutants and impacts on beneficial uses of receiving waters. The program shall include the development of contract language ensuring the Permittee's in-house construction operators or outside contractors comply with the CGP.

(i) **Task Description –** Within the first year of the effective date of the permit, each Permittee shall develop and implement contract language ensuring all outside contractors comply with the CGP and implement appropriate BMPs. Contract language shall apply to all projects that result in a total land disturbance of either one acre or more or that result in a total land disturbance of less than one acre if part of a larger common plan or development or sale.

(ii) **Implementation Level** – The Permittee shall include CGP compliance requirements in construction contract language for all projects one acre or more or that result in a total land disturbance of less than one acre if part of a larger common plan or development or sale.

(iii) **Reporting –** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f. POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR PERMITTEE OPERATIONS PROGRAM

The Permittee shall develop and implement a program to prevent or reduce the amount of pollutant runoff from Permittee operations. The Permittee shall train employees on how to incorporate pollution prevention/good housekeeping techniques into Permittee operations. Permittee shall implement appropriate BMPs for preventing or reducing the amount of storm water pollution generated by Permittee operations.

F.5.f.1. Inventory of Permittee-Owned or Operated Facilities

(i) **Task Description** - Prepare an inventory of Permittee-owned or operated facilities within their jurisdiction that are a threat to water quality, and are not covered by another storm water General Permit.

(ii) **Implementation Level** - Within the second year of the effective date of the permit, the Permittee shall develop and maintain an inventory that shall include facilities that may impact storm water.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.2. Map of Permittee-Owned or Operated Facilities

(i) **Task Description –** Within the second year of the effective date of the permit, prepare and submit a map of the urban area covered by the MS4 permit and identify where the Permittee-owned or operated facilities are located.

(ii) **Implementation Level** - The Permittee shall complete and have available a map that identifies the storm water drainage system corresponding to each of the facilities as well as the receiving waters to which these facilities discharge. The map shall also show the facility and the manager of each facility, including contact information. Historic storm water collection facilities, conveyances and drainages located at historic places that are being operated for public interpretation and education shall be noted on this map so that the Regional Water Board can differentiate between modern and historic during site reviews or audits.

(iii) **Reporting** - The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.3. Facility Assessment

(i) **Task Description** –Within the third year of the effective date of the permit, conduct an inspection and assessment of pollutant discharge potential and pollutant hotspots.

(ii) **Implementation Levels** - The Permittee shall conduct an annual review and assessment of all Permittee-owned or operated facilities to determine their potential to impact surface waters. The assessment shall include the following:

(a) Identification of pollutant hotspots based on the assessment, the Permittee shall identify as pollutant hotspots those facilities that have a high potential to generate storm water and non-storm water pollutants. Among the factors to be considered are the type and volume of pollutants stored at the site, the presence of improperly stored materials, activities that should not be performed outside (e.g., changing automotive fluids, vehicle washing), proximity to water bodies, poor housekeeping practices, and the discharge of pollutant(s) of concern to receiving water(s). Pollutant hotspots shall include, at a minimum, the Permittee’s maintenance yards, hazardous waste facilities, fuel storage

locations, and any other facilities at which chemicals or other materials have a high potential to be discharged in storm water.

(b) Documentation of the assessment procedures and results. The Permittee shall document the procedures it uses for conducting the assessment along with a copy of any site evaluation checklists used to conduct the assessment.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.4. Storm Water Pollution Prevention Plans

(i) **Task Description** – the Permittee shall develop and implement SWPPPs for pollutant hotspots at high priority sites. If a Permittee has an existing or equivalent document such as Hazardous Materials Business Plan or Spill Prevention Plan, the Permittee is not required to develop a SWPPP if that document includes the necessary information required within a SWPPP.

(ii) **Implementation Level** – Within the fourth year of the effective date of this permit, the Permittee shall implement the following:

(a) The Permittee shall develop and implement a site-specific SWPPP that identifies a set of storm water BMPs to be installed, implemented, and maintained to minimize the discharge of pollutants in storm water.

(b) The SWPPP(s) shall be kept on-site at each of the Permittee-owned or operated facilities' offices for which it was completed. The SWPPP shall be updated as necessary.

(c) At a minimum the SWPPP will address the following:

1) Facility specific information (location, owner, address, etc.)
2) Purpose of the document
3) Key staff/contacts at the facility
4) Site map with drainage identified
5) Identification of significant materials that are handled and stored at the facility that may be exposed to storm water
6) Description of potential pollutant sources
7) BMPs employed at facility
8) Spill control and cleanup – response to spills

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment

and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.5. Inspections, Visual Monitoring and Remedial Action

(i) **Task Description** –Within the fifth year of the effective date of the permit, the Permittee shall conduct regular inspections of Permittee-owned and operated facilities not covered by another storm water General Permit. The Permittee may incorporate storm water inspections into existing, routine facility inspections.

(ii) **Implementation Level** – The Permittee shall conduct inspections as follows:

(a) Quarterly hotspot visual inspections – Perform quarterly visual inspections in accordance with the developed standing operating procedures of all hotspot Permittee-owned or operated facilities to ensure materials and equipment are clean and orderly, to minimize the potential for pollutant discharge, and to ensure implementation of BMPs. The Permittee shall look for evidence of spills and immediately clean them up to prevent contact with precipitation or runoff. The quarterly inspections shall be tracked in a log for every facility, and records kept with the SWPPP. The inspection report shall also include any identified deficiencies and the corrective actions taken to correct the deficiencies.

(b) Quarterly Hotspot comprehensive inspections – At least once per quarter, a comprehensive inspection of hotspot facilities, including all storm water BMPs, shall be performed, with specific attention paid to the following, but not limited to waste storage areas, dumpsters, vehicle and equipment maintenance/fueling areas, material handling areas, and similar potential pollutant-generating areas. The quarterly inspection results shall be documented and records kept with the SWPPP. This inspection shall be performed in accordance with the developed standard operating procedures. The inspection report shall also include any identified deficiencies and the corrective actions taken to correct deficiencies.

(c) Quarterly Hotspot visual observation of storm water and non-storm water discharges – At least once per quarter, visually observe discharge location from hotspot facilities. Where discharges are observed identify any observed problems (e.g., color, foam, sheen, turbidity) associated with pollutant sources or BMPs shall be remedied within seven days or before the next storm event, whichever is sooner. Visual observations shall be documented, and records kept with the SWPPP. This inspection shall be done in accordance with the developed standard operating procedures. The inspection report shall also include any identified deficiencies and the corrective actions taken to correct the deficiencies.

(d) Non-Hotspot Inspection – At a minimum, inspect each inventoried facility that is not a hotspot, once per permit term. The inspection shall investigate and assess each of the items identified above.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the

program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.6. Storm Drain System Assessment and Prioritization

(i) **Task Description** –Within the second year of the effective date of the permit, the Permittee shall develop and implement procedures to assess and prioritize the MS4 storm drain system, including but not limited to catch basins, pipe and pump infrastructure, above-ground conveyances, including receiving waterbodies within the Permittee's urbanized area and detention basins.

(ii) **Implementation Level** – The Permittee shall:

Assess/prioritize storm drain system facilities for cleanout– Assign a priority to all storm drain system facilities within the Permittee's urbanized areas based on accumulation of sediment, trash and/or debris. In particular, assign high priority to catch basins meeting the following criteria:

1) Catch basins known to accumulate a significant amount of sediment, trash, and/or debris;
2) Catch basins collecting large volumes of runoff;
3) Catch basin collecting runoff from area that do not receive regular sweet sweeping;
4) Catch basins collecting runoff from drainage areas with exposed or disturbed soil; and
5) Catch basins that receive citizen complaints/reports.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.7. Maintenance of Storm Drain System

(i) **Task Description** –The Permittee shall begin maintenance of all high priority storm drain systems at least annually prior to the rainy season.

(ii) **Implementation Level** – Within the third year of the effective date of the permit, the Permittee shall begin a maintenance program of high priority storm drain systems that, at a minimum includes:

(a) Storm drain systems inspection – Based on the priorities assigned above, in Section F.5.f.6, develop a strategy to inspect storm drain systems within the Permittee's jurisdiction. At a minimum, inspect all catch basins of high priority systems annually, prior to the rainy season.

(b) Storm drain cleaning – Develop and implement a schedule to clean high priority catch basins and other systems. Cleaning frequencies shall be based on priority areas, with higher priority areas receiving more frequent maintenance.

(c) Maintenance of surface drainage structures –Visually monitor all Permittee-owned open channels, detention basins, and other drainage structures for debris at least once per year and identify and prioritize problem areas. At a minimum, removal of trash and debris from open channels and other drainage structures shall occur annually.

(d) Disposal of waste materials - Develop a procedure to dewater and dispose of materials extracted from catch basins. This procedure shall ensure that water removed during the catch basin cleaning process and waste material will not reenter the MS4.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.8. Permittee Operations and Maintenance Activities (O&M)

(i) **Task Description –**The Permittee shall assess their O&M activities for potential to discharge pollutants in storm water and inspect all BMPs on a quarterly basis.

(ii) **Implementation Level** - Within the third year of the effective date of the permit, the Permittee shall:

(a) Develop and implement O&M activity assessment. The O&M activities assessment shall include, but not be limited to, the potential to discharge pollutants in storm water.

(b) Identify all materials that could be discharged from each of these O&M activities.

(c) Develop and implement a set of BMPs that, when applied during Permittee O&M activities, will reduce the discharge of pollutants in storm water. The Permittee shall use the CASQA Municipal Handbook or equivalent.

(d) Evaluate annually all BMPs implemented during O&M activities.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm

water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.f.9. Pesticide, Herbicide, and Fertilizer Application and New Landscape Design and Maintenance Management

(i) **Task Description** –The Permittee shall implement a program which focuses on pollution prevention, source control BMPs, and landscape design and maintenance to reduce the amount of pesticides, herbicides and fertilizers used during their Permittee operations and activities. The Permittee shall implement the landscape design and maintenance on new or decorative landscapes.

(ii) **Implementation Tasks** – Within the second year of the effective date of the permit, the Permittee shall implement the following:

(a) Evaluate pesticides, herbicides and fertilizers used and application activities performed to identify pollution prevention and source control opportunities.

(b) Implement practices that reduce the discharge of pesticides, herbicides and fertilizers. At a minimum the Permittee shall do the following, but not limited to:

1) Educate applicators and distributors of storm water issues.

2) Implement integrated pest management measures that rely on non-chemical solutions, including:

a) Use of native and climate appropriate plants (reduces water usage and fertilization) for decorative landscape applications
b) Keeping clippings and leaves away from waterways and out of the street using mulching, composting, or landfilling
c) Preventing application of pesticides and fertilizers when two or more consecutive days with greater than 50% chance of rainfall are predicted by NOAA[34]
d) Limiting or replacing herbicide and pesticide use (e.g., conducting manual weed and insect removal)
e) Limiting or eliminating the use of fertilizers, including prohibiting application within five feet of pavement, 25 feet of a storm drain inlet, or 50 feet of a water body
f) Reducing mowing of grass to allow for greater pollutant removal, but not jeopardizing public safety

3) Collect and properly dispose of unused pesticides, herbicides, and fertilizers.

4) Minimize irrigation run-off.

(iii) **Reporting** - The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm

[34] www.srh.noaa.gov/forecast

water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.g. POST CONSTRUCTION STORM WATER MANAGEMENT PROGRAM

Permittees shall regulate development to comply with the following Sections:

- F.5.g.1. Site Design Measures
- F.5.g.2. Low Impact Development Design Standards
- F.5.g.3. Alternative Post-Construction Storm Water Management Program
- F.5.g.4. Operation and Maintenance of Post Construction Storm Water Management Measures

Non-traditional Permittees with Regional Water Board approved post-construction storm water management requirements based on a watershed process approach, as described in Section E.12.j. Post-Construction Storm Water Management Requirements Based on Assessment and Maintenance of Watershed Processes, shall implement those post-construction requirements in lieu of Section F.5.g. Post Construction Storm Water Management Program.

F.5.g.1. Site Design Measures

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall require implementation of site design measures for all projects that create and/or replace (including projects with no net increase in impervious footprint) between 2,500 square feet and 5,000 square feet of impervious surface, including detached single family homes that are not part of a larger plan of development.

(ii) **Implementation Level** - Projects shall implement one or more of the following site design measures to reduce project site runoff:

(a) Stream Setbacks and Buffers – a vegetated area including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake reservoir, or coastal estuarine area;
(b) Soil Quality Improvement and Maintenance - improvement and maintenance soil through soil amendments and creation of microbial community;
(c) Tree planting and preservation – planting and preservation of healthy, established trees that include both evergreens and deciduous, as applicable;
(d) Rooftop and Impervious Area Disconnection - rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer;
(e) Porous Pavement - pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants;
(f) Green Roofs – a vegetative layer grown on a roof (rooftop garden);
(g) Vegetated Swales - a vegetated, open-channel management practice designed specifically to treat and attenuate storm water runoff;
(h) Rain Barrels and Cisterns - system that collects and stores storm water runoff from a roof or other impervious surface.

Project proponents shall use the State Water Board SMARTS Post-Construction Calculator[35], or equivalent to quantify the runoff reduction resulting from implementation of site design measures.

(iii) **Reporting** - The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.g.2. Low Impact Development (LID) Design Standards

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall implement standards to effectively reduce runoff and pollutants associated with runoff from development projects.

(ii) **Implementation Level** - The Permittee shall regulate all development projects that create and/or replace 5,000 square feet or more of impervious surface (Regulated Projects). The Permittee shall require these Regulated Projects to implement measures for site design, source control, runoff reduction, storm water treatment and baseline hydromodification management as defined in this Order.

Regulated Projects do not include:

(a) Interior remodels;
(b) Routine maintenance or repair such as: exterior wall surface replacement, roof replacement or pavement resurfacing within the existing footprint.

Regulated Projects include development projects. Development includes new and redevelopment projects on public or private land that fall under the planning and permitting authority of a Permittee. Redevelopment is any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. The following (a-c) describe specific Regulated Project requirements for redevelopment and road projects:

(a) Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.

(b) Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.

[35] The State Water Board SMARTS Post-Construction Calculator can be found at: https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

(c) Road Projects - Any of the following types of road projects that create 5,000 square feet or more of newly constructed contiguous impervious surface and that are public road projects and/or fall under the building and planning authority of a Permittee shall comply with Low Impact Development Standards except that treatment of runoff of the 85th percentile 24-hour storm runoff event) that cannot be infiltrated onsite shall follow U.S. EPA guidance regarding green infrastructure to the extent feasible. Types of projects include:

(1) Construction of new streets or roads, including sidewalks and bicycle lanes built as part of the new streets or roads which create 5,000 square feet or more of impervious surface.
(2) Widening of existing streets or roads with additional traffic lanes.
   a) Where the addition of traffic lanes results in an alteration of more than 50 percent of the impervious surface (5,000 square feet or more) of an existing street or road, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design.
   b) Where the addition of traffic lanes results in an alteration of less than 50 percent (but 5,000 square feet or more) of the impervious surface of an existing street or road, only the runoff equivalent from new and/or replaced impervious surface of the project must be included in the treatment system design.
(3) Specific exclusions are:
   a) Sidewalks built as part of new streets or roads and built to direct storm water runoff to adjacent vegetated areas.
   b) Bicycle lanes that are built as part of new streets or roads that direct storm water runoff to adjacent vegetated areas.
   c) Impervious trails built to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas, preferably away from creeks or towards the outboard side of levees.
   (d) Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.

Effective Date for Applicability of Low Impact Development Runoff Standards to Regulated Projects: By the second year of the effective date of the permit, the Permittee shall require these Post-Construction Standards be applied on applicable new and redevelopment Regulated Projects. These include Regulated Projects that have not been deemed complete for processing, Regulated Projects without vesting tentative maps that have not requested and received an extension of previously granted approvals, and Regulated Projects that have received Project Planning Guide funding. Discretionary projects that have been deemed complete prior to the second year of the effective date of this permit are not subject to the Post-Construction Standards herein. For the Permittee's Regulated Projects, the effective date shall be the date their governing body or designee approves initiation of the project design.

Permittee's Development Projects - The Permittee shall develop and implement an equivalent approach, to the approach used for private development projects, to apply the most current version of the low impact development runoff standards to applicable public development projects.

Where Project Planning Guide funding is applicable, Permittees shall ensure that adequate funding is available to implement post-construction treatment measures for Regulated Projects approved after the effective date of this permit.

Where State of California project approvals are applicable, Permittees shall implement post-construction treatment measures for Regulated Projects approved after the effective date of this permit.

F.5.g.2.a. Source Control Measures

(i) **Task Description** – Regulated Projects with pollutant-generating activities and sources shall be required to implement standard permanent and/or operational source control measures as applicable.

(ii) **Implementation Level** - Measures for the following pollutant-generating activities and sources shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment or equivalent manual, and include:

(a) Accidental spills or leaks
(b) Interior floor drains
(c) Parking/Storage area maintenance
(d) Indoor and structural pest control
(e) Landscape/outdoor pesticide use
(f) Pools, spas, ponds, decorative fountains, and other water features
(g) Restaurants, grocery stores, and other food service operations
(h) Storage and handling of solid waste
(i) Outdoor storage of equipment or materials
(j) Vehicle and equipment cleaning
(k) Vehicle and equipment repair and maintenance
(l) Fuel dispensing areas
(m) Loading docks
(n) Fire sprinkler test water
(o) Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
(p) Unauthorized non-storm water discharges
(q) Building and grounds maintenance

F.5.g.2.b. Numeric Sizing Criteria for Storm Water Retention and Treatment

The Permittees shall require facilities designed to evapotranspire, infiltrate, harvest/use, and biotreat storm water to meet at least one of the following hydraulic sizing design criteria:

(1) Volumetric Criteria:

a) The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or

b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

(2) Flow-based Criteria

a) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or

b) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records.

F.5.g.2.c. Site Design Measures as defined in Section F.5.g.1. shall be based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile rainfall event, to the extent feasible, to meet Section F.5.g.2.b. Numeric Sizing Criteria for Storm Water Retention and Treatment. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required. Any remaining runoff from impervious DMAs may then be directed to one or bioretention facility as specified in Section F.5.g.2.d. Storm Water Treatment Measures and Baseline Hydromodification Management Measures, described below.

F.5.g.2.d. Storm Water Treatment Measures and Baseline Hydromodification Management Measures After implementation of Site Design Measures in F.5.g.2.c., runoff from remaining impervious DMAs must be directed to one or more facilities designed to infiltrate, evapotranspire, and/or biotreat the amount of runoff specified in Section F.5.g.2.b. Numeric Sizing Criteria for Storm Water Retention and Treatment. The facilities must be demonstrated to be at least as effective as a bioretention system with the following design parameters.

(1) Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.
(2) Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
(3) Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.

(4) Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
(5) Underdrain with discharge elevation at top of gravel layer.
(6) No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
(7) No liners or other barriers interfering with infiltration.
(8) Appropriate plant palette for the specified soil mix and maximum available water use.

a) **Alternative Designs for Bioretention Facilities —** Facilities, or a combination of facilities, of a different design than in Section F.5.g.2.d. may be permitted if the following measures of equivalent effectiveness are demonstrated:

(1) Equal or greater amount of runoff infiltrated or evapotranspired
(2) Equal or lower pollutant concentrations in runoff that is discharged after bioretention
(3) Equal or greater protection against shock loadings and spills
(4) Equal or greater accessibility and ease of inspection and maintenance

b) **Allowed Adjustments for Bioretention Facilities for Special Site Conditions** - The bioretention design parameters as specified in Section F.5.g.2.d. may be adjusted for the following special site conditions:

(1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
(2) Facilities in areas with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).
(3) Facilities located in areas of highly infiltrative soils or high groundwater, or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

c) **Exceptions to Requirements for Bioretention Facilities** - Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following:

(1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
(2) Facilities receiving runoff solely from existing (pre-project) impervious areas;
(3) Historic sites, structures, or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

(iii) **Reporting** – The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

F.5.g.3. Alternative Post-Construction Storm Water Management Program

A Permittee may propose alternative post-construction measures in lieu of some or all of Section F.5.g. requirements for multiple benefit projects. Multiple-benefit projects include projects that may address any of the following, in addition to water quality: water supply, flood control, habitat enhancement, open space preservation, recreation, climate change. Multiple-benefit projects may be applied at various scales including project site, municipal or sub-watershed level. Multiple-benefit projects may include, but are not limited to, projects developed under Watershed Improvement Plans (Water Code §16100 et seq.), IRWMP implementation and green infrastructure projects. Multiple benefit projects must be equally or more protective of water quality than Section E.12. requirements.

The Regional Water Board or the Executive Officer may approve alternative post-construction measures for multiple-benefit projects, as described above, after an opportunity for public comment, if the Regional Water Board or Executive Officer finds that the alternative measures are consistent with the MEP standard.

F.5.g.4. Operation and Maintenance (O&M) of Post-Construction Storm Water Management Measures

(i) **Task Description** –Within the third year of the effective date of the permit, the Permittee shall implement an O&M Verification Program for new development projects regulated under this Order.

(ii) **Implementation Level** – At a minimum, the O&M Verification Program shall include the following elements:

(a) Projects shall at a minimum, require at least one of the following from all project proponents and their successors in control of the Project or successors in fee title:

(1) Written conditions in the sales or lease agreements or deed for the project that requires the buyer or lessee to assume responsibility for the O&M of the installed treatment system(s) and hydromodification control(s) (if any) until such responsibility is legally transferred to another entity;

(2) Any other legally enforceable agreement or mechanism, such as recordation in the property deed, that assigns the O&M responsibility for the installed treatment system(s) and hydromodification control(s) (if any) to the project owner(s) or the Permittee.

(b) Coordination with the appropriate mosquito[36] and vector control agency with jurisdiction to establish a protocol for notification of installed treatment systems and hydromodification management controls. On an annual basis, before the wet season, prepare a list of newly installed (installed within the reporting period) storm water treatment systems and hydromodification management controls to the local mosquito and vector control agency and the appropriate Regional Water Board. This list shall include the facility locations and a description of the storm water treatment measures and hydromodification management controls installed.

(c) A database or equivalent tabular format of all projects that have installed treatment systems. This database or equivalent tabular format shall include the following information for each project:

(1) Name and address of the project;
(2) Specific description of the location (or a map showing the location) of the installed treatment system(s) and hydromodification control(s) (if any);
(3) Date(s) that the treatment system(s) and hydromodification controls (if any) is/are installed;
(4) Description of the type and size of the treatment system(s) and hydromodification control(s) (if any) installed;
(5) Responsible operator(s) of each treatment system and hydromodification control (if any);
(6) Dates and findings of inspections (routine and follow-up) of the treatment system(s) and hydromodification control(s) (if any) by the Permittee; and
(7) Any problems and corrective or enforcement actions taken.

(d) Maintenance Approvals: The Permittee shall ensure that systems and hydromodification controls installed at projects are properly operated and maintained for the life of the projects. In cases where the responsible party for a treatment system or hydromodification control has worked diligently and in good faith with the appropriate State and federal agencies and the Permittee to obtain approvals necessary to complete maintenance activities for the treatment system or hydromodification management control, but these approvals are not granted, the Permittee shall be deemed to be in compliance with this Provision.

(iii) **Reporting -** The Permittee shall use State Water Board SMARTS to submit a summary of the past year activities and certify compliance with all requirements of this program element. The summary shall also address the relationship between the program element activities and the Permittee's Program Effectiveness Assessment and Improvement Plan that tracks annual and long-term effectiveness of the storm water program. If a Permittee is unable to certify compliance with a requirement in this program element see Section F.5.j.2.for compliance.

[36] "Best Management Practices for Mosquito Control on California State Properties" are available from the California West Nile virus website at http://www.westnile.ca.gov/resources.php. Please see Table 1, page 22, for a list of California mosquito control agencies or visit http://mvcac.org .

F.5.h. PROGRAM EFFECTIVENESS ASSESSMENT AND IMPROVEMENT

F.5.h.1. Program Effectiveness Assessment and Improvement Plan

(i) **Task Description -** The Permittee shall develop and implement a Program Effectiveness Assessment and Improvement Plan that tracks short and long-term progress of the storm water program. The Program Effectiveness Assessment and Improvement Plan will assist the Permittee to adaptively manage its storm water program and make necessary modifications to the program to improve program effectiveness, reduce pollutants of concern, achieve the MEP standard, and protect water quality, and to document the Permittee's compliance with permit conditions. The Program Effectiveness Assessment and Improvement Plan shall identify the strategy used to gauge the effectiveness of prioritized BMPs and program implementation as a whole. Prioritized BMPs include BMPs implemented based on pollutants of concern. Where pollutants of concern are unidentified, prioritized BMPs are based on common pollutants of concern (i.e., sediment, bacteria, trash, nutrients). The effectiveness assessments will build upon each other from one year to the next and shall identify modifications to the program the Permittee must undertake to improve effectiveness.

(ii) **Implementation Level** - The Program Effectiveness Assessment and Improvement Plan may be modeled upon the most recent version (if applicable) Municipal Storm Water Program Effectiveness Assessment Guidance (CASQA, May 2007) or equivalent.

(a) The Program Effectiveness Assessment and Improvement Plan shall include the following minimum elements:

(1) Implementation of storm water program elements
(2) Identification and targeting of Target Audience(s)

(iii) **Reporting -** By the second year Annual Report complete and submit the Program Effectiveness Assessment and Improvement Plan. At a minimum, the Plan shall include implementation of storm water program elements and identification of the Targeted Audience(s).

F.5.h.2 Storm Water Program Modifications

(i) **Task Description** – Within the fifth year of the effective date of the permit, based on the information gained from the effectiveness assessment, the Permittee shall identify modifications to control measures/significant activities, including new BMPs or modification to existing BMPs. The Permittee shall consult with the Regional Water Board in setting expectations for the scope, timing, and frequency of BMP modifications for the next permit cycle.

(ii) **Implementation Level** –The Permittee shall identify program modifications to include:

(a) Improving upon BMPs that did not accomplish goals;
(b) Continuing and expanding upon BMPs that proved to be effective, including identifying new BMPs or modifications to existing BMPs designed to increase pollutant load reductions;

(c) Discontinuing BMPs that may no longer be productive and replacing with more effective BMPs; and
(d) Shifting priorities to make more effective use of resources

(iii) **Reporting** – By the fifth year Annual Report complete and have available a list of maintenance activities of highest priority BMPs. By the fifth year Annual Report, complete and have available a summary of proposed modifications to the storm water program to improve program effectiveness, to achieve the MEP standard, and to protect water quality.

F.5.i. TOTAL MAXIMUM DAILY LOADS COMPLIANCE REQUIREMENTS

F.5.i.1. The Permittee shall comply with all applicable TMDLs approved pursuant to 40 Code of Federal Regulations § 130.7 that assign a Waste Load Allocation to the Permittee and that have been identified in Attachment G.

F.5.i.2. Waste Load Allocations (WLA), Load Allocations (LA), effluent limitations, implementation requirements, and monitoring requirements are specified in the adopted and approved Regional Water Board Basin Plans and authorizing resolutions which are incorporated herein by reference as enforceable parts of this Order. Applicable Basin Plan amendments and resolutions are identified in Attachment G. With the exception of the TMDLs for the Los Angeles Regional Water Board, Attachment G additionally contains a list of TMDL-specific permit requirements developed by the Regional Boards for compliance with the implementation requirements of the relevant TMDLs. These requirements are an enforceable component of this Order. In some cases, dates are given that fall outside the term of this Order. Compliance dates that have already passed are enforceable on the effective date of this Order. Compliance dates that exceed the term of this Order are included for reference, and become enforceable in the event that this Order is administratively extended.

F.5.i.3. The Regional Water Boards are directed to review, within one year of the effective date of this Order, the TMDL-specific permit requirements contained in Attachment G and to propose to the State Water Board any appropriate revisions after consultation with the Permittees and State Water Board staff. The Los Angeles Regional Water Board will develop TMDL-specific permit requirements within one year of the effective date of this Order in consultation with the Permittees and State Water Board staff. Any proposed revisions by the Regional Water Boards shall be supported by a statement of reasons explaining how the proposed TMDL-specific permit requirements are consistent with the assumptions and requirements of applicable WLAs and with the goals of the TMDL. The State Water Board will incorporate into this Order any necessary revisions, including the statements of reasons through a reopener. The State Water Board may additionally revise this Order through a reopener to incorporate any modifications or revisions to the TMDLs in Attachment G, or to incorporate any new TMDLs adopted during the term of this General Permit that assign a WLA to the Permittee or that identify the Permittee as a responsible party. Where a TMDL is limited to a single constituent within a single reach of the watershed, the Regional Water Board Executive Officer may require additional monitoring, per Water Code § 13383. In revising Attachment G, the State Water Board will allow adequate notice and public review.

F.5.i.4. The Permittee shall complete and have available a report that includes the status of their implementation of the specific TMDL implementation requirements that have been incorporated into the Order with each Annual Report. The TMDL implementation report shall include the following information:

(a) A description of BMPs implemented, including types, number, and locations
(b) An assessment of the effectiveness of implemented BMPs in progressing towards attainment of wasteload allocations within the TMDLs' specified timeframes
(c) All monitoring data, including a statistical analysis of the data to assess progress towards attainment of wasteload allocations within the TMDLs' specified timeframes
(d) Based on results of the effectiveness assessment and monitoring, a description of the additional BMPs that will be implemented to attain wasteload allocations within the TMDLs/ specified timeframes

F.5.i.5. The Permittee shall comply with implementation requirements specified in Category 4b demonstrations associated with Clean Water Act Sections 303d, 306b, and 314 Integrated Reporting and Listing Decisions. Implementation requirements described in Category 4b demonstrations are effective upon Regional Water Board approval of that region's Integrated Reporting and Listing Decisions and associated Category 4b demonstrations.

F.5.j. ONLINE ANNUAL REPORTING

F.5.j.1. Department of Defense and Department of Corrections, ports, transportation agencies and Rehabilitation Permittees are exempt from Annual Reporting of any provision that could pose a security risk and compromise facility security. Any requested information to determine compliance with this Order [40 C.F.R. 122.41(h)] by the Water Boards or U.S. EPA shall be furnished during normal business hours.

F.5.j.2. The Permittee shall use State Water Board's SMARTS to submit a summary of the past year activities for each program element and certify compliance with all requirements of this permit. If a Permittee is unable to certify compliance with a requirement, it must submit in SMARTS the reason for failure to comply, a description and schedule of tasks necessary to achieve compliance, and an estimated date for achieving full compliance.

F.5.j.3. Permittees shall complete and retain all Annual Report information on the previous fiscal year beginning July 1 and ending June 30. The Annual Reporting requirements are set forth in Provisions E. The Permittee shall retain documentation as necessary to support their Annual Report. The Permittee shall make this supporting information available during normal business hours, unless agreed to by the Regional Water Board's Executive Officer.

F.5.j.4. The Permittee shall submit when requested by the Executive Officer of the applicable Regional Water Board a detailed written online annual report or in-person presentation of the annual report that addresses the activities described in Provision F. The detailed Annual Report must clearly refer to the permit

requirements and describe in quantifiable terms, the status of activities undertaken to comply with each requirement.

F.5.j.5. Permittees involved in regional programs may coordinate with the members to identify reporting responsibility. The one report submitted on behalf of Permittees involved in a regional program must include a summary of the past year activities implemented for each program element and certification of compliance for each of the Permittees in the regional program.

G. REGIONAL WATER BOARD AUTHORITIES

Regional Water Boards are responsible for overseeing compliance with this Order. Oversight may include, but is not limited to, reviewing reports, requiring modification to storm water program components and various submissions, imposing region-specific monitoring requirements, conducting inspections and program evaluations (audits), taking enforcement actions against violators of this Order. Permittees shall modify and implement their storm water management programs and monitoring as required by the Regional Water Board Executive Officer. The Regional Water Board may designate additional Small MS4s as Regulated Small MS4s under this Order consistent with the criteria articulated in Finding 24 of this Order. Such designations must be approved by the Regional Water Board following public review and comment. The Executive Director of the State Water Board may amend Attachments A and B to add Regional Water Board designations. The Regional Water Boards may also issue individual permits to Regulated Small MS4s, and alternative general permits to categories of Regulated Small MS4s. Upon issuance of such permits by a Regional Water Board, this Order shall no longer regulate the affected Small MS4(s).

H. DISPUTE RESOLUTION

In the event of a disagreement between a Permittee or other interested party and a Regional Water Board over the interpretation or implementation of any provision of this Order, a Permittee or interested party shall first attempt to resolve the issue with the Executive Officer of the Regional Water Board. If a satisfactory resolution is not obtained at the Regional Water Board level, a Permittee or interested party may submit the issue in writing to the Executive Director of the State Water Board or his designee for resolution, with a copy to the Executive Officer of the Regional Water Board. The issue must be submitted to the Executive Director within thirty days of any final determination by the Executive Officer of the Regional Water Board; after thirty days the Permittee or interested party will be deemed to have accepted the Regional Water Board Executive Officer's determination. The Executive Officer of the Regional Water Board will be provided an opportunity to respond. The Executive Director or his/her designee shall make a determination on the request within 60 days. Determinations of the Regional Water Board Executive Officers in interpreting and implementing this permit are considered actions of the State Water Board except where the Regional Water Board itself acts or the Executive Officer acts under Water Code Sections 13300, 13304, or 13383.

I. PERMIT RE-OPENER

This Order may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, receipt of U.S. EPA guidance concerning regulated activities, judicial decision, or in accordance with 40 Code of Federal Regulations 122.62, 122.63, 122.64, and 124.5. The State Board may additionally reopen and modify this Order at any time prior to its expiration under any of the following circumstances:

1. Present or future investigations demonstrate that the discharge(s) regulated by this Order may have the potential to cause or contribute to adverse impacts on water quality and/or beneficial uses.

2. New or revised Water Quality Objectives come into effect, or any TMDL is adopted or revised that is applicable to the Permittees

3. TMDL-specific permit requirements for adopted TMDLs are developed or revised by a Regional Water Board for incorporation into this Order.

4. The State Water Board determines, after opportunity for public comment and a public workshop, that revisions are warranted to those provisions of the Order addressing compliance with water quality standards in the receiving water or those provisions of the Order laying out an iterative process for implementation of management practices to achieve compliance with water quality standards in the receiving water.

5. The State Board completes the delineation of statewide watershed management zones based on watershed processes and the development of watershed based criteria for hydromodification measures.

6. The State Water Board completes the statewide policy for trash control in California's waterways.

J. PERMIT EXPIRATION

This Order expires on June 30, 2018. If this Order is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with 40 Code of Federal Regulations section 122.6 and remain in full force and effect. If you wish to continue an activity regulated by this Order after the expiration date of this Order, you must apply for and obtain authorization as required by the new permit once it is issued.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of State Water Board held on February 5, 2013.

AYE:	Chairman Charles R. Hoppin Vice Chair Frances Spivy-Weber Board Member Tam M. Doduc Board Member Steven Moore Board Member Felicia Marcus
NAY:	None
ABSENT:	None
ABSTAIN:	None

Jeanine Townsend
Clerk to the Board

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
1001 I STREET
SACRAMENTO, CA 95814

FACT SHEET
FOR

NPDES GENERAL PERMIT and WASTE DISCHARGE REQUIREMENTS
FOR

STORM WATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (ORDER)

ORDER No. 2013-0001-DWQ

This Fact Sheet describes the factual, legal, and methodological basis for the General Permit, provides supporting documentation, and explains the rationale and assumptions used in deriving the limits and requirements.

I. BACKGROUND

History

A 1972 amendment to the federal Water Pollution Control Act (also referred to as the Clean Water Act) provides that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The 1987 amendments to the Clean Water Act added section 402(p), which established a framework for regulating storm water discharges under the NPDES Program. Subsequently, in 1990, the U.S. Environmental Protection Agency (U.S. EPA) promulgated regulations for permitting storm water discharges from industrial sites (including construction sites that disturb five acres or more) and from municipal separate storm sewer systems (MS4s) serving a population of 100,000 people or more. These regulations, known as the Phase I regulations, require operators of medium and large MS4s to obtain storm water permits. On December 8, 1999, U.S. EPA promulgated regulations, known as Phase II regulations, requiring permits for storm water discharges from Small MS4s and from construction sites disturbing between one and five acres of land. The Order accompanying this Fact Sheet regulates storm water discharges from Small MS4s.

A municipal separate storm sewer is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) "owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity…." (ii) designed or used for collecting or conveying storm water; (iii) which is not a combined sewer; and (iv) which is not part of a Publicly Owned Treatment Works (POTW). [See Title 40, Code of Federal Regulations (40 C.F.R.) §122.26(b)(8).]

A Small MS4 is an MS4 that is not permitted under the municipal Phase I regulations. (40 C.F.R. §122.26(b)(16)). Small MS4s include systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares, but do not include separate storm sewers in very discrete areas, such as individual buildings. (40 C.F.R. §122.26(b)(16(iii).) This permit refers to MS4s that operate throughout a community as "Traditional MS4s" and MS4s that are similar to traditional MS4s but operate at a separate campus or facility as "Non-traditional MS4s."

Federal regulations allow two permitting options for storm water discharges: individual permits and general permits. The State Water Resources Control Board (State Water Board) elected to adopt a statewide general permit for Small MS4s in order to efficiently regulate numerous storm water discharges under a single permit. In certain situations a storm water discharge may be more appropriately and effectively regulated by an individual permit, a region-specific general permit, or by inclusion in an existing Phase I MS4 permit. In these situations, the Regional Water Quality Control Board (Regional Water Board) Executive Officer will direct the Small MS4 operator to submit the appropriate application, in lieu of a Notice of Intent (NOI), to comply with the terms of

this Order. In these situations, the individual or regional permits will govern, rather than this Order.

The existing General Permit (Water Quality Order 2003-0005-DWQ) was adopted by the State Water Board in April 2003 for a 5-year permit term. The existing General Permit expired in May 2008; however, it continues in force and in effect until rescinded by the State Water Board, or until a new Order is issued.

The Order regulates storm water runoff from small municipalities and other facilities, including federal and State operated facilities that can include universities, prisons, hospitals, military bases (e.g. State Army National Guard barracks, parks and office building complexes.) Regulating many storm water discharges under one permit greatly reduces the administrative burden associated with permitting individual storm water discharges. Permittees obtain coverage under this Order by filing an electronic NOI through the State Water Board's Stormwater Multiple Application and Report Tracking System (SMARTS) and by mailing the appropriate permit fee to the State Water Board.

Order Goals

The goals for the Order included:

1. Ensure statewide consistency for Regulated Small MS4s.
2. Include more specificity in Order language and requirements to streamline implementation of storm water programs.
3. Implement and enhance actions to control 303(d) listed pollutants, pollutants of concern, achieve Waste Load Allocations adopted under Total Maximum Daily Loads, and protect Areas of Special Biological Significance.
4. Implement more specific and comprehensive storm water monitoring, including monitoring for 303(d) listed pollutants.
5. Incorporate emerging technologies, especially those that are being increasingly utilized by municipalities (e.g., low impact development).
6. Include program elements that address Program Management Effectiveness Assessments.
7. Implement a step-wise stakeholder collaborative approach.

Stakeholder Collaborative Process

State Water Board staff conducted a series of stakeholder meetings with Permittees and other interested parties over a five year period, from 2007- 2012. These meetings included the California Stormwater Quality Association (CASQA) Phase II Small MS4 Subcommittee, representatives of non-governmental organizations, Non-traditional Small MS4s and Regional Water Board staff. The following is a summary of the stakeholder process.

State Water Board staff completed an administrative draft Order and submitted it to CASQA, U.S. EPA, Natural Resources Defense Council, Coast/Bay Keepers, and Heal the Bay for informal stakeholder review in February 2011. Each of the nine Regional Water Boards provided comments. Staff revised the draft Order to address the informal comments received and released it for 60-day public review in June 2011.

Approximately 151 comments were received and several workshops were held throughout California to meet Stakeholders, answer questions and discuss the development process.

On May 4, 2012 a second administrative draft was completed and submitted for informal stakeholder review. On May 18, 2012 the second draft Order was released for 60-day public review. Approximately 110 comments were received and a public hearing was held on August 8, 2012 to hear oral comments on the second administrative draft.

On November 16, 2012 a third draft was completed and submitted for 30-day public review period. The comment deadline was set for noon on December 17, 2012. Approximately 55 comments were received and a board workshop was held on January 8, 2013 to hear comments on the revisions made to the second administrative draft.

On January 23, 2013, a final draft was completed and proposed for State Water Board adoption.

II. PERMITTING APPROACH

Existing General Permit Approach

U.S. EPA storm water regulations for Phase II storm water permits envision a process in which entities subject to regulation develop a Storm Water Management Plan (SWMP). The SWMP contains detailed Best Management Practices (BMPs) and specific level-of-implementation information reviewed and approved by the permitting agency before the Permittee obtains coverage under the storm water permit. The existing General Permit followed this approach as suggested by U.S. EPA and simply identified goals and objectives for each of the six Minimum Control Measures.

The existing General Permit approach provides the flexibility to target an MS4's problem areas while working within the existing organizational structure. However, audits of Permittees and information gained from interviews with Regional Water Board staff revealed that many of these storm water programs lacked a baseline program and specific details in the SWMP to implement an adequate program for protection from the impacts of storm water runoff. Regional Water Board staff found it difficult to determine Permittees' compliance with the existing General Permit, due to the lack of specific requirements. The permit language did not contain specific deadlines for compliance, did not incorporate clear performance standards, and did not include measurable goals or quantifiable targets for implementation.[1]

The Regional Water Boards conducted approximately 36 on-site audits of MS4 programs[2] in the state that addressed 122 Permittees, including some Phase II Small MS4s. They found that programs with more specific permit requirements generally resulted in more comprehensive and progressive storm water management programs. For example, the more prescriptive permit requirements in the Los Angeles and San Diego MS4 permits require Permittees to be specific in how they implement their storm water program. The auditors concluded that the specificity of the provisions enabled the

[1] Storm water Phase I MS4 Permitting: Writing more effective, measurable permits, EPA, Kosco.
[2] Assessment Report on Tetra Tech's Support of California's MS4 Storm Water Program, July 2006.

permitting authorities to enforce the MS4 permits and improve the quality of MS4 discharges. In addition, U.S. EPA on-site audits of MS4s throughout the nation have repeatedly shown the need for clear, measurable requirements in MS4 permits to ensure an effective and enforceable program.

Given this information, State Water Board staff aimed to write permit language clear enough to set appropriate standards and establish required outcomes.

Current Order Approach

The current approach simplifies assessment of Permittee compliance and allows the public to more easily access measurable results. The Order provisions establish compliance implementation levels such as escalating enforcement and requirements for tracking projects. Required actions include specific reporting elements to substantiate compliance with implementation levels. Regional Water Board staff will be able to evaluate each individual Permittee's compliance through an online Annual Report review and the program evaluation (audit) process.

Federal regulations and State law require that the implementation specifics of Municipal Storm Water NPDES permits be adopted after adequate public review and comment.[3] This Order's approach satisfies the public involvement requirements of both the federal Clean Water Act and the California Water Code. Permit details are known at the time of adoption of the Order. Substantive information as to how the discharger will reduce pollutants to the Maximum Extent Practicable (MEP) is not left to the details of the SWMP. The public need not guess program details until Regional Water Board review and approval of a SWMP, as was the case in the existing General Permit.

This Order specifies the actions necessary to reduce the discharge of pollutants in storm water to the MEP in a manner designed to achieve compliance with water quality standards and objectives. This set of specific actions is equivalent to the requirements that were included in a separate SWMP for each Permittee in the existing General Permit.

This order effectively prohibits non-storm water discharges into municipal storm drain systems and watercourses within the Permittees' jurisdictions.

The State Board has also identified the most critical water quality problems as priorities in this Order. The priorities include (1) discharges to Areas of Special Biological Significance (2) discharges to water bodies listed as impaired on the 303[d] list (3) Post-Construction Requirements and (4) Water Quality Monitoring Requirements. A majority

[3] On January 14, 2003, the U.S. Ninth Circuit Court issued a decision in *Environmental Defense Center v. EPA* ((9th Cir. 2003) 344 F.3d 832.)This ruling upheld the Phase II regulations on all but three of the 20 issues contested. The court determined that applications for general permit coverage (including the NOI and any Storm Water Management Program [SWMP]) must be made available to the public, the applications must be reviewed and determined to meet the Maximum Extent Practicable (MEP) standard by the permitting authority before coverage commences, and there must be a process to accommodate public hearings. Regarding the issue of public participation, the Ninth Circuit noted that such participation was required because the "substantive information about how the operator of a small MS4 will reduce discharges to the maximum extent practicable" was found in the storm water management plan rather than the permit itself" (344 F3d at 857).

of the Permittees' implementation efforts focus on the four priority areas as identified by the State Water Board.

Permittee Diversity
In California, Permittees face highly variable conditions both in terms of threats to water quality from their storm water discharges and resources available to manage those discharges. Consequently, making one set of prescriptive requirements work for all of them is inherently difficult. This Order contains separate provisions for Traditional and Non-traditional MS4s. The requirements for the Non-traditional MS4s are tailored specifically to the Non-traditional management structure. Additionally, this permit introduces the concept of compliance tiers in particular sections, designed to relieve the Regional Water Board burden of reviewing and approving individual SWMPs while preserving the ability of the Permittees to tailor requirements that address their unique circumstances.

Non-traditional MS4 Categories and Provisions
This Order identifies specific provisions Non-traditional MS4 Permittees must comply with in Section F and considers the following categories to be Non-traditional MS4s, but not limited to:

- Community Services Districts
- Fairgrounds
- Higher Education Institutions (Community Colleges and Universities)
- Military Bases
- Ports
- State Parks/Beaches/Historical Areas
- School Districts K-12
- State and Federal Prisons/Health Institutions
- State Vehicle Recreation Areas
- Water Agencies
- Transit Agencies

The regulations direct that the term Small MS4s includes "large hospitals" and "prison complexes." (40 C.F.R. §122.26(b)(16)(iii).) For purposes of State Water Board designation of state and federal hospitals and prisons, the Board interprets the terms "large hospital" and "prison complex" to mean health institutions and prison facilities with a resident and staff population of 5,000 or more. However, Regional Water Boards may designate smaller facilities on a case by case basis.

Guidance Document
The case for eliminating a SWMP for this second permit term has been clearly addressed, however, the latent advantages of having some form of a storm water management document has not.

First, a storm water management document assists Permittees in managing their storm water program. Such a document serves as guidance to (1) identify different staff involved in storm water compliance over multiple departments within the Permittee agency and, (2) provide those staff with a simple narrative connecting all the detailed, specific BMPs in relation to multiple Permittee departments. Simply put, the document provides the Permittee with a map to the compliance process.

Second, the storm water management document is an essential tool for Regional Water Board audits. During MS4 audits, the Regional Water Board typically requests and reviews a SWMP to understand the Permittee's storm water program and management structure. Although the Order contains specific details on each program requirement, it lacks the simple narrative nexus that a storm water management document can provide on how the storm water program is implemented by a specific Permittee. The guidance document may be in spreadsheet form, as a flowchart, or as a written narrative. In other words, the structure is left up to the Permittee as to the way in which they want to demonstrate or illustrate the relationship between their storm water program and their management structure. To that end, the guidance document will provide the Permittee with a clear map to the compliance process. Therefore, although the draft Order eliminates the submittal for review and approval of a SWMP, the requirement to develop a planning/guidance document has been retained for new Permittees.

New Permittees are allowed six months to develop and upload the guidance document to SMARTS along with the NOI and appropriate fee. The document is open for public viewing, but will not be reviewed and approved by the relevant Regional Water Board.

Renewal Permittees will also submit a guidance document and are allowed six months to develop and upload the guidance document to SMARTS along with the NOI and appropriate fee.

Note: The finding corresponding to this discussion in the Fact Sheet is slightly modified in the Final Order. See Finding 32.

The State Water Board recognizes that in some instances Renewal Permittees' existing SWMPs have incorporated BMPs designed to address locality-specific storm water issues and that in some cases these BMPs may, because of locality-specific factors, be more protective of water quality than the minimum requirements established by this Order. Renewal Permittees will additionally include in the guidance document the following: identification and brief description of each BMP and associated measurable goal included in the Permittee's most current SWMP that constitutes a more specific local or tailored level of implementation that may be more protective of water quality than the minimum requirements of this Order; and identification of whether the Permittee proposes to maintain, reduce, or cease implementation for each more protective, locally-tailored BMP. In no instance may a BMP be reduced or ceased if it is required by the minimum standards set by this Order.Further, for each more protective, locally-tailored BMP and associated measurable goal for which the Renewal Permittee proposes to reduce or cease implementation, the Renewal Permittee may do so only if the Permittee can demonstrate, to the Regional Water Board Executive Officer, that the reduction or cessation is in compliance with this Order and the maximum extent practicable standard, and will not result in increased pollutant discharges. This process is designed to direct Renewal Permittees, where appropriate, to continue to implement more protective, locally-tailored BMPs and measurable goals developed in the previous permit term that were specifically designed to address local storm water priorities.

Summary of Significant Changes in this Order

This Order significantly differs from the previous order (Order 2003-0005-DWQ) by including the following:

- Specific BMP and Management Measure Requirements
- Elimination of submission of a SWMP for review and approval by the Regional Water Boards

- Electronic filing of NOIs and Annual Reports
- Waiver Certification
- New State Water Board and Regional Water Board designation criteria
- Separate requirements for Traditional and Non-traditional MS4s
- New program management requirements
- Post-construction storm water management requirements
- TMDL implementation requirements
- Requirements for ASBS discharges
- Water quality monitoring and BMP assessment
- Program effectiveness assessment

III. ECONOMIC CONSIDERATIONS

In 2000, the State Water Board issued a precedential order (Order WQ 2000-11 (Cities of Bellflower, et al.)) stating that cost of compliance with the programs and requirements of a municipal storm water permit is a relevant factor in determining MEP. The Order also explicitly stated that a cost benefit analysis is not required. The State Water Board discussed costs as follows:

> *While the standard of MEP is not defined in the storm water regulations or the Clean Water Act, the term has been defined in other federal rules. . . . .*
>
> *These definitions focus mostly on technical feasibility, but cost is also a relevant factor. There must be a serious attempt to comply, and practical solutions may not be lightly rejected. If, from the list of BMPs, a permittee chooses only a few of the least expensive methods, it is likely that MEP has not been met. On the other hand, if a permittee employs all applicable BMPs except those where it can show that they are not technically feasible in the locality, or whose cost would exceed any benefit to be derived, it would have met the standard. MEP requires permittees to choose effective BMPs, and to reject applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs would not be technically feasible, or the cost would be prohibitive. Thus while cost is a factor, the Regional Water Board is not required to perform a cost-benefit analysis.*

(State Water Board Order WQ 2000-11, *supra,* p.20.) The State Water Board received extensive comments addressing the costs associated with compliance with the first publicly released Phase II small MS4 draft Order in June 2011. The depressed economic conditions in California challenge Permittees' ability to fully implement the requirements of the first draft permit. The State Water Board recognizes that many Permittees currently have limited staff and resources to implement storm water provisions. State Water Board staff carefully considered comments received regarding economic feasibility while revising the June 2011 draft Order. The Order continues to address critical water quality priorities, namely discharges to ASBS, TMDLs, and waterbodies listed as impaired on the 303(d) list, but aims to do so in a focused and cost-effective manner.

Brief History
State Water Board staff completed an administrative draft Order and submitted it to CASQA, U.S. EPA, Natural Resources Defense Council, Water Keepers, and Heal the Bay for informal stakeholder review in February 2011. Each of the nine Regional Water

Boards also provided comments. Staff revised the draft Order to address the informal comments received and released it for 60-day public review in June 2011. Approximately 151 comments were received and several workshops were held throughout California to meet Stakeholders, answer questions and discuss the development process.

On October 6, 2011, the California Senate Select Committee on California Job Creation and Retention held a hearing on the economic impacts of the State Water Board's three general or statewide storm water permits that were under renewal: the Phase II Small MS4 permit, the Industrial General Permit, and the Caltrans statewide MS4 permit. The Executive Director of the State Water Board testified at the hearing that the comments regarding cost of compliance with the permits were being considered carefully and that the three permits required substantial revision to address the comments. Following the hearing, State Water Board staff launched Stakeholder meetings beginning in November 2011 to April 2012. The meetings were held with CASQA, National Resources Defense Council, Water Keepers, Heal the Bay and each category of Non-traditional Small MS4 proposed for designation in the draft permit. The meetings were designed to discuss implementation challenges and solutions for each section of this Order, given the issues raised at the Senate hearing and the written comments from the June 2011 draft Order. Substantial revisions were then made and were reflected in the May 2012 draft Order. State Water Board staff attempted to reduce costs while maintaining the level of water quality protection mandated by CWA, CWC and other applicable requirements**.**

Approach to Cost of Compliance
This section is a general discussion of the more significant changes between the June 2011 and the May 2012 draft Order, including cost of compliance. It is not possible to accurately predict the cost impact of requirements that involve an unknown level of implementation or that depend on environmental variables that are as yet undefined. Only general conclusions can be drawn from this information.

It is extremely important to note that many storm water program components and their associated costs existed before any MS4 permits were issued. For example, storm drain maintenance, street sweeping and trash/litter collection costs cannot be solely or even principally attributed to MS4 permit compliance since these long-standing practices preceded the adoption of the earliest storm water permit in 1990. Even many structural BMPs (erosion protection, energy dissipation devices, detention basins etc.) are standard engineering practice for many projects and are not implemented solely to comply with permit provisions. Therefore, the true cost resulting from MS4 permit requirements is some fraction of the total storm water program costs.

The California State University, Sacramento study found that only 38% of program costs are new costs fully attributable to MS4 permits. The remainder of program costs was either pre-existing or resulted from enhancement of pre-existing programs.[4] The County of Orange found that even lesser amounts of program costs are solely attributable to MS4 permit compliance, reporting that the amount attributable to implement its Drainage Area Management Plan is less than 20% of the total budget. The remaining 80% is

[4] Ibid. p. 58.

attributable to pre-existing programs.[5] Any increase in cost to the Permittees by the requirements of this Order will be incremental in nature.

Testimony from the California Senate Select Committee on California Job Creation and Retention hearing and comment letters on the June 2011 draft Order asserted numerous estimates of compliance costs. Generally, the estimates are based on worst-case scenarios or the most restrictive interpretation of the June 2011 draft Order. A worst-case scenario would come about, for example, if a new Traditional MS4 Permittee fails to leverage existing resources and maximize efficiencies, and does not segregate pre-existing program expenditures and new costs to implement the storm water program when considering cost of compliance. Furthermore, the assertions do not take into consideration the phased-in nature of many of the June 2011 draft Order requirements. Finally, the cost estimate assertions did not address the diversity among Permittees, specifically the different levels of compliance from a new vs. renewal Traditional MS4 Permittee expenditure and new vs. renewal Non-traditional MS4 expenditure and funding sources.

State Water Board staff estimated the cost of compliance in two ways. First, staff utilized cost data from the California State University (CSUS) NPDES Stormwater Cost Survey[6]. The rationale for using this document is that it's very difficult to precisely determine the true cost of implementation of the Permittees' storm water management program as affected by this Order. Reported costs of compliance for the same program element vary widely from city to city and by a very great margin that cannot be explained. However, economies of scale play a great role for the great margin of compliance costs. Some Permittees storm water programs are general funded while others utilize a service/user/utility fees to support the program. Unfortunately, those Permittees with general funded programs must compete for dollars in a dwindling economic climate. Furthermore, a study by the Los Angeles Regional Water Board reported wide variability in the cost of compliance among municipal permit holders, which was not easily explained.[7] Due to the wide diversity among the Permittees, Traditional and Non-traditional and new and renewal Permittees, the uncertainty of the extent of needed improvements, and the difficulty in isolating program costs attributable to permit compliance, the true cost of implementation can only be discussed in a general way.

Second, staff considered comparisons between the June 2011 draft Order and first term Phase I MS4 permits. The municipalities chosen in the CSUS survey were smaller Phase I cities, were early in the first permit term, and had reported cost in their annual reports. In addition, the cost categories correspond to the federal Phase II Small MS4 six minimum control measures. Given these factors, State Water Board staff estimated the worst-case scenario example to be a $32 median annual cost per household to implement the June 2011 draft Order. The CSUS survey estimated the annual cost per household for the six storm water programs ranged from $18 to $46.

[5] County of Orange, 2000. A NPDES Annual Progress Report. P. 60. More current data from the County of Orange is not used in this discussion because the County of Orange no longer reports such information.
[6] California State University, NPDES Stormwater Cost Survey, 2005
[7] LARWQCB, 2003. Review and Analysis of Budget Data Submitted by the Permittees for Fiscal Years 2000-2003. p.2

Of the 100 new Traditional Small MS4s proposed to be designated, 20,000 is the average population with an average of 2.8 individuals per household, therefore the average annual cost to implement the June 2011 draft Order is approximately $229,000.

The average population of a renewal Traditional MS4 Permittee identified in the June 2011 draft Order is 27,353 with an average of 2.8 individuals per household. Therefore, the average annual cost to implement the June 2011 draft Order is approximately $313,000.

As discussed previously, the May 2012 draft Order has undergone substantial edits and no requirements have been added to the draft Order that would materially increase the cost of compliance. State Water Board staff carefully evaluated comments from Stakeholder meetings, written public comments, and testimony from the Senate Select Committee hearing. And, although the May 2012 draft Order contains these substantial revisions, the draft Order continues to protect storm water quality without overburdening Permittees and Businesses. Below is a list of some of the more significant changes to reduce costs.

1. Deleted annual cost analysis
2. Deleted Industrial/Commercial Inspection Program
3. Deleted mandatory construction inspection frequency
4. Deleted Trash Reduction Program
5. Modified post-construction standard requirements
6. Modified Community-Based Social Marketing provision
7. Modified Non-traditional MS4 provisions
8. Extended compliance deadlines
9. Eliminated redundancy with construction inventory and tracking requirements
10. Deleted mandatory development of a citizen advisory group
11. Deleted costly IDDE monitoring, complaint response based
12. Made spatial data in a Geographic Information System (GIS) optional
13. Deleted requirement to identify 20% of storm drain system as high priority
14. Included Water Quality Monitoring Tiers

Though no firm conclusions or precise estimates can be drawn from this analysis, it is expected that the revisions to the May 2012 draft Order will significantly reduce the cost of compliance of the average annual cost per household from the estimated $32 to substantially lower.

TMDLs

The cost of complying with TMDL waste load allocations is not considered since TMDLs are not subject to the MEP standard. Federal law requires that NPDES permits contain effluent limitations consistent with the assumptions of any applicable wasteload allocation in a TMDL. (40 C.F.R. §122.44(d)(1)(vii)(B).)

Benefits of Permit Costs

The State Water Board further found in adopting Order WQ-2000-11 that in considering the cost of compliance, it is also important to consider the costs of impairment; that is, the negative impact of pollution on the economy and the positive impact of improved water quality. For example, economic benefits may result through program

implementation, and alternative costs (as well as environmental impacts) may be incurred by not fully implementing the program.

Storm water management programs cannot be considered solely in terms of their costs. The programs must also be viewed in terms of their value to the public. For example, household willingness to pay for improvements in fresh water quality for fishing and boating has been estimated by U.S. EPA to be $158-210.[8] This estimate can be considered conservative, since it does not include important considerations such as marine waters benefits, wildlife benefits, or flood control benefits. The California State University, Sacramento study corroborates U.S. EPA's estimates, reporting annual household willingness to pay for statewide clean water to be $180.[9] Though these costs may be assessed differently at the state level than at the municipal level, the results indicate that there is public support for storm water management programs and that costs incurred by the Permittees to implement its storm water management program remain reasonable.

It is also important to consider the cost of not implementing a storm water management program. Urban runoff in southern California has been found to cause illness in people bathing near storm drains.[10] A study of south Huntington Beach and north Newport Beach found that an illness rate of about 0.8% among bathers at those beaches resulted in about $3 million annually in health-related expenses.[11] Extrapolation of such illness rates and associated health expenses to the beaches and other water contact recreation areas in the state would increase these costs significantly.

Storm water runoff and its impact on receiving waters also negatively affects the tourism industry. The California Travel and Tourism Commission estimated that out-of-state visitors spent $168 per person per day (including transportation) in California in 2007. The Commission estimated total direct travel spending in California was $97.6 billion, directly supporting 924,000 jobs, with earnings of $30.6 billion. Effects on tourism from storm water runoff (e.g. beach closures) can have a significant impact on the economy. The experience of Huntington Beach provides an example of the potential economic impact of poor water quality. Approximately eight miles of Huntington Beach were closed for two months in the middle of summer of 1999, impacting beach visitation and the local economy.

Finally, the benefits of storm water management programs must be considered in conjunction with their costs. A study conducted by University of Southern California and the University of California, Los Angeles assessed the costs and benefits of implementing various approaches for achieving compliance with the MS4 permits in the Los Angeles Region. The study found that non-structural systems would cost $2.8 billion but provide $5.6 billion in benefit. If structural systems were necessary, the study found that total costs would range from $5.7 to $7.4 billion, while benefits could reach $18 billion.[12] Costs are anticipated to be borne over many years, approximately a ten year minimum. That the benefits of the programs would considerably exceed their costs

[8] Federal Register / Vol. 64, No. 235 / Wednesday, December 8, 1999 / Rules and Regulations. P. 68793.
[9] State Water Board, 2005. NPDES Storm water Cost Survey. P. iv.
[10] Haile, R.W., et al, 1996. An Epidemiological Study of Possible Adverse Health Effects of Swimming in Santa Monica Bay. Santa Monica Bay Restoration Project.
[11] Los Angeles Times, May 2, 2005. Here's What Ocean Germs Cost You: A UC Irvine Study Tallies the Cost of Treatment and Lost Wages for Beachgoers Who Get Sick.
[12] LARWQCB, 2004. Alternative Approaches to Storm water Control.

is a view corroborated by U.S. EPA, which also found that the benefits of implementation of its Phase II storm water rule would outweigh the costs.[13]

IV. UNFUNDED MANDATES

Article XIII B, Section 6(a) of the California Constitution provides that whenever "any state agency mandates a new program or higher level of service on any local government, the state shall provide a subvention of funds to reimburse that local government for the costs of the program or increased level of service." The requirements of this Order do not constitute state mandates that are subject to a subvention of funds.

First, the requirements of this Order do not constitute a new program or a higher level of service as compared to the requirements of the Existing Order. The overarching requirement to impose controls to reduce the pollutants in municipal storm water is dictated by the Clean Water Act and is not new to this permit cycle. (33 U.S.C. §1342(p)(3)(B).) The inclusion of new and advanced measures as the storm water programs evolve and mature over time is anticipated under the Clean Water Act (55 Fed. Reg. 48052), and these new and advanced measures do not constitute a new program or higher level of service. Further, this Order sets out a more detailed set of requirements compared to the 2003 Order in large part because, unlike the 2003 Order, this Order does not require submission of SWMPs. Specifics concerning how the minimum measures will be implemented, which would have been proposed in the SWMP under the 2003 Order, are now incorporated into the Order itself.

Second, and more broadly, mandates imposed by federal law, rather than by a state agency, are exempt from the requirement that the local agency's expenditures be reimbursed. (Cal. Const., art. XIII B, §9, subd. (b).) The Draft Order implements federally mandated requirements under the Clean Water Act and its requirements are therefore not subject to subvention of funds. This includes federal requirements to effectively prohibit non-storm water discharges, to reduce the discharge of pollutants to the maximum extent practicable, and to include such other provisions as the Administrator or the State determines appropriate for the control of such pollutants. (30 U.S.C. §1342(p)(3)(B).) The authority exercised under this Order is not reserved state authority under the Clean Water Act's savings clause (*cf. Burbank v. State Water Resources Control Bd.* (2005) 35 Cal.4th 613, 627-628), but instead is part of a federal mandate to develop pollutant reduction requirements for municipal separate storm sewer systems. To this extent, it is entirely federal authority that forms the legal basis to establish the permit provisions. (See, *City of Rancho Cucamonga v. Regional Water Quality Control Bd.-Santa Ana Region* (2006) 135 Cal.App.4th 1377, 1389; *Building Industry Ass'n of San Diego County v. State Water Resources Control Bd.* (2004) 124 Cal.App.4th 866, 882-883.)

Further, the maximum extent practicable standard is a flexible standard that balances a number of considerations, including technical feasibility, cost, public acceptance, regulatory compliance, and effectiveness. (*Building Ind. Asso., supra,* 124 Cal. App.4th at pp. 873, 874, 889.) Such considerations change over time with advances in technology and with experience gained in storm water management. (55 Fed.Reg.

[13] Federal Register / Vol. 64, No. 235 / Wednesday, December 8, 1999 / Rules and Regulations. P. 68791.

48052.) Accordingly, the determination of whether the Draft Order conditions exceed the requirements of federal law cannot be based on a point by point comparison of the permit conditions and the six minimum measures that are required "at a minimum" to reduce pollutants to the maximum extent practicable and to protect water quality (40 C.F.R. §122.34). Likewise, individual permit provisions cannot be considered in isolation. When implementing the federal requirement to reduce pollutants to the maximum extent practicable, the entire permit must be evaluated as a whole. This is so because the permitting agency may decide that it is more practicable to expend limited municipal resources on one aspect of the permit rather than another. In other words, requirements in one area may be relaxed to account for greater expenditures in another that will reduce pollutants to the maximum extent practicable

In recent months, the County of Los Angeles and County of Sacramento Superior Courts have granted writs setting aside decisions of the Commission on State Mandates that held that certain requirements in Phase I permits constituted unfunded mandates. In both cases, the courts found that the correct analysis in determining whether a municipal storm water permit constituted a state mandate was to evaluate whether the permit conditions were expressly specified in federal statute or regulation but whether the permit conditions exceeded the maximum extent practicable standard. (*State of Cal. v. Comm. On State Mandates* (Super. Ct. Sacramento County, 2012, No. 34-2010-80000604), *State of Cal. v. County of Los Angeles* (Super. Ct. Los Angeles County, 2011, No. BS130730.) It should be noted that USEPA has issued an MS4 Permit Improvement Guide (April 2010, available at: http://www.epa.gov/npdes/pubs/ms4permit_improvement_guide.pdf) that recommends many provisions for Phase II MS4 permits not explicitly specified in the six minimum measures established at Code of Federal Regulations, title 40, section 122.34.

As laid out in this Fact Sheet and as supported by the record of this permitting action, the requirements of the Draft Order, taken as a whole rather than individually, are necessary to reduce the discharge of pollutants to the maximum extent practicable, to effectively prohibit non-storm water discharges, and to protect water quality. The findings as to implementing these federal requirements are the expert conclusions of the principal state agency charged with implementing the NPDES program in California. (Wat. Code, §§13001.) The requirements of the Draft Order do not constitute an unfunded mandate.

It should be noted that the Draft Order provisions to effectively prohibit non-storm water discharges are also mandated by the Clean Water Act. (33 U.S.C. §1342(p)(3)(B)(ii).) Likewise, the provisions of this Draft Order to implement total maximum daily loads (TMDLs) are federal mandates. Federal law requires that permits must contain effluent limitations consistent with the assumptions of any applicable wasteload allocation in a TMDL. (40 C.F.R. §122.44(d)(1)(vii)(B).)

Finally, even if any of the permit provisions could be considered unfunded mandates, under Government Code section 17556, subdivision (d), a state mandate is not subject to reimbursement if the local agency has the authority to charge a fee. The local agency permittees have the authority to levy service charges, fees, or assessments sufficient to pay for compliance with this Order. (See, e.g., *Apartment Ass'n of Los Angeles County, Inc. v. City of Los Angeles* (2001) 24 Cal.4th 830, 842.) The authority of a local agency to defray the cost of a program without raising taxes indicates that a

program does not entail a cost subject to subvention. (*Clovis Unified School Dist. v. Chiang* (2010) 188 Cal. App.4th 794, 812, quoting *Connell v. Superior court* (1997) 59 Cal.App.4th 382, 401; *County of Fresno v. State of California* (1991) 53 Cal.3d 482, 487-488.)

V. ROLE OF THE REGIONAL WATER BOARDS

Under the Water Code, either the State Water Board or the regional boards have authority to issue NPDES permits (Wat. Code, §13377.) The State Water Board is issuing this Order; however Regional Water Board staff will continue to have the authority to evaluate each individual Permittee's compliance through online Annual Report review and by requesting a detailed annual report from Permittees anytime during the permit term. In addition, Regional Board staff can conduct program evaluations (audits). These evaluations can either be targeted or comprehensive evaluations. Responsibilities of Regional Water Board staff also include oversight of implementation and compliance with this Order. As appropriate, they can require modification to programs and other submissions, impose region-specific monitoring requirements, conduct inspections, take enforcement actions, and make additional designations of Regulated Small MS4s. The Regional Water Boards also have a role in approving water quality monitoring efforts and may also direct that dischargers carry out a particular type of education and outreach program (*see* discussion under Section XII).

Regional Water Boards may also issue individual permits to Regulated Small MS4s, and alternative general permits to categories of Regulated Small MS4s. In addition, Regional Water Boards may allow Phase II Permittees the ability to become Phase I Permittees within the same urbanized area. Upon issuance of such permits by a Regional Water Board, this Order shall no longer regulate the affected MS4s.

The Permittees and Regional Water Boards are encouraged to work together to accomplish the goals of the storm water program, specifically, by coordinating the oversight of construction and industrial sites. For example, certain Permittees are required to implement a construction program that must include procedures for construction site inspection and enforcement. Construction sites disturbing an acre of land or more are also subject to inspections by the Regional Water Board under the State Water Board's Construction General Permit for Storm Water Discharges associated with Construction and Land Disturbance Activities (CGP). U.S. EPA intended to provide a structure that requires permitting through the federal Clean Water Act while at the same time achieving local oversight of construction projects. A structured plan review process and field enforcement at the local level, which is also required by this Order, were cited in the preamble to the Phase II regulations as the most effective components of a construction program.

The Permittees and Regional Water Boards are encouraged to coordinate efforts and use each of their enforcement tools in the most effective manner. However, in order to further ensure coordination, this Order requires Permittees to include procedures for referring non-filers as identified in the Program Management section and violations of the storm water general permits to the Regional Water Board when observed.

Dispute Resolution

As discussed, several areas of the permit will be mandated at the discretion of the Regional Board Executive Officer after permit adoption. In this function, the Regional Water Board Executive Officers are in essence acting as agents of the State Water Board. Therefore, determinations of the Regional Water Board Executive Officers in interpreting and implementing this permit are considered actions of the State Water Board (and accordingly not actions of the Regional Water Board subject to the petition process under Water Code section 13320) except where the Regional Water Board itself acts or the Executive Officer acts under Water Code Sections 13300, 13304, or 13383. However, recognizing the need for some level of statewide consistency in interpretation and implementation of Order provisions, the Order includes a dispute resolution process where there is disagreement between a Permittee and a Regional Water Board Executive Officer. The Permittee should first attempt to resolve the issue with the Executive Officer of the Regional Water Board. If a satisfactory resolution is not obtained at the Regional Water Board level, the Permittee may submit the issue in writing to the Executive Director of the State Water Board or his designee for resolution, with a copy to the Executive Officer of the Regional Water Board. The issue must be submitted to the Executive Director within thirty days of any final determination by the Executive Officer of the Regional Water Board; after thirty days the Permittee will be deemed to have accepted the Regional Water Board Executive Officer's determination. The Executive Officer of the Regional Water Board will be provided an opportunity to respond.

VI. ENTITIES SUBJECT TO THIS ORDER

This Order regulates discharges of storm water from Regulated Small MS4s. A Regulated Small MS4 is a Small MS4 that has been designated as regulated in accordance with criteria described in 40 C.F.R. 122.32.

a. Renewal Permittee - Traditional and Non-traditional MS4s

All Traditional and Non-traditional MS4s currently covered under the existing General Permit are covered under this Order and must implement the requirements of this Order.

b. New Traditional MS4 Permittee or New Urbanized Areas

In some cases, the urbanized boundaries and/or infrastructure of previously permitted Traditional MS4 Permittees may expand to include new areas designated as urbanized under the 2010 U.S. Decennial Census (e.g., when new areas are annexed within the urbanized area). Permittees must identify and include these new urbanized areas as part of their existing storm water program. Any new urbanized areas must be indicated on Permittees permit boundary map. For cities, the permit area boundary is the city boundary. For counties, permit boundaries must include urbanized areas and places identified in Attachment A located within their jurisdictions. The boundaries must be proposed in the permit boundary map and may be developed in conjunction with the applicable Regional Water Board

New Traditional MS4 Permittees that are outside of Urbanized Areas have been designated as Regulated Small MS4s based on one or more of the following criteria developed by the State Water Board:

1) High population and population density – High population means a population of 10,000 or more. High population density means a density greater than 1,000 residents per square mile. Also considered in this definition is high density created by a non-residential population, such as tourists or commuters.
2) Discharge to Areas of Special Biological Significance (ASBS) as defined in the California Ocean Plan.

The above factors were considered when evaluating whether an MS4 outside an Urbanized Area should be regulated pursuant to this Order. An MS4 and the population that it serves need not meet all of the factors to be designated. The criteria selected to designate MS4s to be regulated are based on the potential impact to water quality due to conditions influencing discharges into their system or due to their discharge location(s).

On a case by case basis, the Regional Water Boards may designate Small MS4s outside of Urbanized Areas as Regulated Small MS4s. Case by case determinations of designation shall be based on the potential of a Small MS4's discharges to result in exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts. Where such case by case designations have been recommended by the Regional Water Boards prior to adoption of this Order, the designated Small MS4s are listed on the relevant Attachments to the Order and the reasons for designation are laid out in the Fact Sheet. The Regional Water Boards may continue to make case by case determinations of designation during the permit term by notification to the discharger, which shall include a statement of reasons for the designation.

Finally, any Small MS4 that contributes substantially to the pollutant loadings of a physically interconnected municipal separate storm sewer that is regulated by the NPDES storm water program must be designated as Regulated Small MS4s. An MS4 is interconnected with a separately permitted MS4 if storm water that has entered the MS4 is discharged to another permitted MS4. In general, if the MS4 discharges more than 10 percent of its storm water to the permitted MS4, or its discharge makes up more than 10 percent of the other permitted MS4's total storm water volume, it is a significant contributor of pollutants to the permitted MS4. In specific cases, the MS4s involved or third parties may show that the 10 percent threshold is inappropriate for the MS4 in question.

The definition for significant contributor of pollutants to an interconnected permitted MS4 uses a volume of 10 percent, with the assumption that storm water contains pollutants. This is meant to capture flows that may affect water quality or the permit compliance status of another MS4, but exclude incidental flows between communities.

c. **New Non-traditional MS4 Permittees**

Non-traditional MS4s include, but are not limited to, universities, prisons, large hospitals, military bases (e.g., State Army National Guard barracks), and State parks.

The existing General Permit, Water Quality Order 2003-0005-DWQ, Attachment 3 listed Non-traditional MS4s anticipated to be designated by the end of the permit term, either by the State or Regional Water Boards. However, some Non-traditional MS4s were not designated. All Non-traditional MS4s, except K-12 School Districts, Offices of Education and Community Colleges, not yet designated are now subject to this Order. These entities are listed in Attachment B.

Additional Non-traditional MS4 Permittees have been designated as Regulated Small MS4s in accordance with the same criteria described in b above.

VII. APPLICATION REQUIREMENTS

All Regulated Small MS4s listed in Attachments A and B are automatically designated upon adoption of this Order and must file for coverage. To file for coverage, Permittees must electronically file an NOI on the State Water Board's SMARTS website and mail the appropriate permit fee to the State Water Board:

https://smarts.waterboards.ca.gov/smarts/faces/SwSmartsLogin.jsp

The NOI will include a statement that the discharger intends to comply with the BMP requirements of the Order in lieu of proposing BMP practices. Permittees must file the NOI by July 1, 2013.

Joint Phase II Co-Permittees or Permittees relying on Separate Implementing Entities must also electronically file an NOI via SMARTS and mail the appropriate fee to the State Water Board, by July 1, 2013.

Census Designated Places (CDPs) are included in Attachment A to clearly show that they are designated Phase II entities. However, CDPs that are located within an urbanized area and within an existing NPDES permit area do not have a government entity and as such, are not required to file separately and pay fees. The Permittee (ie. a designated county) will name the CDPs within their jurisdiction when they file their NOI via SMARTS.

For fee purposes, in determining the total population served by the MS4, both resident and commuter populations are to be included. For example, publicly operated school complexes including universities and colleges, the total population served would include the sum of the average annual student enrollment plus staff.

For community services districts, the total population served would include the resident population and any non-residents regularly employed in the areas served by the district.

Regulated Small MS4s that fail to obtain coverage under this Order or other NPDES permit for storm water discharges will be in violation of the Clean Water Act and the California Water Code.

The Order includes State and Regional Water Board contact information for questions and submittals.

Waiver Certification
This Order allows Regulated Small MS4s to request a waiver of requirements. Regulated Small MS4 must certify (1) their discharges do not cause or contribute to, or have the potential to cause or contribute to a water quality impairment, and (2) they meet one of the following three waiver options:

a. Option 1

(1) The jurisdiction served by the system is less than 1,000 people;
(2) The system is not contributing substantially to the pollutant loadings of a physically interconnected regulated MS4; and
(3) If the small MS4 discharges any pollutants identified as a cause of impairment of any water body to which it discharges, storm water controls are not needed based on waste load allocations that are part of an EPA approved or established TMDL that addresses the pollutant(s) of concern.

b. Option 2

(1) The jurisdiction served by the system is less than 10,000 people;
(2) The Regional Water Board has evaluated all waters of the U.S. that receive a discharge from the system;
(3) The Regional Water Board has determined that storm water BMPs are not needed based on wasteload allocations that are part of an EPA approved or established TMDL that addresses the pollutant(s) of concern or an equivalent analysis; and
(4) The Regional Water Board has determined that future discharges from the Regulated Small MS4 do not have the potential to result in exceedances of water quality standards.

c. Option 3 (applicable to Small MS4s outside an Urbanized Area only)

(1) Small Disadvantaged Community – a community with a population of 20,000 or less with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI (CWC § 79505.5 (a)).

VIII. POST-CONSTRUCTION STORMWATER MANAGEMENT CRITERIA FOR NEW DEVELOPMENT AND REDEVELOPMENT

This Order incorporates Site Design and Low Impact Development (LID) Runoff requirements for new development and redevelopment. The Order will incorporate runoff retention and hydromodification control criteria in the next permit term that will be keyed to specific watershed processes as identified by the State Water Board within specific Watershed Management Zones (WMZs). The WMZs will be used to identify applicable areas and appropriate criteria for runoff retention and hydromodification control.

IX. DISCHARGE PROHIBITIONS

Storm Water Discharges

This Order authorizes storm water and conditionally exempt non-storm water discharges[14] from the Permittees' MS4s subject to effluent and receiving water limitations. This Order prohibits the discharge of material other than storm water, unless specifically authorized in this Order.

Non-Storm Water Discharges

Section 402(p)(3)(B)(ii) of the Clean Water Act requires that MS4 permits include a requirement to effectively prohibit non-storm water discharges into the storm sewers. Prohibition B.3 of the Order implements this requirement. Although the Clean Water Act phrases the non-storm water discharge prohibition as a prohibition of discharges "into the storm sewers," this Order states that "discharges *through the MS4* of material other than storm water to waters of the U.S. shall be effectively prohibited." There is no meaningful distinction between the two language iterations as both prohibit discharges from reaching receiving waters and are consistent with the intent of the Clean Water Act. When discussing the effective prohibition of non-storm water discharger, U.S. EPA's preamble to its Phase I regulations uses the term "through" interchangeably with the term "into." (55 Fed. Reg. 47995.) Staff believes that the use of the phrasing "through the MS4 . . . to waters of the U.S." allows the Permittees greater flexibility with regard to utilizing dry weather diversions.

The Phase I regulations at 40 C.F.R. §122.34(b)(3)(iii).specify certain categories of non-storm water discharges that are conditionally exempt from the prohibition and the Order follows this approach. Unless authorized by a separate NPDES permit, non-storm water discharges that are not specifically exempted by this Order are prohibited. Certain enumerated conditionally exempt non-storm water discharges are allowed provided they are not found to be significant source of pollution If a discharger or a Regional Water Board Executive Officer determines that any individual or class of conditionally exempt non-storm water discharge may be a significant source of pollutants, the Regional Water Board may require the discharger to monitor and submit a report and impose BMPs to control the discharge.

Areas of Special Biological Significance

The State Water Board adopted the California Ocean Plan (Ocean Plan) on July 6, 1972 and revised the Ocean Plan in 1978, 1983, 1988, 1990, 1997, 2000, 2005 and 2009. The Ocean Plan prohibits the discharge of waste to Areas of Special Biological Significance (ASBS). The State Water Board designates ASBS as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable.

The Ocean Plan states that the State Water Board may grant an exception to Ocean Plan provisions where the State Water Board determines that the exception will not compromise protection of ocean waters for beneficial uses and the public interest will be served.

[14] Conditionally exempt non-storm water also refers to authorized non-storm water.

On October 18, 2004, the State Water Board directed several dischargers to cease the discharge of storm water and nonpoint source waste into ASBS, or request an exception to the Ocean Plan. Several of these dischargers are designated as Regulated Small MS4s.

On March 20, 2012, the State Water Board adopted Resolution 2012-0012 granting an exception from the Ocean Plan prohibition to 13 parties (Attachment D) designated as Regulated Small MS4s under this Order. In order to legally discharge into an ASBS, the parties must comply with the terms of the exception and have an appropriate authorization to discharge. Authorization for point source discharges to ASBS consists of coverage under this NPDES Order.

The parties authorized to discharge under the general exception are listed in Attachment D. The general exception contains "Special Protections" to protect beneficial uses and maintain natural water quality in ASBS. Limited by the special conditions in the resolution, parties listed in Attachment D can legally discharge waste into ASBS as long as the discharges are also regulated under this Order.

This Order incorporates the terms of the exception and includes the monitoring requirements the 13 parties identified as Regulated Small MS4s must comply with.

X. EFFLUENT LIMITATIONS

Consistent with Clean Water Act section 402(p)(3)(B)(iii), this Order requires that Permittees implement controls to reduce the discharge of pollutants from their MS4s to waters of the U. S. to the Maximum Extent Practicable (MEP). The MEP standard requires Permittees to apply Best Management Practices (BMPs) that are effective in reducing or eliminating the discharge of pollutants to the waters of the U.S. MEP emphasizes pollutant reduction and source control BMPs to prevent pollutants from entering storm water runoff. MEP may require treatment of the storm water runoff if it contains pollutants. The MEP standard is an ever-evolving, flexible, and advancing concept, which considers technical and economic feasibility. As knowledge about controlling urban runoff continues to evolve, so does that which constitutes MEP. BMP development is a dynamic process and may require changes over time as the Permittees gain experience and/or the state of the science and art progresses. Permittees must conduct and document evaluation and assessment of each relevant element of the program, and of the program as a whole, and revise activities, control measures/BMPs, and measurable goals, as necessary to meet MEP. MEP requires Permittees to choose effective BMPs, and to reject applicable BMPs only where other effective BMPs will serve the same purpose, the BMPs are not technically feasible, or the cost is prohibitive. Further, because local conditions vary, some BMPs may be more effective in one community than in another. MEP is the cumulative result of implementing, evaluating, and creating corresponding changes to a variety of technically appropriate and economically feasible BMPs, ensuring that the most appropriate BMPs are implemented in the most effective manner.

Under 40 Code of Federal Regulations section 122.44(k)(2)&(3), the State Water Board may impose BMPs for control of storm water discharges in lieu of numeric effluent limitations.[15]

In 2004, the State Water Board assembled a blue ribbon panel to address the feasibility of including numeric effluent limits as part of NPDES municipal, industrial, and construction storm water permits. The panel issued a report dated June 19, 2006, which included recommendations as to the feasibility of including numeric limits in storm water permits, how such limits should be established, and what data should be required.

The report concluded that "It is not feasible at this time to set enforceable numeric effluent criteria for municipal BMPs and in particular urban discharges. However, it is possible to select and design them much more rigorously with respect to the physical, chemical and/or biological processes that take place within them, providing more confidence that the estimated mean concentrations of constituents in the effluents will be close to the design target."

Consistent with the federal regulations, the findings of the Blue Ribbon Panel, and precedential State Water Board orders (State Water Board Orders Nos. WQ 91-03 and WQ 91-04), this Order allows the Permittees to implement BMPs to comply with the requirements of the Order.

XI. RECEIVING WATER LIMITATIONS

Under federal law, an MS4 permit must include "controls to reduce the discharge of pollutants to the maximum extent practicable . . . and such other provisions as . . . the State determines appropriate for the control of such pollutants." (Clean Water Act §402(p)(3)(B)(iii).) Consistent with this provision, requirements to meet water quality standards are at the discretion of the permitting agency. (*Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F3d 1159.)

The State Water Board has previously determined that limitations necessary to meet water quality standards are appropriate for the control of pollutants discharged by MS4s and must be included in MS4 permits. (State Water Board Orders WQ 91-03, 98-01, 99-05, 2001-15).). This Order accordingly prohibits discharges that cause or contribute to violations of water quality standards. Consistent with federal law, the State Water Board has also found it appropriate to require implementation of BMPs in lieu of numeric water quality-based effluent limitations and further, in lieu of "strict compliance" with water quality standards, has prescribed an iterative process of BMP improvement to achieve

[15] On November 12, 2010, U.S. EPA issued a revision to a November 22, 2002, memorandum in which it had "affirm[ed] the appropriateness of an iterative, adaptive management best management practices (BMP) approach" for improving storm water management over time. In the revisions, U.S. EPA recommended that, in the case the permitting authority determines that MS4 discharges have the reasonable potential to cause or contribute to a water quality excursion, the permitting authority, where feasible, include numeric effluent limitations as necessary to meet water quality standards. However, the revisions recognized that the permitting authority's decision as to how to express water quality based effluent limitations (WQBELs), i.e. as numeric effluent limitations or BMPs, would be based on an analysis of the specific facts and circumstances surrounding the permit. U.S. EPA has since invited comment on the 2010 memorandum and will be making a determination as to whether to "either retain the memorandum without change, to reissue it with revisions, or to withdraw it." http://www.epa.gov/npdes/pubs/sw_tmdlwla_comments_pdf

water quality standards. (State Water Board Orders WQ 91-03, 98-01, 2001-15; 40 C.F.R. §122.44(k).) As a result, this Order further sets out that, upon determination that a Permittee is causing or contributing to an exceedance of applicable water quality standards, the Permittee must engage in an iterative process of proposing and implementing additional control measures to prevent or reduce the pollutants causing or contributing to the exceedance. This iterative process is modeled on receiving water limitations set out in State Water Board precedential Order WQ 99-05 and required by that Order to be included in all municipal storm water permits.

The Water Boards have generally directed dischargers to achieve compliance with water quality standards by improving control measures through the iterative process and, as a matter of practice, have generally declined to initiate enforcement actions against MS4 permittees who have been actively engaged in the iterative process. At the same time, however, the Water Boards have maintained that the iterative process does not provide a "safe harbor" to MS4 permittees:[16] that is, when a discharger is shown to be causing or contributing to an exceedance of water quality standards, that discharger is in violation of the relevant discharge prohibitions and receiving water limitations of the permit and potentially subject to enforcement by the Water Boards or through a citizen suit, even if the dicharger is actively engaged in the iterative process.

The question of the "safe harbor" became a priority concern for storm water dischargers following the Ninth Circuit's holding in *Natural Resources Defense Council, Inc. v. County of Los Angeles* (2011) 673 F.3d 880 that engagement in the iterative process does not provide a safe harbor from liability for violations of permit terms prohibiting exceedances of water quality standards. Although the U.S. Supreme Court has reversed the judgment of the Ninth Circuit and remanded (on grounds unrelated to the "safe harbor" holding), *LA County Flood Control District v. NRDC* (2013) 568 U.S.____, the receiving water limitations provisions is expected to remain a significant issue for dischargers based on the position, to date, of the Water Boards that the iterative process does not provide a "safe harbor" from violations. The State Water Board has received multiple comments, from dischargers and from other interested parties, expressing confusion and concern about the Order provisions regarding receiving water limitations and the iterative process. Many commenters have stated that the provisions as currently written do not provide the dischargers with a viable path to compliance with the proposed Order. Other commenters, including environmental parties, support the current language.

As stated above, the provisions in this Order regarding receiving water limitations and the iterative process are based on precedential Board orders. Accordingly, substantially identical provisions are found in the adopted Caltrans MS4 NPDES permit, as well as the Phase I NPDES permits issued by the Regional Water Boards. Because of the broad applicability of any policy decisions regarding the receiving water limitations and iterative process provisions, the State Water Board held a public workshop on November 20, 2012, to consider this issue and seek public input.

Rather than delay consideration of adoption of the tentative Order in anticipation of any future changes to the receiving water limitations and iterative process provisions that

[16] *Building Industry Assn. of San Diego County v. State Water Resources Control Bd.* (2004) 124 Cal.App.4th 866; *City of Rancho Cucamonga v. Regional Water Quality Control Bd.* (2006) 135 Cal.App.4th 1377.

may result from the public workshop and deliberation, the Board has added a specific reopener clause at Section H to facilitate any future revisions as necessary.

XII. STORM WATER MANAGEMENT PROGRAM FOR TRADITIONAL MS4s

PROGRAM ELEMENTS

Program Management

This component is essential to ensure timely implementation of all elements of the storm water program and consistency with the Order requirements. Lessons learned in California from Phase I Permittees and various municipal audits are that a Program Management element can:

a. Identify departments that assist with the implementation of the program as well as their roles and responsibilities; and

b. Maintain and enforce adequate legal authority to control pollutant discharges.

Adequate Legal Authority and Certification

Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. §§ 122.22(b), 122.34(b)(3)(ii)(B), (b)(4)(ii)(A), and (b)(5)(ii)(B); 122.41(k). MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; MS4 Program Evaluation Guidance, U.S. EPA , EPA-833-R-07-003

Adequate legal authority is required for Permittees to implement and enforce their storm water programs. Without adequate legal authority, Permittees would be unable to perform many vital program elements such as performing inspections and requiring installation of control measures. In addition, Permittees would not be able to conduct enforcement activities, assess penalties and/or recover costs of remediation.

Enforcement Response Plan

Legal Authority: Clean Water Act §402(p)(3)(b); MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; MS4 Program Evaluation Guidance, U.S. EPA , EPA-833-R-07-003

In ordinances or other regulatory mechanisms, Permittees are required to include penalty provisions to (1) ensure compliance with construction and industrial requirements, (2) to require the removal of illicit discharges, and (3) to address noncompliance with post-construction requirements. To meet these requirements, this Order requires enforcement responses that vary with the type of permit violation, and escalate if violations are repeated or not corrected. The Permittee must develop and implement an Enforcement Response Plan (ERP), which clearly describes the action to be taken for common violations associated with the construction program, illicit discharge detection and elimination, or other program elements. A well-written ERP provides guidance to inspectors on the different enforcement responses available, actions to address general permit non-filers, when and how to refer violators to the State, and how to track enforcement actions.

Education and Outreach on Storm Water Impacts

Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(1); MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; MS4 Program

Evaluation Guidance, U.S. EPA , EPA-833-R-07-003; U.S. EPA Stormwater Phase II Final Rule Fact Sheet Series, U.S. EPA Stormwater Phase II Final Rule (64 FR 68722), U.S. EPA National Menu of Best Management Practices for Stormwater Phase II[17]; Measurable Goals Guidance for Phase II Small MS4s; U.S. EPA Getting In Step

Without a focused and comprehensive program, outreach and education efforts will be poorly coordinated and ineffective. This Order requires Permittees to develop an education and outreach program that is tailored and targeted to specific water quality issues of concern in the community. These community-wide and targeted issues should then guide the development of the comprehensive outreach program, including the creation of appropriate messages and educational materials. Outreach and education not only includes the public as the target audience, but includes Permittee staff and construction site operators as well.

This Order includes a different compliance path that, upon determination by a Regional Board Executive Officer, requires the possible implementation of Community-Based Social Marketing (CBSM). CBSM is a systematic way to change the behavior of communities to reduce their impact on the environment. Simply providing information is usually not sufficient to initiate behavior change. CBSM uses tools and findings from social psychology to discover the perceived barriers to behavior change and ways of overcoming these barriers.[18]

CBSM is also cited in EPA's Getting in Step[19] outreach guide which includes successful CBSM case studies. The CBSM path is included in Attachment E.

To ensure effective implementation of CBSM principles, Regional Water Boards who have invoked Attachment E, CBSM Requirements, are encouraged to consult with Permittees to ensure CBSM principles are implemented adequately. Regional Board staff should use the first year annual report and effectiveness assessment information during the consultation. The information gained from the consultation should assist the Regional Water Board's evaluation of program effectiveness and whether a Permittee should continue implementation of Attachment E.

In addition to external public outreach, outreach and education efforts should also be directed internally at Permittee staff who, as part of their normal job responsibilities, participate in storm water program operations such as illicit discharge detection and elimination, construction, and pollution prevention and good housekeeping. The training program will ensure proper illicit discharge and illicit connection identification, reporting and response. The construction training program will ensure that Permittee staff who is responsible for construction storm water program implementation receive adequate training. Additionally, the Permittee must develop educational materials and training for construction site operators to ensure program compliance. Construction operators must be educated about site requirements for control measures, local storm water requirements, enforcement activities, and penalties for non-compliance. Permittee staff

[17] http://cfpub.epa.gov/npdes/stormwater/menuofbmps/

[18] A variation of social marketing, referred to as CBSM by Canadian environmental psychologist Doug McKenzie-Mohr.

[19] Getting in Step, 3rd Edition, A Guide to Watershed Outreach Campaigns, November 2010
EPA 841-B-10-002

training in pollution prevention/good housekeeping will ensure the incorporation of pollution prevention/good housekeeping techniques into Permittee operations.

A comprehensive and cohesive outreach and education program will likely be effective and well-coordinated if it involves the public, storm water program staff, and construction site operators.

This Order includes a list of potential residential and commercial pollution sources, but the Permittee may also identify other sources that contribute significant pollutant loads to the MS4. The Order identifies specific pollutant generating activities that must be addressed, including organized car washes, mobile cleaning and power washing operations, and landscape over-irrigation.

The Permittee is encouraged to use existing public educational materials in its program. The Permittee is also encouraged to leverage resources with other agencies and municipalities with similar public education goals.

In addition, this Order requires storm water education for school-age children. The United States suffers from a "nature deficit disorder" as discussed in popular literature (e.g., "Last Child in the Woods" by Richard Louv) and elsewhere (American Fisheries Society "Fisheries" magazine, available at www.fisheries.org). As discussed in the "America's Great Outdoors: A Promise to Future Generations" report, in order to make environmental stewardship and conservation relevant to young Americans, environmental and place-based, experiential learning must be integrated into school curricula and school facility management across the country.[20] If a program such as Splash (www.sacsplash.org/),Effie Yeaw Nature Center (www.sacnature.net) or Yolo Basin (www. Yolobasin.org) does not exist, Permittees are encouraged to use California's Education and Environment Initiative Curriculum (EEI)[21] or equivalent. California's landmark EEI Curriculum is a national model designed to help prepare today's students to become future scientists, economists, and green technology leaders.

The K-12th grade curriculum is comprised of 85 units teaching select Science and History-Social Science academic standards. Each EEI Curriculum unit teaches these standards to mastery using a unique set of California Environmental Principles and Concepts. The EEI curriculum was created to bring education about the environment into the primary and secondary classrooms of more than 1,000 school districts serving over 6 million students throughout California.

Classroom education plays an integral role in any storm water pollution outreach program. Providing storm water education through schools conveys the message not only to students but to their parents. Permittees should partner with educators and experts to develop storm water-related programs for the classroom. These lessons need not be elaborate or expensive to be effective.

The Permittees' role is to support a school district's storm water education efforts, not to dictate what programs and materials the school should use. Permittees should work with school officials to identify their needs. For example, if the schools request storm water outreach materials, Permittees can provide a range of educational aids, from

[20] http://americasgreatoutdoors.gov/files/2011/02/AGO-Report-With-All-Appendices-3-1-11.pdf
[21] http://www.californiaeei.org/

simple photocopied handouts, overheads, posters and slide shows, to more costly and elaborate working models and displays.

The principal goal of any public education and outreach effort is to change awareness and knowledge. The advanced level public education and outreach effort goes a step further in pursuit of changing behavior. The Permittee should develop a process to assess its public education and outreach programs and to determine necessary improvements to raise public awareness and knowledge. The Permittee is encouraged to use a variety of assessment methods to evaluate the effectiveness of different public education activities. The first evaluation assessment must be conducted before the final year of the Permittee's coverage under this permit, before the next permit is issued. Permittees should coordinate their evaluation assessment with other Permittees on a regional level to determine how best to get the regional message out and how to facilitate awareness, knowledge and ultimately, behavior changes.

Public Involvement/Participation
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(2).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

Storm water management programs can be greatly improved by involving the community throughout the entire process of developing and implementing the program. Involving the public benefits both the Permittee as well as the community. By listening to public concerns and coming up with solutions together, the Permittee stands to gain public support and the community should become invested in the program. The Permittees will likewise gain more insight into the most effective ways to communicate their messages.

This Order requires the development of a public involvement strategy, which may include a citizen advisory group or process to solicit feedback on the storm water program, and opportunities for citizens to participate in implementation of the storm water program. If a citizen advisory group is developed, the group should meet with the local land use planners and provide input on land use code or ordinance updates so that land use requirements incorporate provisions for better management of storm water runoff and watershed protection. Public participation in implementation of the storm water program can include many different activities such as stream clean-ups, storm drain markings, volunteer monitoring, and participation in integrated regional water management and watershed planning efforts.

Permittees are encouraged to work together with other entities that have an impact on storm water (for example, schools, homeowner associations, Department of Transportation agencies, other MS4s). Permittees are also encouraged to work through existing advisory groups, community groups or processes in order to implement these public involvement requirements.

Illicit Discharge Detection and Elimination
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(3).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

Studies have shown that dry weather flows from the storm drain system may contribute a larger amount of some pollutants than wet weather storm water flows.[22] Detecting and eliminating these illicit discharges involves complex detective work, which makes it hard to establish a rigid prescription to identify and correct all illicit connections. There is no single approach to take, but rather a variety of ways to get from detection to elimination. Local knowledge and available resources can play significant roles in determining which path to take. At the very least, communities need to systematically understand and characterize their stream, conveyance, and storm sewer infrastructure systems. Illicit discharges need to be identified and eliminated. The process is ongoing and the effectiveness of a program should improve with time. A well-coordinated IDDE programs can benefit from and contribute to other community-wide water resources-based programs such as public education, storm water management, stream restoration, and pollution prevention.[23]

This Order requires the Permittees to address illicit discharges into the MS4. An illicit discharge is defined as any discharge to a municipal separate storm sewer system that is not composed entirely of storm water, except allowable discharges pursuant to an NPDES permit (40 C.F.R. 122.34(b)(3)).[24] This Order includes requirements that the Permittee have the legal authority to effectively prohibit non-storm water discharges from entering storm sewers as well as provisions requiring the development of a comprehensive, proactive IDDE program.

Specifically, this Order requires the development of a map that includes outfalls operated by the Permittee within the urbanized area. The map will also include identification of receiving water bodies, priority areas (ie. areas with a history of past illicit discharges), and the permit boundary.

It is essential for Permittees to understand their stream and storm sewer systems and how illicit discharge sources are connected to outfalls that discharge to their system. To that end, this Order requires the development of an inventory that identifies potential illicit discharge sources and facilities. To proactively identify illicit discharges originating from priority inventoried sources, it is essential that an assessment is conducted at least once over the permit term. The assessment may include field observations, field screening, inspections and any other appropriate and effective survey methods that proactively identify potential illicit discharges. As an alternative, the Permittee may require a self-certification program that all appropriate BMPs are in place to prevent illicit discharges from the inventoried source or facility.

Further, a once per permit term survey of outfalls will identify outfalls needing sampling and possible follow-up actions[25]. The outfall inventory will also assist Permittees in the identification of "problem" outfalls, or those outfalls that may have a history of past illicit discharges. The inventory can be utilized to conduct source investigations and

[22] Evaluation of Non-Storm water Discharges to California Storm Drains and Potential Policies for Effective Prohibition. California Regional Water Quality Control Board. Los Angeles, CA., Duke, L.R. 1997., Results of the Nationwide Urban Runoff Program. Water Planning Division, PB 84-185552, Washington, D.C. U.S. EPA. 1983.
[23] Illicit Discharge Detection and Elimination A Guidance Manual for Program Development and Technical Assessments, CWP and Pitt, 2006
[24] Non-point source return flows from irrigated agriculture are not considered illicit discharges.
[25] The Permittee may utilize existing forms such as the CWP Outfall Reconnaissance Inventory/Sample Collection Field Sheet while conducting the mapping inventory and Field Sampling as specified below, in Section E.9.c.(http://cfpub.epa.gov/npdes/stormwater/idde.cfm)

corrective actions for potential illicit discharges into their system. Additionally, dry weather sampling must be conducted in each subsequent year of the permit term for outfalls identified as priority areas. While the Order specifies indicator parameters used to detect illicit discharges, the Permittee may select alternative parameters to sample that are based on local pollutants of concern. Similarly, the action level concentrations for the indicator parameters may also be tailored to match the parameters selected based on local knowledge. Finally, the outfall inventory will assist Permittees in clearly understanding the stream system and the storm sewer system within their jurisdiction.

The Permittee shall provide a mechanism for public reporting of illicit discharges and spills.

Construction Site Storm Water Runoff Control
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(4).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

Permittees must implement a construction site storm water runoff management program that includes an enforceable ordinance or other regulatory mechanism with commonly understood and legally binding definitions. These terms should be defined consistently across other related guidance and regulatory documents. The construction site storm water runoff management program is designed to prevent pollutants associated with construction activity from entering receiving water bodies (ie. sediment, fertilizers, pesticides, paints, solvents and/or fuels).

The Permittee must ensure that construction site operators select and implement appropriate construction site storm water runoff management measures to reduce or eliminate impacts to receiving waters. The Permittee is required to utilize California Stormwater Quality Association's (CASQA) Construction BMP handbook or equivalent to help guide their Construction Program). In the case that a project proponent is not implementing appropriate measures to reduce or eliminate impacts to receiving waters (ie. ineffective BMPs installed), the Permittee must take appropriate enforcement action to address the problem. Enforcement may include verbal warnings, written notices and escalated enforcement measures as described in the Enforcement Response Plan (Section E.6.c. of the Order).

The Permittee must establish review procedures for construction site plans to determine potential water quality impacts and ensure the proposed controls are adequate. These procedures should include a review of individual pre-construction site plans to ensure consistency with local sediment and erosion control requirements. In addition, the Permittee must conduct inspection and enforcement of erosion and sediment control measures once construction begins. The Permittees' Municipal Inspectors must be trained and qualified pursuant to the State Water Board sponsored Qualified Storm Water Pollution Prevention Plan (SWPPP) Practitioner (QSP) certification program. Inspections must be prioritized based on project threat to water quality. It is important that the following factors are considered in determining a project's threat to water quality: soil erosion potential, site slope, project size and type, sensitivity of receiving waterbodies, proximity to receiving waterbodies, non-stormwater discharges, and a past record of non-compliance by the operators of the construction site.

While the construction site storm water runoff management program focuses the Permittee's detailed inspections on projects less than one acre, Permittees must use their discretion to provide oversight to projects that are subject to the CGP that pose a threat to water quality. For example, in the case that a Permittee identifies a project subject to the CGP that has BMPs that have not been maintained, the Permittee should notify the local Regional Water Board. Priority project sites include: sites with 5 acres or more of soil disturbance, sites with one acre or more soil disturbance that discharge to a tributary listed as impaired water for sediment or turbidity under the CWA Section 303(d), and other sites with one acre or more of soil disturbance determined by the Permittee or State or Regional Water Quality Control Board to be a significant threat to water quality.

Pollution Prevention/Good Housekeeping for Permittee Operations
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(6)

Permittees are required to develop a program to:

a. Prevent or reduce the amount of storm water pollution generated by permittee operations.

b. Train employees on how to incorporate pollution prevention/good housekeeping techniques into permittee operations.

c. Identify appropriate control measures and measurable goals for preventing or reducing the amount of storm water pollution generated by permittee operations.

Permittees must first assess the areas and municipal facilities that it controls, determine which activities may currently have a negative impact on water quality, and find solutions for any problems. The simplest solution is to limit the number of activities that are conducted outside and exposed to storm water.

Storm Drain System Maintenance
Storm drain systems need maintenance to ensure that structures within the storm drain system that are meant to reduce pollutants do not become sources of pollution. Maintenance of catch basins and storm sewers will prevent the accumulation of pollutants that are later released during rain events as well as blockages, backups, and flooding. Most Permittees have an existing program to maintain the storm sewer infrastructure. Some of these programs have tended to focus on flood control and complaint response rather than reducing water quality impacts from storm water discharges.

This Order requires that the system be maintained to prevent the discharge of pollutants into receiving waters. To achieve this, the storm sewer system must be mapped and a program of regular maintenance established. The Permittee must establish a tiered maintenance schedule for the entire storm sewer system area, with the highest priority areas being maintained at the greatest frequency. Priorities are driven by water quality concerns and can be based on the land use within the watershed, the condition of the receiving water, the amount and type of material that typically accumulates in an area,

or other location-specific factors. The Permittee also must use spill and illicit discharge data to track areas that may require immediate sewer infrastructure maintenance. Any waste that is collected must be disposed of in a responsible manner.

All storm sewer system maintenance procedures should be documented in the Permittee's standard operating procedures (SOPs) or similar type of documents. All staff should be trained on these SOPs. Maintenance activities should be documented and, where possible, quantified (e.g., number and location of inspections and clean-outs, type and quantity of materials removed). Characterization of the quantity, location, and composition of pollutants removed from catch basins can be used to assess the program's overall effectiveness, identify illicit discharges, and help the Permittee better prioritize implementation activities in the future.

Pollutant Generating Activities
This Order contains specific requirements and recommendations related to pollutant-generating activities such as discouraging conventional landscaping practices (including the application of pesticides, herbicides, and fertilizer) and operating and maintaining public streets.

Resource-sensitive landscaping practices such as integrated pest management (IPM), climate appropriate plant selection and irrigation, and mechanical (non-chemical) removal of unwanted plants are required under this Order. The use of other landscaping practices, such as mulch and compost, minimizing chemical inputs (pesticides, herbicides, and fertilizer), emphasis on maintaining and enhancing soil quality, and erosion control is required. The Order recognizes the storm water quality benefits that will likely result from implementation of the Water Efficient Landscape Ordinance required under AB 1881.

Flood Management Projects
The Order requires that water quality be considered when designing new and upgraded flood management projects. The focus of storm water management in the past has been to control flooding and mitigate property damage, with less emphasis on water quality protection. These structures may handle a significant amount of storm water and therefore offer an opportunity to modify their design to include water quality features for less than the cost of building new controls. This requirement applies to new and upgraded flood control projects.

Municipally-owned or operated facilities
Municipally-owned or operated facilities often serve as the focal point of activity for municipal staff from different departments. Some municipalities have one facility at which all activities take place (e.g., the municipal maintenance yard), while others may have several specialized facilities. A comprehensive inventory and map of facilities will help Permittee staff build a better awareness of facility locations within the MS4 and their potential to contribute storm water pollutants. The facility inventory will also serve as a basis for scheduling periodic facility assessments and developing, where necessary, facility storm water pollution prevention plans.

The best way to avoid pollutant discharges is to keep precipitation and runoff from coming into contact with potential pollutants. For example, the Permittee should cover or build berms around stockpiles, create dedicated structures for stored materials, and

maintain a minimum distance between stockpiles and storm water infrastructure and receiving waters.

Inspections
This Order requires comprehensive quarterly site inspections which is an appropriate frequency to ensure that material stockpiles that might be moved or utilized on a seasonal basis are protected from precipitation and runoff. Also, quarterly inspections will allow inspectors to observe different types of operations that occur at different times of the year (e.g., landscape maintenance crews are less active in the winter). Quarterly visual observations are required so that inspectors can see in real time the qualitative nature of the storm water discharge so that corrective action can be taken where necessary to improve on-site storm water controls.

This Order also specifies documentation requirements of inspection procedures and results, including inspection logs for each facility to ensure that the site inspections are consistent and that maintenance of storm water controls remains part of the municipality's standard operating procedures. The requirement for an inspection log will allow the Regional Water Boards to verify that periodic site inspections have been performed.

Storm Sewer System Maintenance
Fine particles and pollutants from run-off, run-on, atmospheric deposition, vehicle emissions, breakup of street surface materials, littering, and sanding (for improving traction in snow and ice) can accumulate in the gutters between rainfall events. Storm drain maintenance is often the last opportunity to remove pollutants before they enter the environment. Because storm drain systems effectively trap solids, they need to be cleaned periodically to prevent those materials from being picked up during high flow storm events.

Some catch basins will accumulate pollutants faster than others due to the nature of the drainage area and whether controls are present upstream of the catch basin. A priority ranking system is required for catch basins so that municipal resources are directed to the areas and structures that generate the most pollutants. Catch basins with the highest accumulations will need to be cleaned more frequently than those with low accumulations. The Order also includes a requirement that triggers catch basin cleaning when a catch basin is one-third full.

Note:This requirement was eliminated from the Final Order as adopted on February 5, 2013.

Proper storm drain system cleanout includes vacuuming or manually removing debris from catch basins; vacuuming or flushing pipes to increase capacity and remove clogs; removing sediment, debris, and overgrown vegetation from open channels; and repairing structures to ensure the integrity of the drainage system. It is important to conduct regular inspections of all storm sewer infrastructure and perform maintenance as necessary. Though these activities are intended to ensure that the storm drain system is properly maintained and that any accumulated pollutants are removed prior to discharge, if not properly executed, cleanout activities can result in pollutant discharges. The Permittee should carefully evaluate maintenance practices to minimize unintended pollutant discharges, such as flushing storm drains without capturing the discharge.

Materials removed from catch basins must not be allowed to reenter the MS4. If necessary, the material can be dewatered in a contained area and the water treated with

an appropriate and approved control measure or discharged to the sanitary sewer. The solid material must be disposed of properly to avoid discharge during a storm event. Some materials removed from storm drains and open channels may require special handling and disposal, and may not be suitable for disposal in a landfill.

Note: This requirement was eliminated from the Final Order as adopted on February 5, 2013.

Green waste on the streets
For some Traditional MS4 Permittees, residents are allowed to deposit non-containerized green waste (lawn and garden clippings) onto the street for weekly collection by the municipal staff. Permittees instruct residents to put the green waste out right before collection and to avoid putting it in gutters or near storm drains. However, green waste on the street is a potential illicit discharge and maintenance concern.[26] This Order prohibits green waste on the streets. Permittees must find additional ways to educate residents on the potential problems this practice can cause or to find alternatives to the current practice.

Street Sweeping and Cleaning Streets
Street sweeping and cleaning streets and parking lots is a practice that most municipalities initially conducted for aesthetic purposes or air quality benefit. However, the water quality benefits are now widely recognized. As a result, many California MS4 permits require some sort of street sweeping provision that require the MS4 to prioritize streets as high, medium, and low pollutant-generators and base the cleaning schedule appropriately.

This Order does not include street sweeping and cleaning streets as a permit requirement because MS4s already conduct these activities for aesthetics and air quality benefit. Permittees should count street sweeping not as a storm water compliance cost, but an aesthetic and air quality cost.

Third-party contractors
Third-party contractors conducting municipal maintenance activities must be held to the same standards as the Permittee. These expectations are required to be defined in contracts between the Permittee and its contractors; however, the Permittee is responsible for ensuring, through contractually-required documentation or periodic site visits, that contractors are using storm water controls and following standard operating procedures.

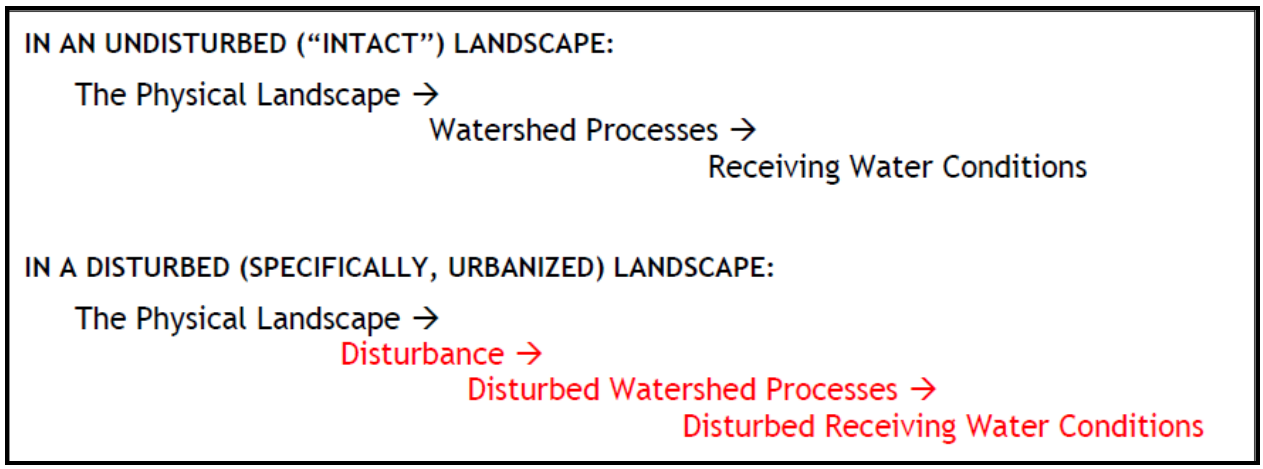
Post Construction Storm Water Management for New Development and Re-development
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(5).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; U.S. EPA Incorporating Environmentally Sensitive Development into Municipal Stormwater Programs, EPA 833-F-07-011

In California, urban storm water is listed as the primary source of impairment for ten percent of all rivers, ten percent of all lakes and reservoirs, and 17 percent of all estuaries (2010 Integrated Report). Although these numbers may seem low, urban areas cover just six percent of the land mass of California[27], and so their influence is

[26] Program Evaluation Report, Sacramento Area Stormwater Program, NPDES Permit No. CA0082597, May 21, 2002, USEPA and Tetra Tech Inc.
[27] U.S. Department of Agriculture, 2009

disproportionately large. Urbanization causes a number of changes in the landscape, including increased loads of chemical pollutants; increased toxicity; changes to flow magnitude, frequency, and seasonality of various discharges; physical changes to stream, lake, or wetland habitats; changes in the energy dynamics of food webs, sunlight, and temperature; and biotic interactions between native and exotic species.[28] These impacts are also referred to as "urban stream syndrome [29]. In addition to surface water impacts, urbanization can alter the amount and quality of storm water that infiltrates and recharges groundwater aquifers. In essence, once watershed processes are disturbed, receiving water conditions also become disturbed, (Figure 1)
In California and the rest of the United States, the challenge to storm water managers and regulators has been to establish goals and performance standards that account for the highly variable nature of urban flow and pollutant inputs while ensuring that the ultimate biological response is within "acceptable" limits. The Surface Water Ambient Monitoring Program (SWAMP) is attempting to define biological responses through their Biological Objectives Development Process. Although final results and policy recommendations from this effort are not yet available, linking urbanization drivers to biological response represents the next phase in storm water management and cannot be delayed.[30]

Figure 1 – Relationship between Physical Landscape, Watershed Processes, and Receiving Water Condition



The Water Boards have historically derived site design, runoff reduction and hydromodification control criteria without identifying the dominant watershed processes and the sensitivity of receiving waterbodies to degradation of those processes. In most MS4 permits, projects are subject to the same set of criteria regardless of the dominant watershed processes and the sensitivity of receiving waters to degradation of those processes. In reality, every location on the landscape does not require the same set of control criteria because of intrinsic differences in the dominant watershed processes at each location and sensitivity of receiving waters to degradation of those processes. In recognizing this, the State Water Board is developing criteria that are more protective of receiving water quality.

[28] Urban Storm Water Management in the United States, National Research Council, 2008.
[29] Walsh, C.J., A.H.Roy, J.W. Feminella, P.D. Cottingham, P.M. Groffman, and R.P. Morgan. 2005. The urban stream syndrome: current knowledge and the search for a cure. J. N. Am. Benthol. Soc. 24(3):706–723.
[30] Urban Storm Water Management in the United States, National Research Council, 2008.

The existing General Permit requires post-construction controls for areas of high growth or areas with a population greater than 50,000. These requirements are contained in Attachment 4 of Order 2003-0005-DWQ and include matching pre-development peak discharge rates, conserving natural areas, minimizing storm water pollutants of concern, protecting slopes and channels, and designing volumetric and flow through treatment measures to handle a specific volume or flow rate. These requirements represented an initial attempt at establishing performance standards that account for hydrological and geomorphological processes (Figure 1). Recent research has yielded new information on complex watershed process interactions. For example, storm water management techniques that are intended to mimic natural hydrologic functions (e.g., low impact development) can protect key hydrologic processes such as surface and base flow, and groundwater recharge. Additionally, there is increasing awareness that, while site-based requirements are important to reduce impacts from urbanization, a site-based approach alone is unable to achieve a broader set of watershed goals, especially given the State Water Board's interest in regional issues such as water reuse, groundwater management, and maintaining instream flows. Consequently, a better understanding of watershed conditions and processes has become increasingly important in the development of MS4 permits.

This Order has specific site design and LID requirements for all projects. The LID requirements emphasize landscape-based site design features that are already required elsewhere (e.g., the Water Efficient Landscape Ordinance required under AB 1881).

Hydromodification Requirements

This Order also incorporates a baseline peak flow matching requirement for hydromodification control. During this permit term, the State Board will work towards developing runoff retention and hydromodification control criteria that are keyed to watershed processes (See discussion in Section VIII.) Watershed management zones[31] will be delineated by the State Board during this permit term. The watershed management zones will be used to identify applicable areas and to determine appropriate criteria for runoff retention and hydromodification control. Watershed process based runoff retention and hydromodification criteria will be incorporated into the next permit. Through the development of hydromodification measures based on watershed management zones, key watershed processes will be protected, and where degraded, restored. As a result of restored and maintained watersheds, key relationships between hydrology, channel geomorphology and biological health will be created and maintained and water quality/beneficial uses protected.

The State Water Board's efforts in developing runoff retention and hydromodification control criteria keyed to watershed processes can be significantly informed by similar efforts carried out regionally under the Regional Water Boards. This Order provides at Provision E.12.k (also referenced in F.5.g.) that Small MS4s shall comply with any post-construction storm water management requirements based on a watershed process approach developed by Regional Water Boards in lieu of the post-construction requirements of E.12 (also referenced in F.5.g.). The regional watershed process-based approach must be approved by the Regional Water Board following a public process and must include the following:

[31] A Watershed Management Zone (WMZ) is a combination of a Physical Landscape Zone (PLZ, based on surficial geology and slope) and direct receiving water type. Key watershed processes potentially impacted by urbanization (e.g., infiltration and groundwater recharge) are derived from each PLZ-receiving water combination.

- Completion of a comprehensive assessment of dominant watershed processes affected by urban storm water
- LID site design and runoff reduction measures, numeric runoff treatment and retention controls, and hydromodification controls that will maintain watershed processes and protect water quality and beneficial uses.
- A process by which Regional Board staff will actively engage Permittees to adaptively manage requirements as determined by the assessment of watershed processes.
- An annual reporting program that involves Regional Board staff and State Board staff to inform statewide watershed process based criteria.

A watershed process-based approach is already being used for Phase II MS4s that participated in the Central Coast Joint Effort for developing hydromodification control criteria. By Resolution No. R3-2012-0025 dated September 6, 2012, the Central Coast Water Board approved modifications to the SWMPs of MS4s participating in the Joint Effort. These modifications would incorporate the Central Coast-Specific Post-Construction Requirements into the SWMPs. Several petitions are currently pending before the State Water Board challenging the Resolution. In the November 16, 2012, draft of this Order, the requirements developed in the Joint Effort were proposed to be adopted into the Order as Attachment J. After receiving extensive public comment on Attachment J, the State Water Board determined that, while the Board continues to support a watershed process-based approach to hydromodification requirements, the Joint Effort process should be allowed to evolve and proceed, without incorporation into this Order, to address several unresolved issues acknowledged by the parties to that process, including the Regional Water Board. Under Provisions E.12.k (also referenced in F.5.g), the Central Coast Region Small MS4s will be required to implement watershed process-based requirements developed through the Joint Effort only after those requirements have been reconsidered and approved by the Central Coast Water Board. Because the requirements cannot be imposed through existing Resolution No. R3-2012-0025 (which operated as an update to SWMPs that are no longer required under this Order), the State Water Board expects the pending petitions on that Resolution to be moot as of adoption of this Order. As part of the petition process, the State Water Board will evaluate whether the entirety of the petitions are moot following adoption of the Order. However, any future action by a Regional Water Board, including the Central Coast Water Board, to adopt a regional watershed process-based approach would be subject to petitions for review by the State Water Board.

Multiple-benefits Projects

This Order encourages and allows for multiple-benefits projects at various scales. At the development site scale, multiple-benefit site design measures are required for all projects that create and/or replace more than 2,500 square feet of impervious surface. Designers are able to quantify runoff reduction using a site design runoff calculator in SMARTS for site design measures (e.g., trees, stream setbacks and buffers, and soil quality improvement). The site design measures in this Order all have multiple benefits (e.g., shading from trees, wildlife habitat from stream setbacks and buffers, less need for pesticides and irrigation from soil quality improvement) in addition to storm water runoff and pollutant load reduction. At the site and local scale, smart growth projects that utilize density, design and land use strategically to achieve multiple benefits including environmental, economic and social benefits are encouraged. For example, high density development contributes to less impervious surface than low density

development, generally resulting in less vehicle-related emissions and pollutants (e.g., heavy metals, oil and grease, fine sediment), improved water and air quality results, thus, achieving environmental benefits. The clustering of populations through high density development essentially substitutes evaluation of individual site design criteria for evaluation of per capita loading (Jacob and Lopez 2009[32]). As such, Permittees may implement an alternative approach to requirements for bioretention measures if they can effectively demonstrate a reduction in runoff volume per capita. In other words, alternative compliance may be achieved through the implementation of high density development, or smart growth projects.

Section E.12.l gives "credit" and creates incentive for Permittees to identify and implement watershed scale projects that achieve multiple-benefits. When evaluating watershed-scale, multiple-benefits projects, environmental, social, technical, economic, and political considerations can become intertwined to the point of intractability. These criteria need to be systematically examined through an organizing framework for rational analysis and alternative comparison. A Multi-Criterion Decision Analysis (MCDA) approach provides a flexible, rational, and transparent means to establish decision-making criteria and prioritize alternatives, assuring that projects achieve the desired multiple-benefit outcomes. Watershed scale multiple-benefit projects include projects that address water quality, water supply, flood control, habitat enhancement, open space preservation, recreation, and climate change. Once these projects are identified under Watershed Improvement Plans (Water Code §16100 et seq.), through an IRWMP process, or as part of an overall green infrastructure effort, the Permittee may impose requirements and create incentives on the site, local, and watershed scale to ensure project success.

Post-Construction BMP Condition Assessment

Permittees must understand how their actions reduce the discharge of pollutants to receiving waters. This is accomplished through an assessment of the performance of the Permittees BMPs, especially structural practices designed for specific pollutant/flow reductions. Only Renewal Permittees were required to install structural post-construction BMPs in the existing permit term. However, during MS4 audits by State and Regional Water Board staff, many of those BMP locations were unknown and not maintained causing water quality threats. In this Order, only Renewal Permittees are asked to implement a plan that contains simple and repeatable field observation and data management tools that can assist them in determining the relative condition of BMPs. The primary purpose is to inform Permittees of: 1) where the BMPs are located, 2) the relative urgency of water quality maintenance and, 3) provide a practical, consistent and reliable tool to track the condition of BMPs relative to observed condition at time of installation or immediately following complete maintenance. Permittees may implement this plan themselves or may be determined through a Self-Certification Annual Report submitted annually by an authorized party demonstrating proper maintenance and operations. Allowing an authorized party to conduct the BMP condition assessment offsets program costs and shifts responsibility to the party that should be maintaining the BMP they initially installed.

[32] Jacob, John S. and Lopez, Ricardo. Is Denser Greener? An Evaluation of Higher Density Development as an Urban Stormwater-Quality Best Management Practice. Jourcal of the American Water Resources Association.June 2009: 45:3: 687 – 701.

Applicability
Renewal Permittees currently listed in Attachment 4 to WQO 2003-0005-DWQ (Attachment 4) must continue to implement Attachment 4 Post-Construction Requirements up until the date when Section E.12 requirements of this Order are effective (the second year of the effective date of the Permit). All Permittees that are not subject to Attachment 4 must implement the CGP Post-Construction Requirements up until the second year of the effective date of the Permit. In the second year of the effective date of the permit, all Permittees, New and Renewal, must implement Section E.12. Post-Construction Requirements contained within this Order.

Lastly, extensive monitoring studies conducted by the California Department of Public Health (CDPH) have documented that mosquitoes opportunistically breed in structural storm water Best Management Practices (BMPs), particularly those that hold standing water for over 96 hours. Certain Low Impact Development (LID) site design measures that hold standing water such as rainwater capture systems may similarly produce mosquitoes. These structures create a potential public health concern and increase the burden on local vector control agencies that are mandated to inspect for and abate mosquitoes and other vectors within their jurisdictional boundaries. These unintended consequences can be lessened when structures incorporate design, construction, and maintenance principles developed specifically to minimize standing water available to mosquitoes1 while having negligible effects on the capacity of the structures to provide water quality improvements as intended. The California Health and Safety Code prohibits landowners from knowingly providing habitat for or allowing the production of mosquitoes and other vectors, and gives local vector control agencies broad inspection and abatement powers. This Order requires regulated MS4s to comply with applicable provisions of the Health and Safety Code and to cooperate and coordinate with CDPH and local mosquito and vector control agencies on vector-related issues.

Water Quality Monitoring Requirements
Legal Authority: Clean Water Act §§308(a), 402(p)(3)(b); 40 C.F.R. §§122.44(i), 122.48(b); MS4Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report[33]; Ecological Condition Assessments of California's Perennial Wadeable Streams: Highlights from the Surface Water Ambient Monitoring Program's Perennial Streams Assessment (PSA) (2000-2007)[34]; National Research Council Report on Urban Storm Water in the United States, 2008[35]

The existing General Permit included requirements meant to eliminate or reduce the discharge of pollutants to receiving waters. Improved knowledge of the water quality impacts and management practices, obtained either as part of the permit requirements or from outside sources (e.g., scientific literature, studies, and expert panels), is

[33] 2010 Integrated Report can be found at:
http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml
[34] Ode, P.R.1, T.M. Kincaid2, T. Fleming3 and A.C. Rehn 9. 2011. Ecological Condition Assessments of California's Perennial Wadeable Streams: Highlights from the Surface Water Ambient Monitoring Program's Perennial Streams Assessment (PSA) (2000-2007). A collaboration between the State Water Resources Control Board's Non-Point Source Pollution Control Program (NPS Program), Surface Water Ambient Monitoring Program (SWAMP), California Department of Fish and Game Aquatic Bioassessment
Laboratory, and the U.S. Environmental Protection Agency.
[35] Urban Storm Water in the United States, National Research Council, 2008 can be found at:
http://www.epa.gov/npdes/pubs/nrc_stormwaterreport.pdf

intended to be used in an adaptive management fashion to inform requirements in subsequent permits. As such, monitoring and assessment represents a critical component in understanding the link between permit requirements, the benefits achieved due to those requirements, and the condition of receiving waters. Aside from general knowledge that storm water discharges from urbanized watersheds contribute pollutants to receiving waters, little is known about the specific conditions in such receiving waters outside of major metropolitan areas. The effectiveness of almost a decade of storm water management in Phase I MS4s has not been systematically evaluated through receiving water monitoring.

Nationwide, there are few of analyses of available data and guidance on how Permittees should be using the data to inform their storm water management decisions.

This Order prioritizes monitoring for ASBS, TMDLs, and 303d listed waterbodies. Permittees that have a population of 50,000 or greater and are part of an urbanized area are required to choose from a number of monitoring options. These larger Permittees are assumed to have the resources to undertake monitoring. For the majority of Phase II Permittees, this permit term will be the first time a monitoring program has been implemented. As such, prioritization of monitoring allows for a firm foundation from which Phase II Permittees may initiate and develop monitoring programs that will result in improvement of local knowledge of water quality impacts and implementation of storm water management practices. Any of the monitoring requirements may be conducted through participation in a regional monitoring group. Regional monitoring not only allows Permittees to share costs but also facilitates monitoring data and information sharing across local regions. In effect, regional programs provide a broad-scale picture of water quality condition within a watershed.

Program Effectiveness Assessment
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R.C.F.R. § 122.34(g) 40 CFR 122.34(g)(3), CASQA Effectiveness Assessment Guide [36]; Evaluating the Effectiveness of Municipal Stormwater Programs, U.S. EPA, EPA 833-F-07-010, MS4Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

A key requirement in the storm water Phase II rule is a report that includes "the status of compliance with permit conditions, an assessment of the appropriateness of identified [control measures] and progress towards achieving identified measurable goals for each of the minimum control measures." This assessment is critical to the storm water program framework which uses the iterative approach of implementing controls, conducting assessments, and designating refocused controls leading toward attainment of water quality standards. As a result, this Order requires a quantative evaluation of the Permittees MS4 programs. Measurable program evaluations are critical to the development, implementation, and adaptation of effective local storm water management programs.

To date, only a small number of Phase I MS4s have provided measurable outcomes with regard to aggregate pollutant reduction achieved by their municipal storm water programs. Most Permittees, both Phase I and II, are struggling simply to organize or document their program activities and few have provided a quantitative link between

[36] https://www.casqa.org/casqastore/products/tabid/154/p-7-effectiveness-assessment-guide.aspx

program activities and water quality improvements. The few that have determined whether or not water quality is improving as a result of storm water program implementation took many years. Despite these past obstacles, the process of evaluating and understanding the relationship between the storm water program implementation and water quality needs to begin now.

Building on the monitoring and assessment program, the Permittee must conduct an annual effectiveness assessment to assess the effectiveness of prioritized BMPs, program elements and the storm water program as a whole. Prioritized BMPs include BMPs implemented based on pollutants of concern. Where pollutants of concern are unidentified, prioritized BMPs are based on common urban pollutants (i.e., sediment, bacteria, trash, nutrients). The California Stormwater Quality Association's (CASQA) Municipal Stormwater Program Effectiveness Guidance describes strategies and methods for assessing effectiveness, including examples of effectiveness assessment for each program component. The CASQA Effectiveness Guidance is available at www.casqa.org for purchase. A two-hour EPA webcast focusing on the CASQA Guide is also available (available at www.epa.gov/npdes/training under "Assessing the Effectiveness of Your Municipal Stormwater Program"). A resources document from the webcast includes a 10 page summary of the Guide and example pages from the municipal chapter: (www.epa.gov/npdes/outreach_files/webcast/jun0408/110961/municipal_resources.pdf)

The Municipal Stormwater Program Effectiveness Assessment Guidance synthesizes information on designing and conducting program effectiveness assessments. The document also explains how to select certain methods based on programmatic outcomes and goals. The reader is led through a series of questions and case studies to demonstrate how proper assessments are selected. Techniques are related to different level of outcomes: level one – documenting activities, level two – raising awareness, level 3 – changing behavior, level 4 – reducing loads from sources, level 5 – improving runoff quality, and level 6 – protecting receiving water quality. The Guide includes fact sheets for all six NPDES program elements, outlining methods and techniques for assessing effectiveness of each program.

Annual Reporting

In general, an annual report must document and summarize implementation of the storm water program during the previous year, evaluate program results and describe planned changes towards continuous improvement. The annual report also can serve as a "state of the storm water program" report for the general public or other stakeholders in the community serving as an excellent summary document to provide about the status of storm water program.

However, lessons learned from Phase I MS4 annual reports demonstrate that many Permittees tend to submit too much information, and, as a result, Regional Water Boards receive large binders full of materials that do not provide useful information to assess compliance. As a result, this Order requires Permittees to annually submit a summary of the past year activities. For example, the Permittees should not only address "bean counting" of required task, but address such questions as:

- For illicit discharge data, what are the most prevalent sources and pollutants in the illicit discharge data, and where are these illicit discharges occurring?
- How many illicit discharges have been identified, and how many of those have been resolved?
- How many outfalls or screening points were visually screened, how many had dry weather discharges or flows, at how many were field analyses completed and for what parameters, and at how many were samples collected and analyzed?
- Does the MS4 need to conduct more inspections in these areas, or develop more specific outreach targeting these sources and pollutants?

In addition, Permittees use SMARTS to certify Annual Reports which verifies compliance with all requirements of this Order.

Nexus Between Annual Reporting and Program Effectiveness Assessment
In addition to submitting program element summaries, Permittee must analyze their yearly activities and link it to their Program Effectiveness Assessment and Improvement Plan which tracks and documents their annual and long-term effectiveness of the storm water program. For example:

- Planned Activities and Changes. The annual report should describe activities planned for the next year highlighting any changes made to improve control measures or program effectiveness.

Detailed Annual Report
Most major areas of this Order require Permittees to submit, via SMARTS, a summary annual report for the past year's activities. For certain program elements such as Water Quality Monitoring, Program Effectiveness Assessment, and TMDLs, more detailed annual report information is required to be tracked and submitted via SMARTS.

Additionally, at any time during the permit term, the Executive Officer of the applicable Regional Water Board can request a more detailed annual report. This information may be required to determine compliance or prior to targeted or comprehensive storm water program audit. The table below shows detailed annual reporting information an Executive Officer of the applicable Regional Water Board may require:

Permit Provision	**Detailed Annual Reporting Information**
E.6.c.	By the third year Annual Report and annually thereafter, report on the Enforcement Response Plan summarizing all enforcement activities including inspections of chronic violators and the incentives, disincentives, or escalated enforcement responses at each site. Summarizations of enforcement activities shall include, at a minimum, the following information for each type of site or facility: (a) Number of violations, including a listing of sites or facilities with identified violations (b) Number of enforcement actions, including types

	(c) Other follow-up actions taken (d) Demonstration that compliance has been achieved for all violations, or a description of actions that are being taken to achieve compliance
E.7.a.	By the third year Annual Report, and annually thereafter, submit a report on the implementation and progress of the public education strategy and general program development and progress. Report on the development of education materials, methods for educational material distribution, public input, landscaping outreach, reporting of illicit discharges, proper application of pesticides, herbicides, and fertilizers, elementary school education, reduction of discharges from organized car washes, mobile cleaning and pressure washing operations, and landscape irrigation efforts. By the fifth year Annual Report, submit a report summarizing changes in public awareness and knowledge resulting from the implementation of the program and any modifications to the public outreach and education program.
E.7.b.1.	By the third year Annual Report, document and maintain records of the training provided and the staff trained annually. The annual report shall include the number and percentage of Permittee's applicable staff that were trained and summarize the knowledge assessment as specified in E.7.b.1.(ii)(d).
E.7.b.2. **Permittee Staff**	By the second year of the permit and annually thereafter, submit the following information: a. Training topics covered b. Dates of training c. Number and percentage of Permittees' staff, as identified in Sections E.7.b.2. possessing the specified credentials.
E.7.b.2. Construction Site Operator Education	By the third year Annual Report and annually thereafter, submit a report including the following information: (a) Training topics covered; (b) Dates of training; (c) Number and percentage of Permittee's operators and number of contractors attending each training; (d) Results of any surveys conducted to demonstrate the awareness and potential behavioral changes in the attendees.
E.7.b.3.	By the second year Annual Report and annually thereafter, submit a summary that includes oversight procedures and identifies and tracks all personnel requiring training and assessment and records. The annual report shall include the number and percentage of Permittee's applicable staff that were trained during the year

	and summarize the knowledge assessment as specified in E.7.b.3(ii)(b).
E.8.	By the second year Annual Report and annually thereafter, submit a description of the public involvement program and summary of the MS4s efforts related to facilitating public involvement, including efforts to engage citizen advisory groups, increase citizen participation, and involvement with the IRWMP or other watershed-level planning effort.
E.9.a.	Submit a map by the second year Annual Report, and annually thereafter submit either (a) a current updated outfall map, or (b) verification that no changes or additions were made to the Permittee's MS4.
E.9.b.	By the second year online Annual Report, submit inventory and annually thereafter an updated inventory. By the second year online Annual Report, identify the illicit discharge procedures implemented and the locations of the implementation. Also identify in each online Annual Report the remaining inventoried facilities and priority areas still requiring illicit discharge assessment over the permit term.
E.9.c.	By the second year Annual Report, submit a report summarizing the field investigation results and areas of follow up actions.including the following information: (a) The number of outfalls found to be flowing or ponding more than 72 hours after the last rain event; (b) The number of such outfalls sampled in accordance with permit conditions; (c) Sampling result in tabular form; and (d) The number of outfalls found to be in exceedance of action levels
E.9.d.	By the second year Annual Report, submit all source investigations and corrective actions. At a minimum the report shall include: (a) Brief description of each non-stormwater discharge reported or observed; (b) Date(s) the non-storm water discharge was reported or observed; (c) Brief description of any actual or potential water quality impact resulting from the discharge; (d) Description and results of steps taken to investigate the source of the discharge; (e) Description and results of all follow-up or enforcement actions taken as a result of the investigation; (f) Date the investigation was closed, and whether the discharge was eliminated.

E.9.e.	Within the first year of the effective date of the permit, submit a spill response plan that contains the items specified in Section E.9.e. In subsequent Annual Reports summarize any spill response activities, and any follow-up actions, as specified in the spill response plan.
E.10.a.	Submit an up to date construction site inventory enumerating items listed in this Section with each Annual Report.
E.10.b.	By the first year Annual Report, submit a summary of review procedures. The summary should clearly indicate how the procedures will achieve compliance with all requirements of this Section, and clearly delineate responsibilities for implementing, and ensuring implementation of each aspect of the procedures.
E.10.c.	By the second year Annual Report and annually thereafter, submit the following information: (a) Total number of active sites disturbing less than one acre of soil requiring inspection; (b) Number and percentage of each type of enforcement action taken as listed in each Permittee's Enforcement Response Plan; (c) Number of sites with discharges of sediment or other construction related materials, both actual and those inferred through evidence.; (d) Number and percentage of violations fully corrected prior to the next rain event but no longer than 10 business days after the violations are discovered or otherwise considered corrected in a Permittee-defined timely period. (e) Number and percentage of violations not fully corrected 30 days after the violations are discovered. (f) Number of follow-up inspections that demonstrated the operator continued to implement BMPs according to plan and the number of follow-up inspections that required further enforcement.
E.11.a.	By the second year Annual Report submit the inventory and submit annual updates thereafter.
E.11.b.	By the second year Annual Report, submit the completed map and update annually thereafter if any of the information indicated on the map has changed.
E.11.c.	By the third year Annual Report, submit the results of the Permittee's annual assessment, including the list of identified hotspots and any identified deficiencies and corrective actions taken. The Permittee shall identify designated hotspots on the facility inventory updated and submitted in each subsequent year annual report.

E.11.d.	By the fourth year Annual Report, submit a summary of SWPPPs developed for pollutant hotspots. In subsequent Annual Reports, submit a summary of SWPPPs updated.
E.11.e.	By the fifth year Annual Report and annually thereafter, submit the following information: (a) Total number of facilities required to be inspected. (b) Verification that all inspections were conducted at all facilities in accordance with the requirements of this Section (c) Summary of spills and corrective actions (d) Summary of the results of inspections, including a summary of deficiencies noted and corrective actions taken (e) Results of the quarterly visual observations of storm water discharges (f) Total number of facilities inspected (visual and comprehensive inspections) and frequency of inspections (g) All inspection records, reports, and logs (h) Records of corrective actions taken and the results of corrective actions
E.11.f.	By the second year Annual Report, submit the assessment procedures and maintenance prioritization list, including a description of the method used to identify high priority storm drain system features and catch basins and number of catch basins identified as high priority. If flood conveyance maintenance is undertaken by another entity, submit a summary report of coordination by the first year Annual Report.
E.11.g.	By the third year Annual Report, submit a summary of the following information: (a) Storm sewer maintenance schedule (b) List of storm sewer systems and the maintenance priority assigned (c) Documentation of all required storm sewer systems maintenance logs (d) Documentation of waste material disposal procedure By the third Annual Report and annually thereafter, the Permittee shall submit verification that all storm drain facilities were maintained according to the priorities, procedures, and schedules developed according to this Section. The report shall include a summary of the results of inspections, deficiencies found, corrective actions taken, and the results of corrective actions.
E.11.h.	By the third year Annual Report, submit the following:

	(a) List of BMPs and associated pollutants with each O&M activity (b) BMPs applied during Permittee O&M activities (c) Log of quarterly BMP evaluations. By the third Annual Report and annually thereafter, the Permittee shall submit verification that identified BMPs were effectively implemented for all O&M activities.
E.11.i.	By the third year Annual Report, submit a summary of the development and implementation process to incorporate water quality and habitat enhancement design into new or upgraded flood management projects. By the fourth year Annual Report and annually thereafter, submit a list of new or upgraded flood management projects, including a summary of water quality and habitat enhancement features incorporated into their design.
E.11.j.	By the second year Annual Report, submit an evaluation of materials used and activities performed for pollution prevention and source control opportunities and a list of practices implemented to minimize the use of herbicide, pesticide, and fertilizers. By the second year Annual Report and annually thereafter, submit verification that identified BMPs were effectively implemented for all landscaping design and maintenance activities. By the second year Annual Report, submit a summary identifying the measures that the Permittee will use to demonstrate reductions in the application of pesticides, herbicides, and fertilizers. In subsequent annual reports, verify implementation of this measure, and describe reductions in pesticide, herbicide, and fertilizer application.
E.12.b	By the second year Annual Report and annually thereafter, the Permittee shall submit the following information: (a) A list of all project creating or replacing 2,500 square feet or more of impervious surface, as described above; and (b) A brief description of site design measures applied to each project.
E.12.c.	For each Regulated Project approved, the following information shall be submitted by the third year Annual Report: (a) Project Name, Number, Location (cross streets), and Street Address; (b) Name of Developer, Phase No. (if project is being constructed in phases, each phase shall have a separate entry), Project Type (e.g., commercial, industrial, multiunit residential, mixed-use, public), and description;

	(c) Project watershed(s); (d) Total project site area and total area of land disturbed; (e) Total new impervious surface area and/or total replaced impervious surface area; (f) For a redevelopment or road widening project: total pre-project impervious surface area and total post-project impervious surface area; (g) Status of project (e.g., application date, application deemed complete date, project approval date); (h) Source control measures; (i) Site design measures; (j) All post-construction storm water treatment systems installed onsite, at a joint storm water treatment facility, and/or at an offsite location; (k) O&M responsibility mechanism for the life of the project. (l) Water quality treatment calculations used; (m) Off-site compliance measures for Regulated Project (if applicable); Additional (watershed-specific) hydromodification standards used.
E.12.h.	By the second year Annual Report and annually thereafter, for each Regulated Project inspected during the reporting period the following information shall be submitted in tabular form: (1) Name of facility/site inspected. (2) Location (street address) of facility/site inspected. (3) Name of responsible operator for installed storm water treatment systems and hydromodification management controls. (4) Inspection details including: date of inspection, type of inspection (e.g., initial, annual, follow-up, spot), type(s) of storm water treatment systems inspected (e.g., swale, bioretention unit, tree well, etc.) and an indication of whether the treatment system is an onsite, joint, or offsite system. (5) Type of hydromodification management controls inspected. (6) Inspection findings or results (e.g., proper installation, proper O&M, system not operating properly because of plugging, bypass of storm water because

	of improper installation, maintenance required immediately, etc.). (7) Enforcement action(s) taken, if any (e.g., verbal warning, notice of violation, administrative citation, administrative order). (8) A discussion of the inspection findings for the year and any common problems encountered with various types of treatment systems and/or hydromodification management controls. This discussion shall include a general comparison to the inspection findings from the previous year. (9) A discussion of the effectiveness of the Permittee's O&M Program and any proposed changes to improve the O&M Program (e.g., changes in prioritization plan or frequency of O&M inspections, other changes to improve effectiveness of O & M program). On an annual basis, before the wet season, provide a list of newly installed (installed within the reporting period) storm water treatment systems and hydromodification management controls to the local mosquito and vector control agency and the appropriate Regional Water Board. This list shall include the facility locations and a description of the storm water treatment measures and hydromodification management controls installed.
E.12.i.	By the third year Annual Report and subsequently thereafter, submit the post-construction best management practice condition assessment plan as required in E.12.i.(ii)a-d.
F.5.b.2.	By the third year Annual Report and annually thereafter, submit the public education strategy and general program development and progress. By the fifth year Annual Report, summarize changes in public awareness and knowledge resulting from the implementation of the program and any modifications to the public education and outreach program. If applicable, submit a report on development of education materials, methods for educational material distribution, public input, Water Efficient Landscape Ordinance, elementary school education, reduction of discharges from mobile cleaning and pressure washing operations, and landscape irrigation efforts.
F.5.b.3.	By the third year Annual Report, submit records of the training provided and the staff trained annually.
F.5.b.4.	By the second year Annual Report and annually thereafter, submit a summary of oversight procedures and identify and track all personnel requiring training and assessment and records.
F.5.c.	By the third year Annual Report and annually thereafter, submit a description of the public involvement program and summary of the MS4s efforts related to facilitating public involvement.

F.5.d.	By second year Annual Report submit the outfall inventory map, and annually thereafter submit either (a) a current updated outfall map, or (b) verification that no changes or additions were made to the Permittee's MS4.
F.5.d.1.	By the second year Annual Report, submit a report summarizing the field investigation results and areas of follow up investigations. The report shall summarize all applicable observations. By the second year of the permit term and annually thereafter, submit all source investigations and corrective actions. At a minimum the report shall include: (a) Date(s) the non-storm water discharge was observed; (b) Results of the investigation; (c) Date the investigation was closed. (d) A summary of all non-storm water discharges that were found.
F.5.e.	By the second year Annual Report, the Permittee submit an updated contract language that includes CGP compliance requirements for all projects subject to the CGP.
F.5.f.1.	By the second year Annual Report submit and annually thereafter an updated inventory.
F.5.f.2.	By the second year Annual Report and annually thereafter, submit the map.
F.5.f.3.	By the third year Annual Report, submit the results of the Permittee's annual assessment, any identified deficiencies and corrective actions taken, list of the pollutant hotspots.
F.5.f.4.	By the fourth year Annual Report and annually thereafter, submit a summary of SWPPPs developed and updated for pollutant hotspots.
F.5.f.5.	By the fifth year Annual Report and annually thereafter, the following information shall be submitted: (a) Total number of facilities required to be inspected. (b) Total number of facilities inspected (visual and comprehensive inspections) and frequency of inspections (c) Summary of spills and corrective actions (d) Results of the quarterly visual observations of storm water discharges
F.5.f.6	By the second year Annual Report, submit the assessment procedures and

	maintenance prioritization list.
F.5.f.7	By the third year Annual Report, submit a summary of the following information: (a) Storm sewer maintenance schedule (b) List of storm sewer systems and the priority assigned (c) Documentation of all required storm sewer systems maintenance logs (d) Documentation of waste material disposal procedure
F.5.f.8.	By the third year Annual Report, submit the following: (a) List of BMPs and associated pollutants with each O&M activity (b) BMPs applied during Permittee O&M activities (c) Log of annual BMP evaluations.
F.5.f.9	By the second year Annual Report, submit an evaluation of materials used and activities performed for pollution prevention and source control opportunities and a list of practices implemented to minimize the use of herbicide, pesticide, and fertilizers. By the second year Annual Report, submit a document identifying the measures that the Permittee will use to demonstrate reductions in the application of pesticides, herbicides, and fertilizers. In subsequent annual reports, use this measure to demonstrate reductions in pesticide, herbicide, and fertilizer application.
F.5.g.	By the second year Annual Report and annually thereafter, the Permittee shall submit the following information: (a) A list of all project creating or replacing 2,500 square feet or more of impervious surface, as described above; and A brief description of site design measures applied to each project. For each project approved, the following information shall be submitted by the second year Annual Report: (a) Project Name, Number, Location (cross streets), and Street Address; (b) Name of Developer, Phase No. (if project is being constructed in phases, each phase shall have a separate entry), Project Type (e.g., commercial, industrial, multiunit residential, mixed-use, public), and description; (c) Project watershed(s);

	(d) Total project site area and total area of land disturbed; (e) Total new impervious surface area and/or total replaced impervious surface area; (f) If a redevelopment or road widening project, total pre-project impervious surface area and total post-project impervious surface area; (g) Status of project (e.g., application date, application deemed complete date, project approval date); (h) Source control measures; (i) Site design measures; (j) All post-construction storm water treatment systems installed onsite, at a joint storm water treatment facility, and/or at an offsite location; (k) O&M responsibility mechanism for the life of the project. (l) Water quality treatment calculations used; (m) Off-site compliance measures (if applicable) (n) Additional (watershed-specific) hydromodification standards used (a) For each project inspected during the reporting period the following information shall be submitted in tabular form as part of each year's Annual Report: (1) Name of facility/site inspected. (2) Location (street address) of facility/site inspected. (3) Name of responsible operator for installed storm water treatment systems and hydromodification management controls. (4) Inspection details including: Date of inspection, type of inspection (e.g., initial, annual, follow-up, spot), type(s) of storm water treatment systems inspected (e.g., swale, bioretention unit, tree well, etc.) and an indication of whether the treatment system is an onsite, joint, or offsite system. (5) Type of hydromodification management controls inspected. (6) Inspection findings or results (e.g., proper installation, proper O&M, system not operating properly because of plugging, bypass of storm water because of improper installation, maintenance required immediately, etc.).

	(7) Enforcement action(s) taken, if any (e.g., verbal warning, notice of violation, administrative citation, administrative order). (8) A discussion of the inspection findings for the year and any common problems encountered with various types of treatment systems and/or hydromodification management controls. This discussion shall include a general comparison to the inspection findings from the previous year. (9) A discussion of the effectiveness of the Permittee's O&M Program and any proposed changes to improve the O&M Program (e.g., changes in prioritization plan or frequency of O&M inspections, other changes to improve effectiveness of program). (b) On an annual basis, before the wet season, provide a list of newly installed (installed within the reporting period) storm water treatment systems and hydromodification management controls to the local mosquito and vector control agency and the appropriate Regional Water Board. This list shall include the facility locations and a description of the storm water treatment measures and hydromodification management controls installed.

Program Management
Without the requirement of a SWMP, this section serves as the framework/backbone for the storm water program. This section is a consolidation of all of the Permittee's relevant ordinances or other regulatory requirements, the description of all programs and procedures (including standard forms to be used for reports and inspections) that will be implemented and enforced to comply with the permit and to document the selection, design, and installation of all storm water control measures.

Legal Authority
Without adequate legal authority the MS4 would be unable to perform many vital program functions such as performing inspections and requiring installation of control measures. In addition, the Permittee would not be able to penalize and/or attain remediation costs from violators.

Certification
Submittal and signature certifies Permittee will comply with this Order.

Enforcement Response Plan (ERP)
This Order requires Permittees to have an established, escalating enforcement policy identified in the ERP that clearly describes the action to be taken for common violations. The plan must describe the procedures to ensure compliance with local ordinances and standards, including the sanctions and enforcement mechanisms that will be used to ensure compliance. (See 40 CFR 122.26(d)(2)(i)). It is critical that the Permittee have the authority to initiate a range of enforcement actions to address the variability and severity of noncompliance.

IDDE and Good Housekeeping
Both these programs pose potential immediate threat to water quality without quick access to information submitted in SMARTS. For example, in order to respond to discharges, an effective IDDE program responds to complaints about illicit discharges or spills such as illegal connections to the storm sewer system, improper disposal of wastes, or dumping of used motor oil or other chemicals. In order to trace the origin of a suspected illicit discharge or connection, the Permittee must have an updated map of the storm drain system and a formal plan of how to locate illicit discharges and how to respond to them once they are located or reported.

Construction Inventory
To effectively conduct inspections, the Permittee must know where construction activity is occurring. A construction site inventory tracks information such as project size, disturbed area, distance to any waterbody or flow channel, when the erosion and sediment control/stormwater plan was approved by the Permittee, and whether the project is covered by the CGP. This inventory will allow the Permittee to track and target its inspections.

Effectiveness Assessment
Without assessing the effectiveness of the stormwater management program the Permittee will not know which parts of the program need to be modified to protect and/or improve water quality and instead will essentially be operating blindly.

XIII. TOTAL MAXIMUM DAILY LOAD (TMDL)

Section 303(d) of the Clean Water Act requires States to identify waters that do not meet water quality standards after applying certain required technology-based effluent limitations (“impaired” waterbodies). States are required to compile this information in a list and submit the list to the U.S. EPA for review and approval. This list is known as the Section 303(d) list of impaired waters, which is incorporated into the Integrated Report.

This listing process requires States to prioritize waters/watersheds for future development of TMDLs. A TMDL is defined as the sum of the individual waste load allocations for point sources of pollution, plus the load allocations for nonpoint sources of pollution, plus the contribution from background sources of pollution. The Water Boards have ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to subsequently develop TMDLs. The 2010 California 303(d) List identifies impaired receiving water bodies and their watersheds within the state.

TMDLs are developed by either the Regional Water Boards or U.S. EPA in response to Section 303(d) listings. Regional Water Board-developed TMDLs are subject to approval by the State Water Board, approval by the Office of Administrative Law, and ultimately approval by U.S. EPA. TMDLs developed by Regional Water Boards are incorporated as Basin Plan amendments and include implementation provisions. TMDLs developed by U.S. EPA typically contain the total load and waste load allocations required by Section 303(d), but do not contain comprehensive implementation provisions.

TMDLs are not self-implementing but rely on other regulatory mechanisms for implementation and enforcement. Urbanized areas typically utilize municipal storm

water permits as the implementation tool. Incorporation of TMDL implementation requirements into general permits (as opposed to individual MS4 permits) is difficult. First, there are numerous Traditional MS4s (municipalities) and Non-traditional MS4s such as military bases, public campuses, prison and hospital complexes covered under this Order. Second, the waste load allocations for many TMDLs are shared among several dischargers; that is, a single waste load allocation may be assigned to multiple dischargers, making it difficult to assign responsibility. Further, individual dischargers may not be explicitly identified. For example, "urban runoff" may be listed as a source of impairment, but the individual municipalities responsible for the impairment may not be identified. Third, the implementation plans adopted by the Regional Water Boards often provide for phased compliance with multiple milestones and deliverables, with optional and alternative means of compliance depending on the results of monitoring and special studies.

This Order requires Permittees to comply with all applicable TMDLs approved pursuant to 40 CFR §130.7 that assign a WLA to the Permittee and that have been identified in Attachment G. However, the high variance in the level of detail and specificity of TMDLs necessitates the development of more specific permit requirements in many cases to provide clarity to the Permittees regarding responsibilities for compliance. The Regional Water Boards have submitted TMDL-specific permit requirements to the State Water Board for applicable TMDLs and all TMDL-specific permit requirements for Traditional MS4s have been incorporated into Attachment G. The Regional Water Boards have also been directed to submit statements explaining how the requirements are designed to achieve the goals of the TMDLs and these have been incorporated into the Fact Sheet where provided (see the following discussions specific to each Regional Water Board).

This Order includes Attachment G, which identifies those approved TMDLs in which storm water or urban runoff is listed as a source. Attachment G then identifies municipalities subject to a given TMDL or assigned a waste load allocation under that TMDL. Finally, Attachment G includes TMDL-specific permit requirements developed by the Regional Water Boards for compliance with the TMDL, making the requirements directly enforceable through the permit.

Because the Permittees have not had an opportunity to meet with Regional Water Board staff to review and discuss the TMDL-specific permit requirements incorporated into this permit, the Regional Water Boards are additionally being directed through this Order to review the TMDL-specific permit requirements of Attachment G in consultation with the Permittees and propose any revisions to the State Water Board within one year of the effective date of this Order. Any such revisions will be incorporated into the permit through a reopener. To the extent they have not already done so, the Regional Water Boards will be expected during that process to prepare a statement for inclusion in the Fact Sheet explaining how the requirements are consistent with the assumptions and requirements of the TMDL WLAs and how they are designed to achieve the goals of the TMDLs.

Further, TMDL-specific permit requirements for TMDLs established in the Los Angeles Regional Water Quality Control Board's region, which apply to Non-Traditional MS4s in the region, have not been included in Attachment G. These TMDL-specific permit requirements will be developed during the one-year review period described above. The State Water Board or the Regional Water Board may designate additional Traditional or Non-traditional MS4s based on applicability of the TMDL requirements.

Permittees will report compliance with the specific TMDL permit requirements in the online Annual Report via SMARTS.

San Francisco Bay Water Board TMDLs

Sonoma Creek Sediment TMDL
The Sonoma Creek Sediment TMDL includes a wasteload allocation of 600 metric tons/year that applies to stormwater runoff discharges from stream crossings and with the operation of public and private roads, paved and unpaved within the watershed not otherwise covered by NPDES permits issued to County and City of Sonoma (Attachment G, Region Specific Requirements). It also includes a load allocation of 2,100 metric tons/year that applies to a roads and streams crossings source category that the City and County of Sonoma share with Caltrans. Caltrans is responsible for runoff from State highways and associated construction activities. Discharges from State highways are regulated via a Statewide Stormwater Permit issued to Caltrans.

The requirements in this Order are based on the TMDL Implementation Plan. To implement the roads and stream crossings allocation, the TMDL Implementation Plan establishes a performance standard for roads to design, construct, and maintain rural roads to minimize road-related sediment delivery to streams and calls on entities responsible for paved road, such as the City and County of Sonoma, to adopt and implement best management practices for maintenance of unimproved (dirt/gravel) roads, conduct a survey of stream-crossings associated with paved public roadways and develop a prioritized implementation plan for repair and/or replacement of high priority crossings/culverts to reduce road related erosion and protect stream-riparian habitat conditions.

Napa River Sediment TMDL
The Napa River Sediment TMDL includes a wasteload allocation of 800 metric tons/year that applies to stormwater runoff discharges from stream crossings and stormwater runoff discharges associated with operation of public and private roads, paved and unpaved within the watershed not otherwise covered by NPDES permits issued to Napa County and municipalities including the City of Napa, Town of Yountville, City of St. Helena, City of Calistoga, and City of American Canyon (Attachment G, Region Specific Requirements). It also includes a load allocation of 27,000 metric tons/year that applies to a roads and streams crossings source category that Napa County and the City of Napa, Town of Yountville, City of St. Helena, City of Calistoga, and City of American Canyon share with Caltrans. Caltrans is responsible for runoff from State highways and associated construction activities. Discharges from State highways are regulated via a Statewide Stormwater Permit issued to Caltrans.

The requirements in this Order are based on the TMDL Implementation Plan. To implement the roads and stream crossings allocation, the TMDL Implementation Plan establishes a performance standard for roads as follows: road-related sediment delivery to channels should be ≤ 500 cubic yards per mile per 20 year period. The TMDL Implementation Plan also calls on entities responsible for paved roads to conduct a survey of stream-crossings associated with paved public roadways and develop a prioritized implementation plan for repair and/or replacement of high priority crossings/culverts to reduce road related erosion and protect stream-riparian habitat conditions.

Sonoma Creek Pathogens TMDL
The Sonoma Creek Pathogens TMDL assigns a waste load allocation to municipal runoff as specified in Attachment G, Region Specific Requirements.

The requirements in this Order are based on the TMDL Implementation Plan. The Implementation Plan for the pathogen TMDL calls on parties responsible for municipal runoff (i.e., City and County of Sonoma) to comply with existing stormwater management plans and to update or amend them as needed, to include requirements for a) public participation and outreach, b) pet waste management, c) illicit sewage discharge detection and elimination to reduce and eliminate fecal coliform discharges to Sonoma Creek, and d) develop and implement pollution prevention strategies. The Implementation Plan also anticipates the City and County of Sonoma will participate in evaluation of *E. coli* concentration trends in Sonoma Creek and its tributaries and to report annually on water quality monitoring results and progress made on implementation of human and animal runoff reduction measures. These implementation actions would be extensions of existing programs.

Napa River Pathogens TMDL
The Napa River Pathogens TMDL assigns a waste load allocation to municipal runoff as specified in Attachment G, Region Specific Requirements.

The requirements in this Order are based on the TMDL Implementation Plan. The Implementation Plan for the pathogen TMDL calls on parties responsible for municipal runoff (i.e., Napa County and municipalities including the City of Napa, Town of Yountville, City of St. Helena, City of Calistoga, and City of American Canyon) to comply with existing stormwater management plans and to update or amend them as needed, to include requirements for a) public participation and outreach, b) pet waste management, c) illicit sewage discharge detection and elimination to reduce and eliminate fecal coliform discharges to Sonoma Creek, and d) develop and implement pollution prevention strategies. The Implementation Plan also anticipates these parties to participate in evaluation of *E. coli* concentration trends in the Napa River and its tributaries and to report annually on water quality monitoring results and progress made on implementation of human and animal runoff reduction measures. These implementation actions would be extensions of existing programs.

Tomales Bay Pathogens TMDL
The Tomales Bay Pathogens TMDL assigns a waste load allocation to municipal runoff as specified in Attachment G, Region Specific Requirements.

The requirements in this order are based on the TMDL Implementation Plan. The Implementation Plan for the pathogen TMDL calls on parties responsible for municipal runoff (i.e., Marin County) to comply with existing stormwater management plans and to update or amend them as needed, to include requirements for a) public participation and outreach, b) pet waste management, c) illicit sewage discharge detection and elimination to reduce and eliminate fecal coliform discharges to Tomales Bay and its tributaries including Olema, Lagunitas, Walker, and San Geronimo Creeks, and d) develop and implement pollution prevention strategies. The Implementation Plan also anticipates these parties to participate in evaluation of *E. coli* concentration trends in Tomales Bay and its tributaries and to report annually on water quality monitoring results and progress made on implementation of human and animal runoff reduction measures.

The Implementation Plan anticipates that dischargers (including Marin County) and stakeholders, in collaboration with the Water Board will conduct water quality monitoring to evaluate fecal coliform concentration trends in Tomales Bay and its tributaries.

These implementation actions would be extensions of existing Stormwater Management Programs and would build upon previous and ongoing successful efforts to reduce pathogen loads to Tomales Bay and its tributaries.

Richardson Bay Pathogens TMDL
The Richardson Bay Pathogens TMDL assigns a waste load allocation to municipal runoff as specified in Attachment G, Region Specific Requirements.

The requirements in this order are based on the TMDL Implementation Plan. The Implementation Plan for the pathogen TMDL calls on parties responsible for municipal runoff (i.e., Marin County, City of Mill Valley, City of Tiburon, City of Belvedere, and city of Sausalito) to comply with existing stormwater management plans and to update or amend them as needed, to include requirements for a) public participation and outreach, b) pet waste management, c) illicit sewage discharge detection and elimination to reduce and eliminate fecal coliform discharges to Sonoma Creek, and d) develop and implement pollution prevention strategies. The Implementation Plan also parties responsible for municipal runoff to report annually on progress made on implementation of human and animal runoff reduction measures. These implementation actions would be extensions of existing programs.

Urban Creeks and Diazinon & Pesticide Toxicity TMDL
The Urban Creeks and Diazinon & Pesticide TMDL assigns a waste load allocation to municipal runoff as specified in Attachment G, Region Specific Requirements.

The requirements in this order are based on the TMDL Implementation Plan. The Implementation Plan for the Urban Creeks and Diazinon & Pesticide Toxicity TMDL calls on parties responsible for municipal runoff (i.e., Marin County, City of Mill Valley, City of Belvedere, Town of Corte Madera, Town of Fairfax, City of Larkspur, City of Mill Valley, City of Novato, Town of Ross, Town of San Anselmo, City of San Rafael, City of Sausilito, Town of Tiburon, County of Sonoma, City of Sonoma, and City of Petaluma) to adopt an Integrated Pest Management Policy (IPM) or ordinance, as the basis of a Pesticide-Related Toxicity Program. Implementation actions of the program must include: a) training of all municipal employees who use or apply pesticides in the IPM practices and policy/ordinance, b) require contractors to implement IPM, c) keep County Agricultural Commissioners informed of water quality issues related to pesticides, d) conduct outreach to residents and pest control applicators on less toxic methods for pest control, e) keep records on pesticide use, and f) monitor water and sediment for pesticides and associated toxicity in urban creeks via an individual or regional monitoring program.

Central Valley Water Board TMDLs

Delta Methylmercury TMDL
On April 22, 2010, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopted Resolution No. R5-2010-0043 to amend the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) to

include a methylmercury TMDL and an implementation plan for the control of methylmercury and total mercury in the Sacramento-San Joaquin Delta Estuary (Delta Mercury Control Program). The Basin Plan amendment includes the addition of: (1) site-specific numeric fish tissue objectives for methylmercury; (2) the commercial and sport fishing (COMM) beneficial use designation for the Delta and Yolo Bypass; (3) methylmercury load allocations for non-point sources and waste load allocations for for point sources; and (4) an implementation plan that includes adaptive management to address mercury and methylmercury in the Delta and Yolo Bypass.

The Delta TMDL covers the Counties of Alameda, Contra Costa, Sacramento, San Joaquin, Solano and Yolo both within legal Delta boundary defined by California Water Code Section 12220 and the Yolo Bypass, a 73,300-acre floodplain on the west side of the lower Sacramento River.

The Delta is on the Clean Water Act Section 303(d) List of Impaired Water Bodies because of elevated levels of mercury in fish. Beneficial uses of the Delta that are impaired due to the elevated methylmercury levels in fish are wildlife habitat (WILD) and human consumption of aquatic organisms. The Delta provides habitat for warm and cold-water species of fish and their associated aquatic communities. Additionally, the Delta and its riparian areas provide valuable wildlife habitat. There is significant use of the Delta for fishing and collection of aquatic organisms for human consumption. Further, water is diverted from the Delta for statewide municipal (MUN) and agricultural (AGR) use.

Mercury in the Central Valley comes primarily from historic mercury and gold mines and from resuspension of contaminated material in stream beds and banks downstream of the mines, as well as from modern sources such as atmospheric deposition from local and global sources, waste water treatment plants, and urban runoff. Methylmercury, the most toxic form of mercury, forms primarily by sulfate reducing bacteria methylating inorganic mercury. Sources of methylmercury include methylmercury flux from sediment in open water and wetland habitats, urban runoff, irrigated agriculture, and waste water treatment plants. Water management activities, including water storage, conveyance, and flood control, can affect the transport of mercury and the production and transport of methylmercury.

The Delta Mercury Control Program assigns massed-based methylmercury TMDL allocations to all sources of methylmercury in the Delta and Yolo Bypass, including urban runoff from Phase 1 and Phase 2 MS4s. In the Delta and Yolo Bypass, the TMDL assigns individual methylmercury waste load allocations to the following small urban runoff agencies:

City of Lathrop
City of Lodi
City of Rio Vista
County of San Joaquin
County of Solano
City of West Sacramento
County of Yolo
City of Tracy

Mercury is often attached to sediment, and the formation of methylmercury is linked in part to the concentration of mercury concentrations in sediment. Reductions in mercury concentrations will result in methylmercury reductions and subsequently methylmercury levels in fish. To comply with the TMDL, the agencies are required to implement best management practices to control erosion and sediment discharges with the goal of reducing mercury discharges.

Central Coast Water Board TMDLs

Morro Bay Sediment TMDL
The numeric targets approved in the TMDL are expressed in terms of receiving water indicators, e.g. pool residual volume, median diameter of spawning graves, etc. The TMDL also expressed the sediment assimilative capacity and allocations required to achieve the numeric targets. The allocations require a 50% reduction of current loading (estimated in 2003) to achieve the numeric targets. The wasteload allocations assigned to the responsible parties in this permit represent a 50% reduction from 2003 loading estimates.

San Lorenzo River Sediment TMDL
The numeric targets approved in the TMDL are expressed in terms of receiving water indicators, e.g. pool residual volume, median diameter of spawning graves, etc. The TMDL also expressed the sediment assimilative capacity and allocations required to achieve the numeric targets. The allocations require reductions of 24-27 percent of current sediment loading (estimated in 2002) to achieve the numeric targets. The wasteload allocations assigned to the responsible parties in this permit represent a 24-27 percent reduction from the 2003 loading estimates.

Pajaro River Sediment TMDL
The numeric targets approved in the TMDL are expressed in terms of receiving water indicators, e.g. pool residual volume, median diameter of spawning graves, etc. The TMDL also expressed the sediment assimilative capacity and allocations required to achieve the numeric targets. The allocations require reductions of 90% from current sediment loading (estimated in 2005) to achieve the numeric targets. The wasteload allocations assigned to the responsible parties in this permit represent a 90% reduction of the 2005 loading estimate.

For All TMDLs Requiring Wasteload Allocation Attainment Programs
In situations where MS4s must reduce their wasteload discharges in accordance with TMDLs, the Central Coast Water Board has required the MS4s to develop Wasteload Allocation Attainment Programs. Since these MS4s have been documented as sources of impairment, they must be held to a high standard to ensure they ultimately achieve their wasteload allocations and no longer contribute to the water body impairments addressed by the TMDLs. Indeed, the TMDLs set forth the expectation that the MS4s achieve their wasteload allocations within specified timeframes. This approach stands in contrast to the typical regulatory approach applied to municipal stormwater, which calls for implementation of BMPs according to an iterative process of continual improvement, with no associated timelines for achieving water quality standards. The MS4s' contribution to the impairment of water bodies, combined with the expectation that they achieve their wasteload allocations within specified timeframes, necessitates a

systematic approach to program implementation as it relates to the discharge of pollutants associated with impairments.

The federal regulations indicate that such an approach is appropriate. The Preamble to the Phase II federal storm water regulations states: "Small MS4 permittees should modify their programs if and when available information indicates that water quality considerations warrant greater attention or prescriptiveness in specific components of the municipal program."[37]

Central Coast Water Board staff developed the Wasteload Allocation Attainment Programs as a means to systematically guide municipalities towards attainment of their wasteload allocations. Without a systematic approach of this type, Water Board staff believes that attainment of wasteload allocations is unlikely. This belief is supported by many MS4s' storm water management programs. For example, programs typically include basic or minimum BMPs to be implemented to attain wasteload allocations. While some of these BMPs are likely to be beneficial, the connection between others and wasteload reductions is unclear. In addition, it appears that most of these BMPs are currently implemented, yet impairments continue, indicating that greater efforts are warranted. Moreover, BMPs implemented by MS4s often do not address all of the issues identified in TMDLs. This insufficient approach to BMP implementation in light of documented impairments and approved TMDLs indicates that a more systematic approach, as represented by the Wasteload Allocation Attainment Programs, is warranted.

On a broader scale, storm water programs often do not exhibit the rationale used for BMP selection, or draw connections between those BMPs selected and eventual wasteload allocation attainment. Without this level of planning, the significant challenge of achieving wasteload allocations within specified timeframes is not likely to be met. The Wasteload Allocation Attainment Program requirements are expressly designed to ensure adequate planning is conducted so that MS4s' TMDL implementation efforts are effective. The main steps to be followed for Wasteload Allocation Attainment Program development and implementation are activities that are basic to successfully correcting water quality problems. The Wasteload Allocation Attainment Program requirements specify that MS4s address the following items as they apply to TMDLs: (1) An implementation and assessment strategy; (2) source identification and prioritization; (3) BMP identification, prioritization, implementation (including schedule), analysis, and assessment; (4) monitoring program development and implementation (including schedule); (5) reporting and evaluation of progress towards achieving wasteload allocations; and (6) coordination with stakeholders. The United States Environmental Protection Agency (U.S. EPA) forwards similar approaches for TMDL implementation in its *Draft TMDLs to Stormwater Permits Handbook*, which discusses BMP review and selection, establishing linkages between BMP implementation and load reductions, effectiveness assessment, and BMP/outfall/receiving water monitoring.[38]

Ultimately, the Wasteload Allocation Attainment Programs place the responsibility for program development, assessment, improvement, and success on the municipalities. Placement of responsibility on the municipalities is appropriate, since the municipalities are the parties contributing to the water quality impairment. This approach is also

[37] 64 FR 68753
[38] USEPA. 2008. Draft TMDLs to Stormwater Permits Handbook. Chapters 5 and 6.

consistent with the Water Board's approach of requiring plans for control of pollutants from other sources identified by TMDLs, such as sanitary sewer collection and treatment systems and domestic animal discharges. The Water Board will collectively assess the progress of the various sources towards achieving receiving water quality standards as part of its triennial review, but each source must be responsible for assessing its own progress towards achieving its wasteload allocation. Without progress by each responsible party, the Water Board will not be able to demonstrate progress towards correcting the impairment. The process of planning, assessment, and refinement outlined by the Wasteload Allocation Attainment Programs helps ensure continual improvement and ultimate attainment of water quality standards at impaired receiving waters. This will be especially important as the complexity of achieving wasteload allocations increases when more and more TMDLs are adopted.

The Central Coast Water Board staff believes this standardized process of development, implementation, assessment, and review of the Wasteload Allocation Attainment Programs provides the greatest likelihood for the TMDLs' wasteload allocations to be attained.

XIV. STORM WATER MANAGEMENT PROGRAM FOR NON-TRADITIONAL MS4s

Differences between Traditional and Non-traditional MS4s

Because of the differences between Traditional and Non-traditional MS4s this Order includes Section F to address their specific management structure.

Non-Traditional Small MS4s required to comply with this Order are identified in Attachment B.

Non-traditional MS4s differ from cities and counties, because most potential sources of illicit discharges and storm water pollution are associated with activities under their direct operational control.

Some Non-traditional MS4s may also lack the legal authority or employ a different type of enforcement mechanism than a city/county government to implement their storm water program.

Certain Non-traditional Small MS4s such as Department of Defense and Department of Corrections and Rehabilitation Permittees required exemption from certain provisions due to security risks and/or compromised facility security.

Program Management – Applicable to all Non-traditional MS4 Categories
Legal Authority: Clean Water Act § 40 CFR 122.26(d)(2)(i) and 40 CFR 122.34(b)(3)(ii)(B), (b)(4)(ii)(A), and (b)(5)(ii)(B).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; MS4 Program Evaluation Guidance, U.S. EPA , EPA-833-R-07-003

Program Management

Program Management is essential to ensure that all elements of the storm water program are implemented on schedule and consistent with the Order requirements.

See Online Annual Reporting for further discussion later in this section.

Legal Authority
Legal authority to control discharges into a Permittee's storm sewer system is critical for compliance. Most Non-traditional MS4s lack the legal authority or employ a different type of enforcement mechanism than a city or county government to implement its storm water program. To the extent allowable under State and federal law, this Order requires each Non-traditional MS4 to operate with sufficient legal authority to control discharges into and from its MS4. The legal authority may be demonstrated by a combination of statutes, permits, contracts, orders, and interagency agreements. Non-traditional MS4 Permittees also do not generally have the authority to impose a monetary penalty. Although these differences exist, just like Traditional MS4s, Non-traditional MS4s must have the legal authority to develop, implement, and enforce the program.

Coordination
This Order allows Non-traditional MS4s to coordinate their storm water programs with other entities within or adjacent to their MS4 and allows the concept of a Separate Implementing Entity. A Separate Implementing Entity allows Permittees to leverage resources and skills. Additional information regarding SIEs is discussed later in this section.

Education and Outreach Program
Legal Authority: Clean Water Act § 40 CFR 122.34(b)(1).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

Because the population served by most Non-traditional MS4s will generally be served by the public education and outreach efforts of the local jurisdiction, the most useful supplement to those education and outreach efforts would be to label the Non-traditional MS4 catch basins. However, some Non-traditional MS4s such as universities have tenants and residents that may not be as effectively served by the local jurisdiction's public education and outreach program, therefore a separate education and outreach program may be needed. Where the local jurisdiction's public education and outreach efforts do effectively target and reach these tenant and resident populations, the Non-traditional MS4s are not expected to duplicate those efforts.

Some Non-traditional MS4s are well suited for regional education and outreach. For example, school districts often have several schools located with a watershed or regional boundary. This Order allows Non-traditional MS4s to comply with the Education and Outreach provisions through a regional collaborative effort.

Regional outreach and collaboration requires the Permittees to define a uniform and consistent message, deciding how best to communicate the message, and how to facilitate behavioral changes.

Public Involvement and Participation
Legal Authority: Clean Water Act § 40 CFR 122.34(b)(2)).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

Non-traditional MS4s have the same responsibilities as Traditional MS4s to ensure the storm water program is publicized and must involve the population they serve in the development of the program. However, the most effective BMP for Non-traditional

MS4s is to provide up-to-date information about the storm water program online if the Non-traditional MS4 maintains a website, or the Non-traditional MS4 Permittee may choose to post information about their program on the local jurisdiction's website.

Illicit Discharge Detection and Elimination Program
Legal Authority: Clean Water Act § 40 CFR 122.26(d)(2)(iv)(B)
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

The federal Phase II regulations require all MS4s to develop a process to trace the source of illicit discharges and eliminate them. The regulations also state that appropriate enforcement procedures and actions must be included in this process.

Unlike Traditional MS4s, Non-traditional MS4s have direct control of their own staff and contractors. Therefore, the enforcement provisions identified in the Illicit Discharge Detection and Elimination program are often not applicable to Non-traditional MS4 Permittees. Non-traditional MS4 Permittees should address illicit non-storm water discharges through the implementation of a Spill Response Plan However, Non-traditional MS4 Permittees often comply with existing state/federal regulations that required a Spill Response Plan or Hazardous Materials plan that identifies notification procedures for other operators or local agencies and includes details that are similar if not the same as a Spill Response Plan. Therefore, to leverage resources and maximize efficiencies the requirements in this Order recommend utilizing existing documents if that document contains the same information.

Construction Site Storm Water Runoff Control and Outreach Program
The purpose of this program component is to prevent sediment and other pollutants from entering the Non-traditional MS4 during the construction phase of development projects. In general, Non-traditional MS4 Permittees will obtain coverage under, and comply with, the CGP for their own construction projects. To the extent that they have the legal authority, Non-traditional MS4s must also require other entities discharging to their MS4 to obtain coverage under and comply with the CGP during the construction phase of their projects.

This Order relieves Non-traditional MS4 Permittees from development and implementation of a complete construction storm water runoff control program. This Order does require education and outreach to staff, construction site operators and contractors on how to control construction storm water runoff.

The CGP is inherently a robust permit with stringent reporting requirement for any construction project disturbing one acre or more in California. Often, Non-traditional MS4s have a few construction projects occurring at once such as those in a City or County. There are, however, very few Non-tradtional MS4s that have dozens of active construction sites. Further, Non-traditional MS4 Permittees are often both the owner and contractor of a construction project. Finally, municipal governments must review and approve erosion and sediment control plans prior to the issuance of grading permits. Most all Non-traditional MS4s do not require approval from local municipalities prior to construction activity. Conditioning of a construction project is usually conducted in-house by Non-traditional MS4 Permittee staff. If contractors are brought in to conduct construction activity, this Order requires Non-traditional MS4 Permittees to include

"bullet proof" contract language ensuring construction operators or contractors comply with the CGP and implement appropriate BMPs.

Pollution Prevention and Good Housekeeping Program
Legal Authority: Clean Water Act § 40 CFR 122.34(b)(6)

MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001

Non-traditional MS4s have the same responsibilities as Traditional MS4s to prevent or reduce storm water pollution generated by their own operations, to train employees about pollution prevention/good housekeeping practices, and to identify appropriate measures to prevent or reduce the amount of storm water generated by their operations.

Post-Construction Storm Water Management Program
Legal Authority: Clean Water Act § 402(p)(3)(b); 40 C.F.R. § 122.34(b)(5).
MS4 Permit Improvement Guide, U.S. EPA, April 2010, EPA 833-R-10-001; U.S. EPA Incorporating Environmentally Sensitive Development into Municipal Stormwater Programs, EPA 833-F-07-011

This Order has specific site design and LID requirements for all projects. The LID requirements emphasize landscape-based site design features that are already required elsewhere (e.g., the California Water Efficient Landscape Ordinance). The goal during this permit term is to develop runoff retention and hydromodification control criteria that are keyed to watershed processes. Watershed management zones will be delineated by the State Board during this permit term. The Watershed management zones will be used to identify applicable areas and appropriate criteria for runoff retention and hydromodification control. Regional Boards that have approved watershed process-based criteria for post-construction will be permitted to continue requiring Permittees to implement these criteria.

Total Maximum Daily Load (TMDL)
The Order includes Attachment G, which identifies only those approved TMDLs in which storm water or urban run-off is listed as a source. In addition, Attachment G identifies Permittees subject to TMDLs or assigned waste load allocation. If Non-traditional MS4 Permittees have been identified in Attachment G, they must implement the specific TMDL permit requirements.

Program Effectiveness Assessment
Non-traditional MS4s have the same responsibilities as Traditional MS4s to conduct quantitative evaluation of their storm water program.

Online Annual Reporting
Non-traditional MS4s have the same responsibilities as Traditional MS4s to submit online Annual Reports via SMARTS.

Separate Implementing Entity
Legal Authority: Clean Water Act § 40 CFR 122.35

This Order allows a Regulated MS4s to rely on a Separate Implementing Entity to meet permit requirements, as allowed by U.S. EPA in the Phase II regulations. Reliance on Separate Implementing Entity may be particularly beneficial for Non-Traditional MS4s. An example is a community service district that is charged with creating and implementing a municipal storm water program.

Co-application and cooperative implementation of the storm water program by any Permittee with another Permittee can maximize efficiency and reduce overall costs. Non-traditional MS4s are encouraged to co-apply with local jurisdictions and utilize shared resources to implement the storm water program. Additionally, co-application and cooperative storm water program implementation can achieve watershed-wide consistency.

A Permittee may rely on a Separate Implementing Entity to implement one or more program elements, if the Separate Implementing Entity can appropriately and adequately address the storm water issues of the Permittee. To do this, both entities must agree to the arrangement, and the Permittee must comply with the applicable parts of the Separate Implementing Entity's program.

In accordance with 40 Code of Federal Regulations, section 122.35(a)(3), the Permittee remains responsible for compliance with its permit obligations if the Separate Implementing Entity fails to implement the control measure(s) or any component thereof. Therefore, the entities are encouraged to enter into a legally binding agreement to minimize any uncertainty about compliance with the permit.

If the Non-traditional MS4 Permittee relies on a Separate Implementing Entity to implement all program elements and the Separate Implementing Entity also has a storm water permit, the Permittee relying on Separate Implementing Entity must still file an NOI via SMARTS, submit the appropriate fee and file online Annual Reports. Both parties must also submit to the appropriate Regional Water Board a certification of the arrangement. The arrangement is subject to the approval of the Regional Water Board Executive Officer prior to filing an electronic NOI via SMARTS.

School districts present an example of where a Separate Implementing Entity arrangement may be appropriate, either by forming an agreement with a city or with an umbrella agency, such as the County Office of Education. Because schools provide a large audience for storm water education the two entities may coordinate an education program. An individual school or a school district may agree to provide a one-hour slot for all second and fifth grade classes during which the city would make its own storm water presentation. Alternatively, the school could agree to teach a lesson in conjunction with an outdoor education science project, which may also incorporate a public involvement component. Additionally, the school and the city or Office of Education may arrange to have the school's maintenance staff attend the other entity's training sessions.

XV. RELATIONSHIP BETWEEN THE ORDER AND THE STATEWIDE GENERAL PERMIT FOR DISCHARGES OF STORM WATER ASSOCIATED WITH INDUSTRIAL ACTIVITY

In some cases, certain Non-traditional MS4s will be subject to both this Order and the IGP.

The intent of both of these permits is to reduce pollutants in storm water, but neither permit's requirements totally encompass the other. This Order requires that Non-traditional MS4 operators address storm water program elements, while the IGP requires the development and implementation of a SWPPP for certain "industrial" activities as well as requiring specific visual and chemical monitoring.

In the Preamble to the Phase II regulations, U.S. EPA notes that for a combination permit to be acceptable, it must contain all of the requirements for each permit. Further, "when viewed in its entirety, a combination permit, which by necessity would need to contain all elements of otherwise separate industrial and MS4 permit requirements, and require NOI information for each separate industrial activity, may have few advantages when compared to obtaining separate MS4 and industrial general permit coverage." (64 Fed. Reg. 68781.) Where the permits do overlap, one program may reference the other. More specifically, the Good Housekeeping for Permittee Operations program element requires evaluation of Permittee operations, some of which may be covered under the IGP. The development and implementation of the SWPPP under the IGP will likely satisfy the Good Housekeeping requirements for those industrial activities. The Non-traditional MS4 storm water program may incorporate by reference the appropriate SWPPP.

There may be instances where a Non-traditional MS4 has, under the IGP, obtained coverage for the entire facility (rather than only those areas where industrial activities occur) and has developed a SWPPP that addresses all the program elements required by this Order. In these instances, the Non-traditional MS4 is not required to obtain coverage under this Order. The entity should, in such cases, provide to the appropriate Regional Water Board documentation that its SWPPP addresses all program elements.

XVI. USE OF PARTNERSHIPS IN MS4 PERMITS

Since the Phase II Rule applies to all small MS4s within an urbanized area regardless of political boundaries it is very likely that multiple governments and agencies within a single geographic area are subject to NPDES permitting requirements. For example, a city government that operates a small MS4 within an urbanized area may obtain permit coverage under this Order while other MS4s in the same vicinity (such as a County, other cities, public university, or military facility) may also be covered under this Order. All MS4s are responsible for permit compliance within their jurisdiction.

Given the potential for overlapping activities in close proximity, the State Water Board encourages MS4s in a geographic area to establish cooperative agreements in implementing their storm water programs, especially with receiving water monitoring. Partnerships and agreements between Permittees and/or other agencies can minimize unnecessary duplication of effort and result in efficient use of available resources. Sharing resources can allow MS4s to focus their efforts on high priority program components. By forming partnerships, water quality can be examined and improved on a consolidated, efficient, watershed-wide scale rather than on a piece-meal, site-by-site basis.

XVII. REGIONAL BOARD DESIGNATIONS

Designation of additional Small MS4s outside of Urbanized Areas as Regulated Small MS4s may be made by the Regional Water Boards on a case by case basis. Case by case determinations of designation are based on the potential of a Small MS4's discharges to result in exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts. The tables below includes designations recommend by the Regional Water Boards prior to adoption of this Order. The Regional Water Boards may continue to make case by case determinations of designation during the permit term by notification to the discharger (which shall include a statement of reasons for the designation) and following an opportunity for public review and comment.

Traditional Small MS4s

Place name	County	Regional Board	Justification
Crescent City	Del Norte	1	7500 population and in urbanized area
Bayview CDP	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of these areas is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds
Cutten CDP	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of this area is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds
Humboldt Hill CDP	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of this area is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds
Myrtletown CDP	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of this area is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds

Pine Hills CDP	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of this area is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds
Ridgewood Heights USSA	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of these areas is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds
Rosewood USSA	Humboldt	1	Adjacent to, but outside of Eureka city limits located in southern Humboldt Bay, in unincorporated Humboldt County. Designation of this area is needed to address pollutant sources of urbanized and urbanizing areas within 303(d) listed watersheds
Cloverdale CDP	Sonoma	1	There are urbanized areas within the County of Sonoma not covered under the Phase I Permit. These areas are located within the Russian River watershed, a 303(d) listed watershed. Currently, there is only limited storm water management in these areas, allowing the discharge of pollutants to the impacted water body. Storm water management is needed in these areas to reduce the pollutant loads and for early TMDL implementation
Forestville CDP	Sonoma	1	There are urbanized areas within the County of Sonoma not covered under the Phase I Permit. These areas are located within the Russian River watershed, a 303(d) listed watershed. Currently, there is only limited storm water management in these areas, allowing the discharge of pollutants to the impacted water body. Storm water management is needed in these areas to reduce the pollutant loads and for early TMDL implementation
Guerneville CDP	Sonoma	1	There are urbanized areas within the County of Sonoma not covered under the Phase I Permit. These areas are located within the Russian River watershed, a 303(d) listed watershed. Currently, there is only limited storm water management in these areas, allowing the discharge of pollutants to the impacted water body. Storm water management is needed in these areas to reduce the pollutant loads and for early TMDL implementation

Monte Rio	Sonoma	1	There are urbanized areas within the County of Sonoma not covered under the Phase I Permit. These areas are located within the Russian River watershed, a 303(d) listed watershed. Currently, there is only limited storm water management in these areas, allowing the discharge of pollutants to the impacted water body. Storm water management is needed in these areas to reduce the pollutant loads and for early TMDL implementation
Occidental CDP	Sonoma	1	There are urbanized areas within the County of Sonoma not covered under the Phase I Permit. These areas are located within the Russian River watershed, a 303(d) listed watershed. Currently, there is only limited storm water management in these areas, allowing the discharge of pollutants to the impacted water body. Storm water management is needed in these areas to reduce the pollutant loads and for early TMDL implementation
Yreka City	Siskiyou	1	Discharges to a TMDL listed waterbody and identified on Attachment G
Gonzalez City	Monterey	3	Greater than 5,000 population
Moss Landing CDP	Monterey	3	Proximity to ocean areas (Monterey Bay National Marine Sanctuary, including Elkhorn slough)
Blacklake CDP	San Luis Obispo	3	Proximity to urbanized area (Oceano, Arroyo Grande, Grover Beach and Nipomo)
Cayucos CDP	San Luis Obispo	3	Greater than 2,000 population and proximity to Pacific Ocean

Lake Nacimiento CDP	San Luis Obispo	3	Greater than 2,000 population and proximity to Lake Nacimiento (drinking water source)
San Miguel	San Luis Obispo	3	Greater than 2,000 population High Growth Rate (16.8%)
Shandon CDP	San Luis Obispo	3	High Growth Rate (31.3%)
Guadalupe City	Santa Barbara	3	Incorporated area exceeding 5,000 population
Hope Ranch CDP	Santa Barbara	3	Proximity to urbanized area
Mission Canyon CDP	Santa Barbara	3	Proximity to urbanized area
Mission Hills CDP	Santa Barbara	3	Proximity to urbanized area
Toro Canyon CDP	Santa Barbara	3	Proximity to urbanized area
Live Oak CDP	Santa Cruz	3	Greater than 5,000 population Discharges to a TMDL listed waterbody and identified on Attachment G

City of Avalon	Los Angeles	4	Proximity to sensitive water body
Colusa County	Colusa	5S	Discharges to a TMDL listed waterbody and identified on Attachment G
Amador County	Amador	5S	Currently, there is only limited storm water management in this area, allowing discharge of pollutants to waters of the State already impacted with multiple constituents and parameters. Storm water management is needed in these areas to reduce the pollutant loads prior to adoption of any TMDLs, which are typically not estimated to be completed until 2020 or thereafter in many cases. Additionally, several waterbodies or waterbody segments within or bounding Amador County are 303(d) listed for invasive species (Cosumnes River, above Michigan Bar), mercury (Pardee Reservoir, Camanche Reservoir), pH - High (Amador Lake, Bear River from Allen to Upper Bear River Reservoir), copper (Camanche Reservoir), and zinc (Camanche Reservoir) according to the 2010 CWA 303(d) list. Camanche Reservoir drains to Lower Mokelumne River. The Lower Mokelumne River (in Delta Waterways, eastern portion) is 303(d) listed for chlorpyrifos, copper, mercury, dissolved oxygen, unknown toxicity, and zinc. Both the Cosumnes and Mokelumne Rivers drain to the San Joaquin River, which is 303(d) listed for these same constituents and parameters. Many of these constituents are known to bind to various size sediment particles migrating into surface waters.

Non-Traditional Small MS4s

Place name	Category	Regional Board	Justification
Petaluma Coast Guard Training Center	Defense, Department of	1	Activities that could impact water quality, fueling, maintenance. Personnel that should be educated on how their activities effect water quality.
Alameda-Contra Costa Transit District (AC Transit)	Special District	2	The Alameda-Contra Costa Transit District (AC Transit) is a large special transit district like the Valley Transit Authority (VTA) and BART which are both already designated. In order to fully regulate both large bus storage and maintenance facilities and new development related to bus stops and plazas they need to be fully regulated under the Phase II stormwater permit, as they do not fall under the local city regulatory jurisdiction for all aspects of their operations.
AMTRAK	Special District	2	Within urbanized area
Bay Area Rapid Transit	Special District	2	Within urbanized area
CalTrain	Special District	2	Within urbanized area
Golden Gate Bridge, Highway and Transportation District	Special District	2	Within urbanized area
Valley Transit Authority	Special District	2	Within urbanized area
Port of Oakland	Port	2	Within urbanized area
Port of Redwood City	Port	2	Within urbanized area
San Jose Airport	Airport	2	Within urbanized area
Oceano Community Services District	Community Services District	3	Within urbanized area
Fort Ord Reuse Authority	Local Agency	3	Adjacent to urbanized area, Planned annexation into urbanized area
Fort Hunter Ligget, Army Garrison	Defense, Department of	3	Within urbanized area

March Air Reserve Base	Defense, Department of	8	The former March Air Reserve Base was downsized and became known as March ARB. March ARB is an active military base that covers 2,300 acres. Activities in the base proper includes military activities such as air refueling, air cargo, air reconnaissance, military interceptors, military housing, recreational and dining facilities, commercial air cargo, training facilities, schools, operations centers for troop transport and industrial, including airport operations. Land use activities are under Base commander authority. The base is currently covered under an individual industrial storm water permit for their industrial operations and is a stakeholder under the Lake Elsinore/Canyon Lake TMDL. In addition to industrial permit monitoring, the Base monitors their compliance with the TMDL. We believe Phase II permit coverage is an appropriate permit to address the pollutants and flows generated from Base operations. Development and redevelopment post construction controls are of particular importance to be incorporated into the base's storm water program through Phase II permit coverage.
→ March Joint Powers Authority	March Joint Powers Commission	8	The March JPA is a federally recognized reuse authority for the former March Air Force base. It encompasses most of the 6, 500 acres of the former active duty March Air Force Base area and approximately 450 acres adjacent to the base in the industrial area of the City of Moreno Valley. March JPA also assumed the following authorities: 1 - Land Use Authority - Land use authority was transferred to March JPA from the County of Riverside, City of Riverside, and City of

Note: This discharger was not designated in the final version of Attachment B of the Order adopted by the Board on February 5, 2013.

				Moreno Valley. The March JPA has adopted development and building codes and standards. The March JPA General Plan has been developed by the March JPA in accordance with state statutes, as well as the associated Master Environmental Impact Report. The March JPA General Plan is designed to implement the March Final Reuse Plan and related activities. 2 - Airport Authority - March Inland Port Airport Authority (MIPAA), is a governing body under the governance umbrella of the March JPA. MIPAA is responsible for the development and operation of the March Inland Port (MIP), a joint use aviation facility targeted for air cargo operations. The developments approved by the March JPA todate included residential, commercial and industrial sources of pollutants. About 1/8th of the area has been developed. March JPA has the authority to develop its own MS4s within their jurisdiction and connect to MS4s owned/operated by Phase 1 permittees. Many of the functions resemble that of a local agency. Therefore, March JPA should be subject to the Phase II (or they can join our Phase 1).
Miramar Marine Corps Air Station	Defense, Department of	9	Within urbanized area
→ General Services Administration Facilities (GSA)	Federal Facility	9	The site is the General Services Administration Facilities (GSA), located at 801 E. San Ysidro Blvd., San Ysidro, CA 92173 and is a federal facility. They are the owner and operator of a series of lateral drains which tie into a main open-trunk running and discharging along the border fence. They are responsible for the storm drains, including the new trunk slated for construction, and the entire system

Note: This discharger was not designated in the final version of Attachment B of the Order adopted by the Board on February 5, 2013.

			acts as a MS4. Additionally, GSA is the landlord of the world's busiest Land Port of Entry (LPOE). Located between San Diego and Tijuana, the San Ysidro LPOE supports 24 northbound vehicle lanes into the United States and six southbound lanes into Mexico. Every day, this land port serves over 50,000 northbound vehicles and 25,000 northbound pedestrians. GSA maintains border crossing services, as well as increasing efficiency, security, and safety for federal agencies and the traveling public. Looking to the future, the San Ysidro LPOE is undergoing a major expansion that will include a new northbound inspection facility, primary vehicle inspection booths, secondary inspection area, administration space, and a pedestrian processing facility. A new southbound inspection facility will also be developed, and Interstate 5 will be shifted to the west to align with Mexico's planned use of a reconstructed entry facility at the vacant Virginia Avenue/El Chaparral commercial facility.
Metropolitan Transit System (MTS)	Transportation Agency	9	The Metropolitan Transit Development Board (MTDB) was created in 1975 by the passage of California Senate Bill 101 and came into existence on January 1, 1976. In 2005, MTDB changed its name to the Metropolitan Transit System (MTS). MTS licenses and regulates taxicabs, jitneys, and other private for-hire passenger transportation services by contract with the cities of San Diego, El Cajon, Imperial Beach, La Mesa, Lemon Grove, Poway, and Santee. MTS provides bus and rail services directly or by contract with public or private operators. MTS determines the routing, stops, frequency of service, and hours of

			operation for its existing services. MTS does a significant amount of their vehicles maintenance.
North County Transit District (NCTD)	Transportation Agency	9	North county Transit district (NCTD) owns and operates the Sprinter Rail located along 22 miles of the rail corridor (see attached file) and adjacent staging areas within the Cities of Oceanside, Vista, San Marcos and Escondido and within the County of San Diego. The project's total disturbed acreage is approximately 280 acres. Storm water runoff from the project discharges directly into Waters of the State, the Municipal Separate Storm Sewer System (MS4) and, ultimately discharging to Loma Alta Creek, Buena Vista Creek, Buena Creek, San Marcos Creek, Escondido Creek and unmanned tributaries. Beginning October 2007, during construction, the San Diego Water Board had identified significant violations of the Stormwater Permit (99-08-DWQ). NCTD threatens to continue to discharge waste (e.g. sediment and sediment-laden water) in violation of the Basin Plan Prohibitions.

Draft Attachment A - Traditional Small MS4 Designation and Monitoring Matrix

Place Name	County	RB	Permittee Type	Population 2010	Monitoring Type	Urbanized Area/ Urban Cluster Name	Designation Criteria
Monitoring Types: Ω = Water Quality Monitoring Options, λ = TMDL Attachment G Requirements, Δ = ASBS Special Protections							
***additional monitoring may be required if permittee discharges to a 303(d) listed waterbody**							
****The list of Regulated MS4s may be amended by the Executive Director consistent with the designation criteria list in the Order**							
*****CDPs located within an existing NPDES permit area within an urbanized area are not required to file for separate coverage and pay separate fees**							
Amador County							
Amador County	Amador	5S	New				Regional Board Designation
Butte County							
Butte County	Butte	5R	Renewal		λ		Renewal
Chico City	Butte	5R	Renewal	86,187	λ	Chico, CA Urbanized Area	Renewal
Oroville City	Butte	5R	New	15,546		Oroville, CA Urban Cluster	High Population/Density
Paradise Town	Butte		New	26,218		Paradise, CA Urban Cluster	High Population/Density
Calaveras County							
Calaveras County	Calaveras	5S	Renewal				Renewal
Colusa County							
Colusa County	Colusa	5S	New		λ		TMDL
Del Norte County							
Crescent City	Del Norte	1	New	7,643		Crescent City, CA Urban Cluster	Regional Board Designation
El Dorado County							
Cameron Park CDP	El Dorado	5S	New	18,228		Sacramento, CA Urbanized Area	Within Urbanized Area
Diamond Springs CDP	El Dorado	5S	New	11,037		Sacramento, CA Urbanized Area	Within Urbanized Area
El Dorado County	El Dorado	5S	Renewal				Renewal
El Dorado Hills CDP	El Dorado	5S	Renewal	42,108		Sacramento, CA Urbanized Area	Renewal
Placerville City	El Dorado	5S	Renewal	10,389		Placerville--Diamond Springs, CA	Renewal
Fresno County							
Kingsburg City	Fresno	5F	Renewal	11,382		Selma, CA Urban Cluster	Renewal
Reedley City	Fresno	5F	Renewal	24,194		Reedley--Dinuba, CA Urban Clus	Renewal
Selma City	Fresno	5F	Renewal	23,219		Selma, CA Urban Cluster	Renewal
Coalinga City	Fresno	5F	New	13,380		Coalinga, CA Urban Cluster	High Population/Density
Mendota City	Fresno	5F	New	11,014		Mendota, CA Urban Cluster	High Population/Density
Parlier City	Fresno	5F	New	14,494		Parlier, CA Urban Cluster	High Population/Density
Sanger City	Fresno	5F	New	24,270		Sanger, CA Urban Cluster	High Population/Density
Humboldt County							
Arcata City	Humboldt	1	Renewal	17,231		Arcata-McKinleyville, CA Urban C	Renewal

Bayview CDP	Humboldt	1	New	2,510		Eureka, CA Urban Cluster	Regional Board Designation
Cutten CDP	Humboldt	1	New	3,108		Eureka, CA Urban Cluster	Regional Board Designation
Eureka City	Humboldt	1	Renewal	27,191		Eureka, CA Urban Cluster	Renewal
Fortuna City	Humboldt	1	Renewal	11,926		Fortuna, CA Urban Cluster	Renewal
Humboldt Hill CDP	Humboldt	1	New	3,414		Eureka, CA Urban Cluster	Regional Board Designation
Humboldt County	Humboldt	1	New		Δ		ASBS
McKinleyville CDP	Humboldt	1	Renewal	15,177		Arcata-McKinleyville, CA Urban C	Renewal
Myrtletown CDP	Humboldt	1	New	4,675		Eureka, CA Urban Cluster	Regional Board Designation
Pine Hills CDP	Humboldt	1	New	3,108		Eureka, CA Urban Cluster	Regional Board Designation
Ridgewood Heights USSA	Humboldt	1	New				Regional Board Designation
Rosewood USSA	Humboldt	1	New				Regional Board Designation
Trinidad City	Humboldt	1	New	367	Δ		ASBS
Imperial County							
Brawley City	Imperial	7	Renewal	24,953		Brawley, CA Urban Cluster	Renewal
Calexico City	Imperial	7	Renewal	38,572		El Centro--Calexico, CA Urbanize	Renewal
El Centro City	Imperial	7	Renewal	42,598		El Centro--Calexico, CA Urbanize	Renewal
Imperial City	Imperial	7	Renewal	14,758		El Centro--Calexico, CA Urbanize	Renewal
Imperial County	Imperial	7	Renewal				Renewal
Kern County							
Delano City	Kern	5F	New	38,824		Delano, CA Urbanized Area	Within Urbanized Area
Ridgecrest City	Kern	6V	New	27,616		Ridgecrest, CA Urban Cluster	High Population/Density
Tehachapi City	Kern	5F	New	14,414		Tehachapi--Golden Hills, CA Urb	High Population/Density
Wasco City	Kern	5F	New	25,545		Wasco, CA Urban Cluster	High Population/Density
Kings County							
Hanford City	Kings	5F	Renewal	53,967	Ω	Hanford, CA Urbanized Area	Renewal
Kings County	Kings	5F	Renewal				Renewal
Lemoore City	Kings	5F	Renewal	24,531		Hanford, CA Urbanized Area	Renewal
Lake County							
Clearlake City	Lake	5S	Renewal	15,250	λ	Clearlake, CA Urban Cluster	Renewal
Lakeport City	Lake	5S	Renewal	4,753		Clearlake, CA Urban Cluster	Renewal
Lake County	Lake	5S	Renewal		λ		Renewal
Lassen County							
Susanville City	Lassen	6SLT	New	17,947		Susanville, CA Urban Cluster	High Population/Density
Los Angeles County							
Avalon City	Los Angeles	4	New	3,728		Avalon, CA Urban Cluster	Regional Board Designation
Madera County							
Bonadelle Ranchos-Madera R	Madera	5F	New	8,569	λ	Bonadelle Ranchos-Madera Ran	Within Urbanized Area
Madera Acres CDP	Madera	5F	New	9,163		Madera, CA Urbanized Area	Within Urbanized Area

Madera City	Madera	5F	Renewal	61,416	λ	Madera, CA Urbanized Area	Renewal
Madera County	Madera	5F	Renewal		λ		Renewal
Chowchilla City	Madera	5F	New	18,720		Chowchilla, CA Urban Cluster	High Population/Density
Marin County							
Belvedere City	Marin	2	Renewal	2,068	λ	San Francisco--Oakland, CA Urb	Renewal
Black Point-Green Point CDP	Marin	2	Renewal	1,306		San Francisco--Oakland, CA Urb	Renewal
Corte Madera Town	Marin	2	Renewal	9,253		San Francisco--Oakland, CA Urb	Renewal
Fairfax Town	Marin	2	Renewal	7,441		San Francisco--Oakland, CA Urb	Renewal
Kentfield CDP	Marin	2	New	6,485		San Francisco--Oakland, CA Urb	Within Urbanized Area
Larkspur City	Marin	2	Renewal	11,926		San Francisco--Oakland, CA Urb	Renewal
Lucas Valley-Marinwood CDP	Marin	2	Renewal	6,094		San Francisco--Oakland, CA Urb	Renewal
Marin County	Marin	2	Renewal		Δ λ		Renewal
Mill Valley City	Marin	2	Renewal	13,903	λ	San Francisco--Oakland, CA Urb	Renewal
Novato City	Marin	2	Renewal	51,904	λ	San Francisco--Oakland, CA Urb	Renewal
Ross Town	Marin	2	Renewal	2,415		San Francisco--Oakland, CA Urb	Renewal
San Anselmo Town	Marin	2	Renewal	12,336		San Francisco--Oakland, CA Urb	Renewal
San Rafael City	Marin	2	Renewal	57,713	λ	San Francisco--Oakland, CA Urb	Renewal
Sausalito City	Marin	2	Renewal	7,061	λ	San Francisco--Oakland, CA Urb	Renewal
Strawberry CDP	Marin	2	New	5,393		San Francisco--Oakland, CA Urb	Within Urbanized Area
Tamalpais-Homestead Valley	Marin	2	Renewal	10,735		San Francisco--Oakland, CA Urb	Renewal
Tiburon Town	Marin	2	Renewal	8,962	λ	San Francisco--Oakland, CA Urb	Renewal
Woodacre CDP	Marin	2	Renewal	1,348		San Francisco--Oakland, CA Urb	Renewal
Mendocino County							
Fort Bragg City	Mendocino	1	Renewal	7,273		Fort Bragg, CA Urban Cluster	Renewal
Mendocino County	Mendocino	1	Renewal				Renewal
Ukiah City	Mendocino	1	Renewal	16,075		Ukiah, CA Urban Cluster	Renewal
Merced County							
Atwater City	Merced	5F	Renewal	28,168	λ	Merced, CA Urbanized Area	Renewal
Delhi CDP	Merced	5F	Renewal	10,755	λ	Turlock, CA Urbanized Area	Renewal
Franklin CDP	Merced	5F	New	6,149		Merced, CA Urbanized Area	Within Urbanized Area
Livingston City	Merced	5F	Renewal	13,058	λ	Turlock, CA Urbanized Area	Renewal
Los Banos City	Merced	5F	Renewal	35,972	λ	Los Banos, CA Urban Cluster	Renewal
Merced City	Merced	5F	Renewal	78,958	λ	Merced, CA Urbanized Area	Renewal
Merced County	Merced	5F	Renewal		λ		Renewal
Winton CDP	Merced	5F	Renewal	10,613	λ	Merced, CA Urbanized Area	Renewal
Monterey County							
Carmel Valley Village CDP	Monterey	3	Renewal	4,407		Carmel Valley Village, CA Urban	Renewal
Carmel-by-the-Sea City	Monterey	3	Renewal	3,722	Δ	Seaside--Monterey, CA Urbanize	Renewal
Castroville CDP	Monterey	3	Renewal	6,481		Salinas, CA Urbanized Area	Renewal

Del Rey Oaks City	Monterey	3	Renewal	1,624		Seaside--Monterey, CA Urbanize	Renewal
Elkhorn CDP	Monterey	3	New	12,723		Salinas, CA Urbanized Area	Within Urbanized Area
Gonzalez City	Monterey	3	New	8,187			Regional Board Designation
King City City	Monterey	3	Renewal	12,874		King City, CA Urban Cluster	Renewal
Las Lomas CDP	Monterey	3	Renewal	3,024		Watsonville, CA Urbanized Area	Renewal
Marina City	Monterey	3	Renewal	19,718		Seaside--Monterey, CA Urbanize	Renewal
Monterey City	Monterey	3	Renewal	27,810	Δ	Seaside--Monterey, CA Urbanize	Renewal
Monterey County	Monterey	3	Renewal		Δλ		Renewal
Moss Landing CDP	Monterey	3	Renewal	204			Regional Board Designation
Pacific Grove City	Monterey	3	Renewal	15,041	Δ	Seaside--Monterey, CA Urbanize	Renewal
Pajaro CDP	Monterey	3	Renewal	3,070		Watsonville, CA Urbanized Area	Renewal
Prunedale CDP	Monterey	3	Renewal	17,560		Salinas, CA Urbanized Area	Renewal
Sand City City	Monterey	3	Renewal	334		Seaside--Monterey, CA Urbanize	Renewal
Seaside City	Monterey	3	Renewal	33,025		Seaside--Monterey, CA Urbanize	Renewal
Soledad City	Monterey	3	Renewal	25,738		Soledad, CA Urban Cluster	Renewal
Greenfield City	Monterey	3	New	16,330		Greenfield, CA Urban Cluster	High Population/Density
Napa County							
American Canyon City	Napa	2	Renewal	19,454	λ	Vallejo, CA Urbanized Area	Renewal
Calistoga City	Napa	2	Renewal	5,155	λ	Calistoga, CA Urban Cluster	Renewal
Napa City	Napa	2	Renewal	76,915	λ	Napa, CA Urbanized Area	Renewal
Napa County	Napa	2	Renewal		λ		Renewal
St. Helena City	Napa	2	Renewal	5,814	λ	St. Helena, CA Urban Cluster	Renewal
Yountville City	Napa	2	Renewal	2,933	λ	Yountville, CA Urban Cluster	Renewal
Nevada County							
Grass Valley City	Nevada	5S	Renewal	12,860		Grass Valley, CA Urban Cluster	Renewal
Truckee Town	Nevada	5S	Renewal	16,180	λ	Truckee, CA Urban Cluster	Renewal
Placer County							
Placer County (Region 6)	Placer	6	Renewal		λ		Renewal
Auburn City	Placer	5S	Renewal	13,330		Auburn--North Auburn, CA Urbar	Renewal
Granite Bay CDP	Placer	5S	Renewal	20,402		Sacramento, CA Urbanized Area	Renewal
Lincoln City	Placer	5S	Renewal	42,819	λ	Sacramento, CA Urbanized Area	Renewal
Loomis Town	Placer	5S	Renewal	6,430	λ	Sacramento, CA Urbanized Area	Renewal
North Auburn CDP	Placer	5S	Renewal	13,022		Auburn--North Auburn, CA Urbar	Renewal
Placer County (Region 5S)	Placer	5S	Renewal				Renewal
Rocklin City	Placer	5S	Renewal	56,974	λ	Sacramento, CA Urbanized Area	Renewal
Roseville City	Placer	5S	Renewal	118,788	λ	Sacramento, CA Urbanized Area	Renewal
San Benito County							
Hollister City	San Benito	3	Renewal	34,928	λ	Hollister, CA Urban Cluster	Renewal
San Bernardino County							

Apple Valley Town	San Bernardino	6V	Renewal	69,135	Ω	Victorville--Hesperia, CA Urbaniz	Renewal
Barstow City	San Bernardino	6V	New	22, 639		Riverside--San Bernardino, CA U	Within Urbanized Area
Hesperia City	San Bernardino	6V	Renewal	90,173		Victorville--Hesperia, CA Urbaniz	Renewal
Oak Hills CDP	San Bernardino	6V	New	8,879		Victorville--Hesperia, CA Urbaniz	Within Urbanized Area
Phelan CDP	San Bernardino	6V	New	14,304		Victorville--Hesperia, CA Urbaniz	Within Urbanized Area
Spring Valley Lake CDP	San Bernardino	6V	New	8,220		Victorville--Hesperia, CA Urbaniz	Within Urbanized Area
Victorville City	San Bernardino	6V	Renewal	115,903	Ω	Victorville--Hesperia, CA Urbaniz	Renewal
San Bernardino County	San Bernardino	6V	Renewal				Renewal
San Francisco County							
San Francisco City (San Fran	San Francisco	2	Renewal			San Francisco--Oakland, CA Urb	Renewal
San Francisco City (Port of Sa	San Francisco	2	Renewal			San Francisco--Oakland, CA Urb	Renewal
San Joaquin County							
Escalon City	San Joaquin	5S	New	7, 132		Stockton, CA Urbanized Area	New
Lathrop City	San Joaquin	5S	Renewal	18,023	λ	Manteca, CA Urbanized Area	Renewal
Lathrop City	San Joaquin	5S	Renewal	18,023	λ	Stockton, CA Urbanized Area	Renewal
Lodi City	San Joaquin	5S	Renewal	62,134	λ	Lodi, CA Urbanized Area	Renewal
Manteca City	San Joaquin	5S	Renewal	347	λ	Stockton, CA Urbanized Area	Renewal
Manteca City	San Joaquin	5S	Renewal	67,096	Ω	Manteca, CA Urbanized Area	Renewal
Ripon City	San Joaquin	5S	Renewal	14,297	λ	Manteca, CA Urbanized Area	Renewal
San Joaquin County	San Joaquin	5S	Renewal		λ		Renewal
Tracy City	San Joaquin	5S	Renewal	82,922	λ	Tracy, CA Urbanized Area	Renewal
Woodbridge CDP	San Joaquin	5S	Renewal	3,984		Lodi, CA Urbanized Area	Renewal
San Luis Obispo County							
Arroyo Grande City	San Luis Obispo	3	Renewal	17,252		Arroyo Grande--Grover Beach, C	Renewal
Atascadero City	San Luis Obispo	3	Renewal	28,310		El Paso de Robles (Paso Robles)	Renewal
Blacklake CDP	San Luis Obispo	3	New	930		Nipomo, CA Urban Cluster	Regional Board Designation
Cambria	San Luis Obispo	3	Renewal	6,032		Cambria, CA Urban Cluster	Renewal
Cayucos CDP	San Luis Obispo	3	New	2,592		Morro Bay--Los Osos, CA Urban	Regional Board Designation
El Paso de Robles (Paso Rob	San Luis Obispo	3	Renewal	29,793		El Paso de Robles (Paso Robles)	Renewal
Grover Beach City	San Luis Obispo	3	Renewal	13,156		Arroyo Grande--Grover Beach, C	Renewal
Lake Nacimiento CDP	San Luis Obispo	3	New	2,411			Regional Board Designation
Morro Bay City	San Luis Obispo	3	Renewal	10,234	λ	Morro Bay--Los Osos, CA Urban	Renewal
Nipomo CDP	San Luis Obispo	3	Renewal	16,714		Nipomo, CA Urban Cluster	Renewal
Pismo Beach City	San Luis Obispo	3	Renewal	7,655		Arroyo Grande--Grover Beach, C	Renewal
San Luis Obispo City	San Luis Obispo	3	Renewal	45,119	λ	San Luis Obispo, CA Urbanized A	Renewal
San Luis Obispo County	San Luis Obispo	3	Renewal		λ		Renewal
San Miguel	San Luis Obispo	3	New	2,336			Regional Board Designation
Shandon CDP	San Luis Obispo	3	New	1,295			Regional Board Designation
Santa Barbara County							

Buellton City	Santa Barbara	3	Renewal	4,828		Solvang--Buellton--Santa Ynez, C	Renewal
Carpinteria City	Santa Barbara	3	New	13,040		Santa Barbara, CA Urbanized Ar	Within Urbanized Area
Goleta City	Santa Barbara	3	Renewal	29,888		Santa Barbara, CA Urbanized Ar	Renewal
Guadalupe City	Santa Barbara	3	New	7,080		Guadalupe, CA Urban Cluster	Regional Board Designation
Hope Ranch CDP	Santa Barbara	3	New				Regional Board Designation
Isla Vista CDP	Santa Barbara	3	Renewal	23,096		Santa Barbara, CA Urbanized Ar	Renewal
Lompoc City	Santa Barbara	3	Renewal	42,434		Lompoc, CA Urbanized Area	Renewal
Los Olivos CDP	Santa Barbara	3	Renewal	1,132		Solvang--Buellton--Santa Ynez, C	Renewal
Mission Canyon CDP	Santa Barbara	3	New	2,381			Regional Board Designation
Mission Hills CDP	Santa Barbara	3	New	3,576			Regional Board Designation
Montecito CDP	Santa Barbara	3	New	8,965		Santa Barbara, CA Urbanized Ar	Within Urbanized Area
Orcutt CDP	Santa Barbara	3	Renewal	28,905		Santa Maria, CA Urbanized Area	Renewal
Santa Barbara City	Santa Barbara	3	Renewal	88,410	Ω	Santa Barbara, CA Urbanized Ar	Renewal
Santa Barbara County	Santa Barbara	3	Renewal				Renewal
Santa Maria City	Santa Barbara	3	Renewal	99,553	Ω	Santa Maria, CA Urbanized Area	Renewal
Santa Ynez CDP	Santa Barbara	3	Renewal	4,418		Solvang--Buellton--Santa Ynez, C	Renewal
Solvang City	Santa Barbara	3	Renewal	5,245		Solvang--Buellton--Santa Ynez, C	Renewal
Summerland CDP	Santa Barbara	3	Renewal	1,448		Santa Barbara, CA Urbanized Ar	Renewal
Toro Canyon CDP	Santa Barbara	3	New	1,508			Regional Board Designation
Vandenberg Village CDP	Santa Barbara	3	Renewal	6,497		Lompoc, CA Urbanized Area	Renewal
Santa Clara County							
Gilroy City	Santa Clara	3	Renewal	48,821	λ	Gilroy--Morgan Hill, CA Urbanize	Renewal
Morgan Hill City	Santa Clara	3	Renewal	37,882	λ	Gilroy--Morgan Hill, CA Urbanize	Renewal
San Martin CDP	Santa Clara	3	Renewal	7,027		Gilroy--Morgan Hill, CA Urbanize	Renewal
Santa Clara County	Santa Clara	3	Renewal		λ		Renewal
Santa Cruz County							
Aptos CDP	Santa Cruz	3	Renewal	6,220		Santa Cruz, CA Urbanized Area	Renewal
Ben Lomond CDP	Santa Cruz	3	New	6,234		Santa Cruz, CA Urbanized Area	Within Urbanized Area
Capitola City	Santa Cruz	3	Renewal	9,918		Santa Cruz, CA Urbanized Area	Renewal
Interlaken CDP	Santa Cruz	3	New	7,321		Watsonville, CA Urbanized Area	Within Urbanized Area
Live Oak CDP	Santa Cruz	3	New	17,158		Santa Cruz, CA Urbanized Area	Regional Board Designation
Pleasure Point CDP	Santa Cruz	3	New	5846		Santa Cruz, CA Urbanized Area	Within Urbanized Area
Rio del Mar CDP	Santa Cruz	3	New	9,216		Santa Cruz, CA Urbanized Area	Within Urbanized Area
Santa Cruz City	Santa Cruz	3	Renewal	59,946	λ	Santa Cruz, CA Urbanized Area	Renewal
Santa Cruz County	Santa Cruz	3	Renewal		λ		Renewal
Scotts Valley City	Santa Cruz	3	Renewal	11,580	λ	Santa Cruz, CA Urbanized Area	Renewal
Soquel CDP	Santa Cruz	3	New	9,644		Santa Cruz, CA Urbanized Area	Within Urbanized Area
Watsonville City	Santa Cruz	3	Renewal	51,199	λ	Watsonville, CA Urbanized Area	Renewal
Shasta County							

Anderson City	Shasta	5R	New	9,932	λ	Redding, CA Urbanized Area	Renewal
Redding City	Shasta	5R	New	89,861	λ	Redding, CA Urbanized Area	Renewal
Shasta County	Shasta	5R	New		λ		Renewal
Shasta Lake City	Shasta	5R	New	10,164		Redding, CA Urbanized Area	Renewal
Siskiyou County							
Yreka City	Siskiyou	1	New	7,765	λ	Yreka, CA Urban Cluster	TMDL
Solano County							
Benicia City	Solano	2	Renewal	26,997		Vallejo, CA Urbanized Area	Renewal
Solano County (Region 2)	Solano	2	Renewal		λ		Renewal
Dixon City	Solano	5S	Renewal	18,351	λ	Dixon, CA Urban Cluster	Renewal
Rio Vista City	Solano	5S	Renewal	7,360	λ	Rio Vista, CA Urban Cluster	Renewal
Solano County (Region 5S)	Solano	5S	Renewal		λ		Renewal
Vacaville City	Solano	5S	Renewal	92,428	λ	Fairfield, CA Urbanized Area	Renewal
Vacaville City	Solano	5S	Renewal	92,428	Ω	Vacaville, CA Urbanized Area	Renewal
Sonoma County							
Cloverdale City	Sonoma	1	New	8,618		Cloverdale, CA Urban Cluster	Regional Board Designation
Cotati City	Sonoma	1	Renewal	7,265	λ	Santa Rosa, CA Urbanized Area	Renewal
Forestville CDP	Sonoma	1	New	3,293		Forestville, CA Urban Cluster	Regional Board Designation
Guerneville CDP	Sonoma	1	New	4,534		Guerneville, CA Urban Cluster	Regional Board Designation
Healdsburg City	Sonoma	1	Renewal	11,254		Santa Rosa, CA Urbanized Area	Renewal
Monte Rio	Sonoma	1	New	1,152		Guerneville, CA Urban Cluster	Regional Board Designation
Occidental CDP	Sonoma	1	New	1,115			Regional Board Designation
Rohnert Park City	Sonoma	1	Renewal	40,971	λ	Santa Rosa, CA Urbanized Area	Renewal
Sebastopol City	Sonoma	1	Renewal	7,379	λ	Santa Rosa, CA Urbanized Area	Renewal
Windsor Town	Sonoma	1	Renewal	26,801	λ	Santa Rosa, CA Urbanized Area	Renewal
Petaluma City	Sonoma	2	Renewal	57,941	λ	Petaluma, CA Urbanized Area	Renewal
Sonoma City	Sonoma	2	Renewal	10,648	λ	Sonoma, CA Urban Cluster	Renewal
Sonoma County and Sonoma	Sonoma	1&2	Renewal		λ		Renewal
Stanislaus County							
Bret Harte CDP	Stanislaus	5S	New	5,152		Modesto, CA Urbanized Area	Within Urbanized Area
Ceres City	Stanislaus	5S	Renewal	45,417	λ	Modesto, CA Urbanized Area	Renewal
Empire CDP	Stanislaus	5S	Renewal	4,189	λ	Modesto, CA Urbanized Area	Renewal
Hughson City	Stanislaus	5S	Renewal	6,640	λ	Modesto, CA Urbanized Area	Renewal
Keyes CDP	Stanislaus	5S	Renewal	5,601	λ	Modesto, CA Urbanized Area	Renewal
Oakdale City	Stanislaus	5S	Renewal	20,675	λ	Modesto, CA Urbanized Area	Renewal
Patterson City	Stanislaus	5S	Renewal	20,413	λ	Patterson, CA Urban Cluster	Renewal
Riverbank City	Stanislaus	5S	Renewal	22,678	λ	Modesto, CA Urbanized Area	Renewal
Salida CDP	Stanislaus	5S	Renewal	13,722	λ	Modesto, CA Urbanized Area	Renewal
Stanislaus County	Stanislaus	5S	Renewal		λ		Renewal

Turlock City	Stanislaus	5S	Renewal	68,549	λ	Turlock, CA Urbanized Area	Renewal
West Modesto CDP	Stanislaus	5S	New	5,682		Modesto, CA Urbanized Area	Within Urbanized Area
Newman City	Stanislaus	5S	New	10,224		Newman, CA Urban Cluster	High Population/Density
Sutter County							
Live Oak	Sutter	5S	New	8,392	λ	Live Oak (Sutter County), CA Urb	TMDL
Sutter County	Sutter	5S	Renewal		λ		Renewal
Yuba City City	Sutter	5S	Renewal	64,925	λ	Yuba City, CA Urbanized Area	Renewal
Tehama County							
Red Bluff City	Tehama	5R	New	14,076	λ	Red Bluff, CA Urban Cluster	High Population/Density
Tulare County							
East Porterville CDP	Tulare	5F	New	6,767		Porterville, CA Urbanized Area	Within Urbanized Area
Exeter City	Tulare	5F	Renewal	10,334		Visalia, CA Urbanized Area	Renewal
Farmersville City	Tulare	5F	Renewal	10,588		Visalia, CA Urbanized Area	Renewal
Goshen CDP	Tulare	5F	Renewal	3,006		Visalia, CA Urbanized Area	Renewal
Porterville City	Tulare	5F	Renewal	54,165	Ω	Porterville, CA Urbanized Area	Renewal
Strathmore CDP	Tulare	5F	Renewal	2,819		Porterville, CA Urbanized Area	Renewal
Tulare City	Tulare	5F	Renewal	59,278	Ω	Visalia, CA Urbanized Area	Renewal
Tulare County	Tulare	5F	Renewal		λ		Renewal
Visalia City	Tulare	5F	Renewal	124,442	Ω	Visalia, CA Urbanized Area	Renewal
Dinuba City	Tulare	5F	New	21,453		Reedley--Dinuba, CA Urban Clus	High Population/Density
Yolo County							
Davis City	Yolo	5S	Renewal	65,622	λ	Davis, CA Urbanized Area	Renewal
UC Davis CDP	Yolo	5S	New	5,786		Davis, CA Urbanized Area	Within Urbanized Area
West Sacramento City	Yolo	5S	Renewal	48,744	λ	Sacramento, CA Urbanized Area	Renewal
Woodland City	Yolo	5S	Renewal	55,468	λ	Woodland, CA Urbanized Area	Renewal
Yolo County	Yolo	5S	Renewal		λ		Renewal
Yuba County							
Linda CDP	Yuba	5S	Renewal	17,773	λ	Yuba City, CA Urbanized Area	Renewal
Marysville City	Yuba	5S	Renewal	12,072	λ	Yuba City, CA Urbanized Area	Renewal
Olivehurst CDP	Yuba	5S	Renewal	13,656	λ	Yuba City, CA Urbanized Area	Renewal
Yuba County	Yuba	5S	Renewal		λ		Renewal

Draft Attachment B - Non-Traditional Small MS4 Permittees

Region	Permittee Name	Agency	Designation Criteria	Permittee Type	Monitoring Type
Monitoring Type: Δ = Areas of Special Biological Significance Special Protections					
*The list of Regulated MS4s in this Attachment may be amended by the Executive Director consistent with the designation criteria listed in the Order. Revised 2/19/13 to change Agency to Department of Homeland Security for Petaluma Coast Guard Training Center and Alameda Coast Guard Integrated Support Command, removed VA Northern CA Healthcare Systems and Martinez Center for Rehab and Extended.					
North Coast Regional Water Board					
1	Sonoma State University	California State University	Within Urbanized Area	New	
1	Caspar Headlands SB	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Caspar Headlands SR	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Del Norte Coast Redwoods SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Humboldt Lagoons SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Jug Handle SR	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Mendocino Headlands SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Mill Creek Property	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Patrick's Point SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Pelican SB	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Point Cabrillo Light Station Property	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Prairie Creek Redwoods SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Sinkyone Wilderness SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Tolowa Dunes SP	Parks and Recreation, Dept. of	ASBS	New	Δ
1	Trinidad SB	Parks and Recreation, Dept. of	ASBS	New	Δ

1	Petaluma Coast Guard Training Center	Homeland Security, Department of	Regional Board Designation	New	
San Francisco Regional Water Board					
2	San Jose Airport	Airport	Regional Board Designation	New	
2	FCI Dublin	Bureau of Prisons	Within Urbanized Area	New	
2	California State University Maritime	California State University	Within Urbanized Area	New	
2	California State University East Bay - Hayward Campus	California State University	Within Urbanized Area	New	
2	California State University East Bay - Concord Campus	California State University	Within Urbanized Area	New	
2	San Jose State University	California State University	Within Urbanized Area	New	
2	San Quentin State Prison	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
2	Travis Air Force Base	Defense, Department of	Within Urbanized Area	New	
2	Agnews Developmental Center East & West	Developmental Services, Dept of	Within Urbanized Area	New	
2	Sonoma Development Center	Developmental Services, Dept of.	Renewal	Renewal	
2	Sonoma-Marin Fair	District Agricultural Association	Within Urbanized Area	New	
2	Napa County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
2	Montara SB	Parks and Recreation, Dept. of	ASBS	New	
2	Port of Oakland	Port	Regional Board Designation	New	
2	Port of Redwood City	Port	Regional Board Designation	New	
2	AMTRAK	Special District	Regional Board Designation	New	
2	Bay Area Rapid Transit	Special District	Regional Board Designation	New	
2	CalTrain	Special District	Regional Board Designation	New	
2	Golden Gate Bridge, Highway and Transportation District	Special District	Regional Board Designation	New	

2	Valley Transit Authority (VTA)	Special District	Regional Board Designation	New	
2	Alameda Coast Guard Integrated Support Command	Homeland Security, Department of	Regional Board Designation	New	
2	University of California Berkeley	University of California	Within Urbanized Area	New	
2	The University of California, San Francisco	University of California	Within Urbanized Area	New	
Central Coast Regional Water Board					
3	USP Lompoc	Bureau of Prisons	Within Urbanized Area	New	
3	FCI Lompoc	Bureau of Prisons	Within Urbanized Area	New	
3	California Polytechnic State University	California State University	Within Urbanized Area	New	
3	California State University Monterey Bay	California State University	Within Urbanized Area	New	
3	Los Osos Community Services District	Community Services District	Renewal	Renewal	
3	Oceano Community Services District	Community Services District	Renewal	Renewal	
3	Templeton Community Services District	Community Services District	Renewal	Renewal	
3	California Men's Colony	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
3	Fort Hunter Ligget, Army Garrison	Defense, Department of	Regional Board Designation	New	
3	US Army Presidio of Monterey; includes Defense Language Institute	Defense, Department of	Within Urbanized Area	New	
3	Vandenberg AFB	Defense, Department of	Renewal	Renewal	
3	Monterey County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
3	Santa Maria Fairpark	District Agricultural Association	Within Urbanized Area	New	
3	Santa Cruz County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
3	Earl Warren Showgrounds (National Horse Show)	District Agricultural Association	Within Urbanized Area	New	
3	San Luis Obispo County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	

3	Fort Ord Reuse Authority	Local Agency	Regional Board Designation	New	
3	Ano Nuevo SP	Parks and Recreation, Dept. of	ASBS	New	Δ
3	Ano Nuevo SR	Parks and Recreation, Dept. of	ASBS	New	Δ
3	Carmel River SB	Parks and Recreation, Dept. of	ASBS	New	Δ
3	Julia Pfeiffer Burns SP	Parks and Recreation, Dept. of	ASBS	New	Δ
3	Oceano Dunes SVRA	Parks and Recreation, Dept. of	Within Urbanized Area	New	
3	Pismo SB	Parks and Recreation, Dept. of	Within Urbanized Area	New	
3	Point Lobos SR	Parks and Recreation, Dept. of	ASBS	New	Δ
3	Carpinteria Unified School District	School District, Carpinteria Unified	Renewal	Renewal	
3	University of California, Santa Barbara	University of California	Renewal	Renewal	
3	University of California, Santa Cruz	University of California	Renewal	Renewal	
Los Angeles Regional Water Board					
4	FCI Terminal Island	Bureau of Prisons	Within Urbanized Area	New	
4	CCM Long Beach	Bureau of Prisons	Within Urbanized Area	New	
4	California State University Los Angeles	California State University	Within Urbanized Area	New	
4	California State University Northridge	California State University	Within Urbanized Area	New	
4	California State University Channel Islands	California State University	Within Urbanized Area	New	
4	California State University Long Beach	California State University	Within Urbanized Area	New	
4	California State Polytechnic University, Pomona	California State University	Within Urbanized Area	New	
4	California State University Dominguez Hills	California State University	Within Urbanized Area	New	
4	Naval Base Ventura County; includes Port Hueneme and Point Mugu	Defense, Department of	Within Urbanized Area	New	

4	Lanterman Developmental Center	Developmental Services, Dept of	Within Urbanized Area	New	
4	Ventura County Fairgrounds (Seaside Park and Ventura County Fairgrounds)	District Agricultural Association	Within Urbanized Area	New	
4	Point Dume SB	Parks and Recreation, Dept. of	ASBS	New	Δ
4	Point Mugu SP	Parks and Recreation, Dept. of	ASBS	New	Δ
4	Robert H. Meyer Memorial SB	Parks and Recreation, Dept. of	ASBS	New	Δ
4	UCLA	University of California	Within Urbanized Area	New	
4	Long Beach VA Medical Center	Veteran Affairs	Within Urbanized Area	New	
4	VA Greater Los Angeles Healthcare System (GLA)	Veteran Affairs	Within Urbanized Area	New	
Central Valley Regional Water Board					
5F	USP Atwater	Bureau of Prisons	Within Urbanized Area	New	
5F	California State University Bakersfield	California State University	Within Urbanized Area	New	
5F	Porterville Developmental Center	Developmental Services, Dept of	Within Urbanized Area	New	
5F	Madera County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5F	Kern County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5F	Tulare County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5F	Kings County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5F	The Big Fresno Fair	District Agricultural Association	Within Urbanized Area	New	
5F	Merced County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5F	University of California, Merced	University of California	Within Urbanized Area	New	
5F	Lemoore NAS	Defense, Department of	Within Urbanized Area	New	
5R	California State University Chico	California State University	Within Urbanized Area	New	

5R	Silver Dollar Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5R	Shasta County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5R	Carnegie State Vehicular Recreation Area	Parks and Recreation, Dept. of	Within Urbanized Area	New	
5S	California State University Sacramento	California State University	Renewal	Renewal	
5S	California State University Stanislaus	California State University	Within Urbanized Area	New	
5S	Rancho Murieta Community Services District	Community Services District	Renewal	Renewal	
5S	Mountain House Community Services District	Community Services District	Renewal	Renewal	
5S	Cosumnes Community Services District	Community Services District	Renewal	Renewal	
5S	CSP, Solano County	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
5S	Deuel Vocational Institution	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
5S	Folsom State Prison	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
5S	CSP, Sacramento	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
5S	California Medical Facility	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
5S	Contra Costa County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5S	Sutter County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5S	Yolo County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5S	Stanislaus County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5S	San Joaquin County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
5S	California Exposition & State Fair	Exposition & State Fair, California	Renewal	Renewal	
5S	Elk Grove Unified School District	School District, Elk Grove Unified	Renewal	Renewal	

5S	Tracy Joint Unified School District	School District, Tracy Joint Unified	Renewal	Renewal	
5S	The University of California, Davis	University of California	Renewal	Renewal	
5S	Sacramento Medical Center at Mather	Veteran Affairs	Within Urbanized Area	New	
Lahontan Regional Water Board					
6V	FCI Victorville	Bureau of Prisons	Within Urbanized Area	New	
6V	San Bernardino County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
Santa Ana Regional Water Board					
8	Los Alamitos AFRC	California Army National Guard	Within Urbanized Area	New	
8	California State University Fullerton	California State University	Within Urbanized Area	New	
8	California State University San Bernardino	California State University	Within Urbanized Area	New	
8	California Institution for Men	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
8	California Institution for Women	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
8	California Rehabilitation Center	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
8	Fairview Developmental Center	Developmental Services, Dept of.	Within Urbanized Area	New	
8	March Air Force Base	Department of Defense	Regional Board Designation	New	
8	Orange County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
8	Crystal Cove SP	Parks and Recreation, Dept. of	ASBS	New	Δ
8	University of California, Irvine	University of California	Within Urbanized Area	New	
8	University of California, Riverside	University of California	Within Urbanized Area	New	
8	Jerry L. Pettis Memorial VA Medical Center	Veteran Affairs	Within Urbanized Area	New	

San Diego Regional Water Board					
9	MCC San Diego	Bureau of Prisons	Within Urbanized Area	New	
9	San Diego State University	California State University	Within Urbanized Area	New	
9	California State University San Marcos	California State University	Within Urbanized Area	New	
9	R J Donovan Correctional Facility at Rock Mountain	Corrections and Rehabilitation, Dept of	Within Urbanized Area	New	
9	Miramar Marine Corps Air Station	Defense, Department of	Regional Board Designation	New	
9	Camp Pendleton	Defense, Department of	Within Urbanized Area	New	
9	Del Mar Fairgrounds	District Agricultural Association	Renewal	Renewal	
9	San Diego County Fairgrounds	District Agricultural Association	Within Urbanized Area	New	
9	North County Transit District (NCTD)	Transportation Agency	Regional Board Designation	New	
9	University of California, San Diego	University of California	Within Urbanized Area	New	
9	VA San Diego Healthcare System	Veteran Affairs	Within Urbanized Area	New	

Special Conditions (Specific Provisions) for Traditional and Non-Traditional Small MS4 ASBS Discharges

---

All Traditional and Non-traditional Small MS4 Permittees that discharge to ASBS as listed in Attachment D have been granted an exception to the Ocean Plan and shall comply with the following Special Protections requirements. Special Protections for Areas of Special Biological Significance, Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges (Attachment B to State Water Board Resolution 2012-0001) (Special Protections).

The Special Protections for Areas of Special Biological Significance require submittal of Compliance Plans to be included in a SWMP. However, SWMPs are no longer required for submittal by this Order. As such, Permittees shall submit a stand-alone Compliance Plan document for ASBS discharges and submit per the Special Conditions compliance schedule, through their online Annual Report.

I. PROVISIONS FOR POINT SOURCE DISCHARGES OF STORM WATER

The following terms, prohibitions, and special conditions (hereafter collectively referred to as special conditions) are established as limitations on point source storm water. These special conditions provide Special Protections for marine aquatic life and natural water quality in Areas of Special Biological Significance (ASBS), as required for State Water Quality Protection Areas pursuant to California Public Resources Code Sections 36700(f) and 36710(f). These Special Protections are adopted by the State Water Board as part of the California Ocean Plan (Ocean Plan) General Exception.

A. PERMITTED POINT SOURCE DISCHARGES OF STORM WATER

1. General Provisions for Permitted Point Source Discharges of Storm Water

    a. Existing storm water discharges into an ASBS are allowed only under the following conditions:

        (1) The discharges are authorized by this Order;

        (2) The discharges comply with all of the applicable terms, prohibitions, and special conditions contained in the Special Protections as laid out in this Attachment; and

        (3) The discharges:

            (i) Are essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage;

            (ii) Are designed to prevent soil erosion;

            (iii) Occur only during wet weather;

            (iv) Are composed of only storm water runoff.

    b. Discharges composed of storm water runoff shall not alter natural ocean water quality in an ASBS.

c. The discharge of trash is prohibited.

d. Only discharges from existing storm water outfalls are allowed. Any proposed or new storm water runoff discharge shall be routed to existing storm water discharge outfalls and shall not result in any new contribution of waste to an ASBS (i.e., no additional pollutant loading). "Existing storm water outfalls" are those that were constructed or under construction prior to January 1, 2005. "New contribution of waste" is defined as any addition of waste beyond what would have occurred as of January 1, 2005. A change to an existing storm water outfall, in terms of re-location or alteration, in order to comply with these special conditions, is allowed and does not constitute a new discharge.

e. Non-storm water discharges are prohibited except as provided below:

(1) The term "non-storm water discharges" means any waste discharges from a municipal separate storm sewer system (MS4) or other NPDES permitted storm drain system to an ASBS that are not composed entirely of storm water.

(2) The following non-storm water discharges are allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability or occur naturally:

(i) Discharges associated with emergency firefighting operations.

(ii) Foundation and footing drains.

(iii) Water from crawl space or basement pumps.

(iv) Hillside dewatering.

(v) Naturally occurring groundwater seepage via a storm drain.

(vi) Non-anthropogenic flows from a naturally occurring stream via a culvert or storm drain, as long as there are no contributions of anthropogenic runoff.

(3) Discharges from utility vaults and underground structures to a segment of the MS4 with a direct discharge to an ASBS are permitted if such discharges are authorized by the General NPDES Permit for Discharges from Utility Vaults and Underground Structures to Surface Water, NPDES No. CAG 990002. Other short-duration, intermittent non-storm water discharges related to utilities (e.g. groundwater dewatering, potable water system flushing, hydrotest discharges) to a segment of the MS4 with a direct discharge to an ASBS are permitted if such discharges are authorized by an NPDES permit issued by the relevant Regional Water Board. A Regional Water Board may nonetheless prohibit a specific discharge from a utility vault or underground structure or other specific utility-related discharge if it determines that the discharge is causing the MS4 discharge to the ASBS to alter natural ocean water quality in the

ASBS. Additional non-storm water discharges to a segment of the MS4 with a direct discharge to an ASBS are allowed only to the extent the relevant Regional Water Board finds that the discharge does not alter natural ocean water quality in the ASBS.

This provision does not supersede the authority of the MS4 to effectively prohibit a non-storm water discharge that has been found to alter natural ocean water quality in the ASBS.

(4) Authorized non-storm water discharges shall not cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS.

2. Compliance Plans for Inclusion in Storm Water Management Plans (SWMP) and Storm Water Pollution Prevention Plans (SWPPP)

The Permittee shall specifically address the prohibition of non-storm water runoff and the requirement to maintain natural water quality for storm water discharges to an ASBS in an ASBS Compliance Plan to be submitted to the appropriate Regional Water Board. The ASBS Compliance Plan is subject to approval by the Executive Director of the State Water Board.

a. The Compliance Plan shall include a map of surface drainage of storm water runoff, showing areas of sheet runoff, prioritize discharges, and describe any structural Best Management Practices (BMPs) already employed and/or BMPs to be employed in the future. Priority discharges are those that pose the greatest water quality threat and which are identified to require installation of structural BMPs. The map shall also show the storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion and waste and hazardous material storage areas, if applicable. The SWMP or SWPPP shall also include a procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

b. The ASBS Compliance Plan shall describe the measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) has been eliminated, how these measures will be maintained over time, and how these measures are monitored and documented.

c. The ASBS Compliance Plan shall require minimum inspection frequencies as follows:

(1) The minimum inspection frequency for construction sites shall be weekly during rainy season;

(2) The minimum inspection frequency for industrial facilities shall be monthly during the rainy season;

(3) The minimum inspection frequency for commercial facilities (e.g., restaurants) shall be twice during the rainy season;

(4) Storm water outfall drains equal to or greater than 18 inches (457 mm) in diameter or width shall be inspected once prior to the beginning of the rainy season and once during the rainy season and maintained to remove trash and other anthropogenic debris.

d. The ASBS Compliance Plan shall address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff, that are necessary to comply with these special conditions, will be achieved through BMPs. Structural BMPs need not be installed if the Permittee can document to the satisfaction of the State Water Board Executive Director that such installation would pose a threat to health or safety. BMPs to control storm water runoff discharges (at the end-of-pipe) during a design storm shall be designed to achieve on average the following target levels:

(1) Table B Instantaneous Maximum Water Quality Objectives in Chapter II of the Ocean Plan; or

(2) A 90% reduction in pollutant loading during storm events, for the Permittee's total discharges. The baseline for the reduction is the effective date of the Exception. The baseline for these determinations is the effective date of the Exception, and the reductions must be achieved and documented within six (6) years of the effective date.

e. The ASBS Compliance Plan shall address erosion control and the prevention of anthropogenic sedimentation in ASBS. The natural habitat conditions in the ASBS shall not be altered as a result of anthropogenic sedimentation.

f. The ASBS Compliance Plan shall describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. The ASBS Compliance Plan shall include non-structural BMPs that address public education and outreach. Education and outreach efforts must adequately inform the public that direct discharges of pollutants from private property not entering an MS4 are prohibited. The ASBS Compliance Plan shall also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider using LID practices to infiltrate, use, or evapotranspire storm water runoff on-site.

g. The BMPs and implementation schedule shall be designed to ensure that natural water quality conditions in the receiving water are achieved and maintained by either reducing flows from impervious surfaces or reducing pollutant loading, or some combination thereof.

h. If the results of the receiving water monitoring described in Section IV. B. below indicate that the storm water runoff is causing or contributing to an alteration of natural ocean water quality in the ASBS, the Permittee shall submit a report to the State Water Board and Regional Water Board within 30 days of receiving the results.

(1) The report shall identify the constituents in storm water runoff that alter natural ocean water quality and the sources of these constituents.

(2) The report shall describe BMPs that are currently being implemented, BMPs that are identified in the ASBS Compliance Plan for future implementation, and any additional BMPs that may be added to the ASBS Compliance Plan to address the alteration of natural water quality. The report shall include a new or modified implementation schedule for the BMPs.

(3) Within 30 days of the approval of the report by the State Water Board Executive Director, the Permittee shall revise its ASBS Compliance Plan to incorporate any new or modified BMPs that have been or will be implemented, the implementation schedule, and any additional monitoring required.

(4) As long as the Permittee has complied with the procedures described above and is implementing the revised ASBS Compliance Plan, the Permittee does not have to repeat the same procedure for continuing or recurring exceedances of natural ocean water quality conditions due to the same constituent.

(5) Compliance with this section does not excuse violations of any term, prohibition, or condition contained in the Special Protections.

3. Compliance Schedule

a. On the effective date of the Exception, all non-authorized non-storm water discharges (e.g., dry weather flow) are effectively prohibited.

b. Within 18 months from the effective date of the Exception, the Permittee shall submit a written ASBS Compliance Plan to the State Water Board Executive Director that describes its strategy to comply with these special conditions, including the requirement to maintain natural water quality in the affected ASBS. The ASBS Compliance Plan shall include a time schedule to implement appropriate non-structural and structural controls (implementation schedule) to comply with these special conditions.

c. Within 18 months of the effective date of the Exception, any non-structural controls that are necessary to comply with these special conditions shall be implemented.

d. Within six (6) years of the effective date of the Exception, any structural controls identified in the ASBS Compliance Plan that are necessary to comply with these special conditions shall be operational.

e. Within six (6) years of the effective date of the Exception, all Permittees must comply with the requirement that their discharges into the affected ASBS maintain natural ocean water quality. If the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then the Permittee must re-sample the receiving water, pre- and post-storm. If after re-sampling the post-storm levels are still higher than the 85th percentile threshold of reference water quality data, and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is exceeded. See attached Flowchart Section C.

f. The Executive Director of the State Water Board may only authorize additional time to comply with the special conditions d. and e., above if good cause exists to do so. Good cause means a physical impossibility or lack of funding.

If a Permittee claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the Permittee first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in d. or e. The notice shall describe the reason for the noncompliance or anticipated noncompliance and specifically refer to this Section of this Exception. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the Permittee to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The Permittee shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality.

The Permittee may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. for Traditional Small MS4s, a demonstration of significant hardship to Permittee ratepayers, by showing the relationship of storm water fees to annual household income for residents within the Permittee's jurisdictional area, and the Permittee has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate; or

2. for Non-Traditional Small MS4s, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process.

II. ADDITIONAL REQUIREMENTS FOR PARKS AND RECREATION FACILITIES

In addition to the provisions in Section I (A) a Permittee with parks and recreation facilities shall comply with the following:

A. The Permittee shall include a section in an ASBS Compliance Plan to address storm water runoff from parks and recreation facilities.

1. The Section shall identify all pollutant sources, including sediment sources, which may result in waste entering storm water runoff. Pollutant sources include, but are not limited to, roadside rest areas and vistas, picnic areas, campgrounds, trash receptacles, maintenance facilities, park personnel housing, portable toilets, leach fields, fuel tanks, roads, piers, and boat launch facilities.

2. The Section shall describe BMPs or Management Measures/Practices that will be implemented to control soil erosion (both temporary and permanent erosion controls) and reduce or eliminate pollutants in storm water runoff in order to achieve and maintain natural water quality conditions in the affected ASBS. The plan shall include BMPs or Management Measures/Practices to ensure that trails and culverts are maintained to prevent erosion and minimize waste discharges to ASBS.

3. The Section shall include BMPs or Management Measures/Practices to prevent the discharge of pesticides or other chemicals, including agricultural chemicals, in storm water runoff to the affected ASBS.

4. The Section shall include BMPs or Management Measures/Practices that address public education and outreach. The goal of these BMPs or Management Measures/Practices is to ensure that the public is adequately informed that waste discharges to the affected ASBS are prohibited or limited by special conditions in in the Special Protections as laid out in this Attachment . The BMPs or Management Measures/Practices shall include signage at camping, picnicking, beach and roadside parking areas, and visitor centers, or other appropriate measures, which notify the public of any applicable requirements of the Special Protections as laid out in this Attachment and identify the ASBS boundaries.

5. The Section shall include BMPs or Management Measures/Practices that address the prohibition against the discharge of trash to ASBS. The BMPs or Management Measures/Practices shall include measures to ensure that adequate trash receptacles are available for public use at visitor facilities, including parking areas, and that the receptacles are adequately maintained to prevent trash discharges into the ASBS. Appropriate measures include covering trash receptacles to prevent trash from being windblown and periodically emptying the receptacles to prevent overflows.

6. The Section shall include BMPs or Management Measures/Practices to address runoff from parking areas and other developed features to ensure that the runoff does not alter natural water quality in the affected ASBS. BMPs or Management Measures/Practices shall include measures to reduce pollutant loading in runoff to the ASBS through installation of natural area buffers (LID), treatment, or other appropriate measures.

B. Maintenance and repair of park and recreation facilities must not result in waste discharges to the ASBS. The practice of road oiling must be minimized or eliminated, and must not result in waste discharges to the ASBS.

III. ADDITIONAL REQUIREMENTS – WATERFRONT AND MARINE OPERATIONS

In addition to the provisions in Section I (A), a Permittee with waterfront and marine operations shall comply with the following:

A. For discharges related to waterfront and marine operations, the Permittee shall develop a Waterfront and Marine Operations Management Section (Waterfront Section) for its ASBS Compliance Plan. The Waterfront Section shall contain appropriate Best Management Practices (BMPs) to address pollutant discharges to the affected ASBS.

1. The Waterfront Section shall contain appropriate BMPs for any waste discharges associated with the operation and maintenance of vessels, moorings, piers, launch ramps, and cleaning stations in order to ensure that beneficial uses are protected and natural water quality is maintained in the affected ASBS.

2. For discharges from marinas and recreational boating activities, the Waterfront Section shall include appropriate Management Measures, described in The Plan for California's Nonpoint Source Pollution Control Program, for marinas and recreational boating, or equivalent practices, to ensure that nonpoint source pollutant discharges do not alter natural water quality in the affected ASBS.

3. The Waterfront Section shall include BMPs to address public education and outreach to ensure that the public is adequately informed that waste discharges to the affected ASBS are prohibited or limited by special conditions in the Special Protections as laid out in this Attachment. The BMPs shall include appropriate signage, or similar measures, to inform the public of the ASBS restrictions and to identify the ASBS boundaries.

4. The Waterfront Section shall include BMPs to address the prohibition against trash discharges to ASBS. The BMPs shall include the provision of adequate trash receptacles for marine recreation areas, including parking areas, launch ramps, and docks. The plan shall also include appropriate BMPs to ensure that the receptacles are adequately maintained and secured in order to prevent trash discharges into the ASBS. Appropriate BMPs include covering the trash receptacles to prevent trash from being windblown, staking or securing the trash receptacles so they don't tip over, and periodically emptying the receptacles to prevent overflow.

5. The Permittee shall submit the Waterfront Plan to the Executive Director of the State Water Board within six months of the effective date of these special conditions. The Waterfront Plan is subject to approval by the State Water Board Executive Director. The plan must be fully implemented within 18 months of the effective date of the Exception.

B. The discharge of chlorine, soaps, petroleum, other chemical contaminants, trash, fish offal, or human sewage to ASBS is prohibited. Sinks and fish cleaning stations are point source discharges of wastes and are prohibited from discharging into ASBS. Anthropogenic accumulations of discarded fouling organisms on the sea floor must be minimized.

C. Limited-term activities, such as the repair, renovation, or maintenance of waterfront facilities, including, but not limited to, piers, docks, moorings, and breakwaters, are authorized only in accordance with Chapter III.E.2 of the Ocean Plan.

D. If the Permittee anticipates that it will fail to fully implement the approved Waterfront Plan within the 18 month deadline, the Permittee shall submit a technical report as soon as practicable to the State Water Board Executive Director. The technical report shall contain reasons for failing to meet the deadline and propose a revised schedule to fully implement the plan.

E. The State Water Board Executive Director may, for good cause, authorize additional time to comply with the Waterfront Plan. Good cause means a physical impossibility or lack of funding.

If a Permittee claims physical impossibility, it shall notify the Board in writing within thirty (30) days of the date that the Permittee first knew of the event or circumstance that caused or would cause it to fail to meet the deadline in Section III.A.5. The notice shall describe the reason for

the noncompliance or anticipated noncompliance and specifically refer to this Section of the Special Protections as laid out in this Attachment. It shall describe the anticipated length of time the delay in compliance may persist, the cause or causes of the delay as well as measures to minimize the impact of the delay on water quality, the measures taken or to be taken by the Permittee to prevent or minimize the delay, the schedule by which the measures will be implemented, and the anticipated date of compliance. The Permittee shall adopt all reasonable measures to avoid and minimize such delays and their impact on water quality. The Permittee may request an extension of time for compliance based on lack of funding. The request for an extension shall require:

1. a demonstration of significant hardship by showing that the Permittee has made timely and complete applications for all available bond and grant funding, and either no bond or grant funding is available, or bond and/or grant funding is inadequate.

2. for governmental agencies, a demonstration and documentation of a good faith effort to acquire funding through that agency's budgetary process, and a demonstration that funding was unavailable or inadequate.

IV. MONITORING REQUIREMENTS

Monitoring is mandatory for all Permittees to assure compliance with the Ocean Plan. Monitoring requirements include both: (A) core discharge monitoring, and (B) ocean receiving water monitoring. The State and Regional Water Boards must approve sampling site locations and any adjustments to the monitoring programs. All ocean receiving water and reference area monitoring must be comparable with the Water Boards' Surface Water Ambient Monitoring Program (SWAMP).

Safety concerns: Sample locations and sampling periods must be determined considering safety issues. Sampling may be postponed upon notification to the State and Regional Water Boards if hazardous conditions prevail.

Analytical Chemistry Methods: All constituents must be analyzed using the lowest minimum detection limits comparable to the Ocean Plan water quality objectives. For metal analysis, all samples, including storm water effluent, reference samples, and ocean receiving water samples, must be analyzed by the approved analytical method with the lowest minimum detection limits (currently Inductively Coupled Plasma/Mass Spectrometry) described in the Ocean Plan.

A. CORE DISCHARGE MONITORING PROGRAM

1. General sampling requirements for timing and storm size:

   Runoff must be collected during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event. Runoff samples shall be collected when post-storm receiving water is sampled, and analyzed for the same constituents as receiving water and reference site samples (see section IV B) as described below.

2. Runoff flow measurements

   a. For municipal/industrial storm water outfalls in existence as of December 31, 2007, 18 inches (457mm) or greater in diameter/width (including multiple outfall pipes in combination having a width of 18 inches, runoff flows must be measured or calculated, using a method acceptable to and approved by the State and Regional Water Boards.

   b. This will be reported annually for each precipitation season to the State and Regional Water Boards.

3. Runoff samples – storm events

   a. For outfalls equal to or greater than 18 inches (0.46m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination, and

      (2) samples of storm water runoff shall be analyzed for critical life stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS

      (3) If a Permittee has no outfall greater than 36 inches, then storm water runoff from the Permittee's largest outfall shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates).

   b. For outfalls equal to or greater than 36 inches (0.91m) in diameter or width:

      (1) samples of storm water runoff shall be analyzed during the same storm as receiving water samples for oil and grease, total suspended solids, and, within the range of the southern sea otter indicator bacteria or some other measure of fecal contamination; and

      (2) samples of storm water runoff shall be further analyzed during the same storm as receiving water samples for Ocean Plan Table B metals for protection of marine life, Ocean Plan polynuclear aromatic hydrocarbons (PAHs), current use pesticides (pyrethroids and OP pesticides), and nutrients (ammonia, nitrate and phosphates) and

      (3) samples of storm water runoff shall be analyzed for critical stage chronic toxicity (one invertebrate or algal species) at least once during each storm season when receiving water is sampled in the ASBS.

   c. For a Permittee not participating in a regional monitoring program [see below in Section IV (B)] in addition to (a.) and (b.) above, a minimum of the two largest outfalls or 20 percent of the larger outfalls, whichever is greater, shall be sampled (flow weighted composite samples) at least three times annually during wet weather (storm event) and

analyzed for all Ocean Plan Table A constituents, Table B constituents for marine aquatic life protection (except for toxicity, only chronic toxicity for three species shall be required), DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, and Ocean Plan indicator bacteria. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one (the largest) such discharge shall be sampled annually in each Region.

4. The Executive Director of the State Water Board may reduce or suspend core monitoring once the storm runoff is fully characterized. This determination may be made at any point after the discharge is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

B. OCEAN RECEIVING WATER AND REFERENCE AREA MONITORING PROGRAM

In addition to performing the Core Discharge Monitoring Program in Section IV..A above, all applicants having authorized discharges must perform ocean receiving water monitoring. In order to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS, Permittees may choose either (1) an individual monitoring program, or (2) participation in a regional integrated monitoring program.

1. Individual Monitoring Program: The requirements listed below are for those Permittees who elect to perform an individual monitoring program to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within the affected ASBS. In addition to Core Discharge Monitoring, the following additional monitoring requirements shall be met:

    a. Three times annually, during wet weather (storm events), the receiving water at the point of discharge from the outfalls described in section (IV)(A)(3)(c) above shall be sampled and analyzed for Ocean Plan Table A constituents, Table B constituents for marine aquatic life, DDT, PCBs, Ocean Plan PAHs, OP pesticides, pyrethroids, nitrates, phosphates, salinity, chronic toxicity (three species), and Ocean Plan indicator bacteria.

        The sample location for the ocean receiving water shall be in the surf zone at the point of discharges; this must be at the same location where storm water runoff is sampled. Receiving water shall be sampled at approximately the same time prior to (pre-storm) and during (or immediately after) the same storm (post storm). Reference water quality shall also be sampled and analyzed for the same constituents pre-storm and post-storm, during the same storms when receiving water is sampled. Reference stations will be determined by the State Water Board's Division of Water Quality and the applicable Regional Water Board(s).

    b. Sediment sampling shall occur at least three times during every five (5) year period. The subtidal sediment (sand or finer, if present) at the discharge shall be sampled and analyzed for Ocean Plan Table B constituents for marine aquatic life, DDT, PCBs, PAHs, pyrethroids, and OP pesticides. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed.

c. A quantitative survey of intertidal benthic marine life shall be performed at the discharge and at a reference site. The survey shall be performed at least once every five (5) year period. The survey design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The results of the survey shall be completed and submitted to the State Water Board and Regional Water Board at least six months prior to the end of the permit cycle.

d. Once during each five (5) year period, a bioaccumulation study shall be conducted to determine the concentrations of metals and synthetic organic pollutants at representative discharge sites and at representative reference sites. The study design is subject to approval by the Regional Water Board and the State Water Board's Division of Water Quality. The bioaccumulation study may include California mussels (*Mytilus californianus*) and/or sand crabs (*Emerita analoga* or *Blepharipoda occidentalis*). Based on the study results, the Regional Water Board and the State Water Board's Division of Water Quality, may adjust the study design in subsequent permits, or add or modify additional test organisms (such as shore crabs or fish), or modify the study design appropriate for the area and best available sensitive measures of contaminant exposure.

e. Marine Debris: Representative quantitative observations for trash by type and source shall be performed along the coast of the ASBS within the influence of the Permittee's outfalls. The design, including locations and frequency, of the marine debris observations is subject to approval by the Regional Water Board and State Water Board's Division of Water Quality.

f. The monitoring requirements of the Individual Monitoring Program in this section are minimum requirements. After a minimum of one (1) year of continuous water quality monitoring of the discharges and ocean receiving waters, the Executive Director of the State Water Board (may require additional monitoring, or adjust, reduce or suspend receiving water and reference station monitoring. This determination may be made at any point after the discharge and receiving water is fully characterized, but is best made after the monitoring results from the first permit cycle are assessed.

2. Regional Integrated Monitoring Program: Permittees may elect to participate in a regional integrated monitoring program, in lieu of an individual monitoring program, to fulfill the requirements for monitoring the physical, chemical, and biological characteristics of the ocean receiving waters within their ASBS. This regional approach shall characterize natural water quality, pre- and post-storm, in ocean reference areas near the mouths of identified open space watersheds and the effects of the discharges on natural water quality (physical, chemical, and toxicity) in the ASBS receiving waters, and should include benthic marine aquatic life and bioaccumulation components. The design of the ASBS stratum of a regional integrated monitoring program may deviate from the otherwise prescribed individual monitoring approach (in Section IV.B.1) if approved by the State Water Board's Division of Water Quality and the Regional Water Boards.

   a. Ocean reference areas shall be located at the drainages of flowing watersheds with minimal development (in no instance more than 10% development), and shall not be located in CWA Section 303(d) listed waterbodies or have tributaries that are 303(d) listed. Reference areas shall be free of wastewater discharges and anthropogenic non-storm water runoff. A minimum of low threat storm runoff discharges (e.g. stream highway overpasses and campgrounds) may be allowed on a case-by-case basis.

Reference areas shall be located in the same region as the ASBS receiving water monitoring occurs. The reference areas for each Region are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean reference water samples must be collected from each station, each from a separate storm. A minimum of one reference location shall be sampled for each ASBS receiving water site sampled per responsible party. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

b. ASBS ocean receiving water must be sampled in the surf zone at the location where the runoff makes contact with ocean water (i.e. at "point zero"). Ocean receiving water stations must be representative of worst-case discharge conditions (i.e. co-located at a large drain greater than 36 inches, or if drains greater than 36 inches are not present in the ASBS then the largest drain greater than18 inches.) Ocean receiving water stations are subject to approval by the participants in the regional monitoring program and the State Water Board's Division of Water Quality and the applicable Regional Water Board(s). A minimum of three ocean receiving water samples must be collected during each storm season from each station, each from a separate storm. A minimum of one receiving water location shall be sampled in each ASBS per responsible party in that ASBS. For parties discharging to ASBS in more than one Regional Water Board region, at a minimum, one reference station and one receiving water station shall be sampled in each region.

c. Reference and receiving water sampling shall commence during the first full storm season following the adoption of these special conditions, and post-storm samples shall be collected when annual storm water runoff is sampled. Sampling shall occur in a minimum of two storm seasons. For those ASBS Permittees that have already participated in the Southern California Bight 2008 ASBS regional monitoring effort, sampling may be limited to only one storm season.

d. Receiving water and reference samples shall be analyzed for the same constituents as storm water runoff samples. At a minimum, constituents to be sampled and analyzed in reference and discharge receiving waters must include oil and grease, total suspended solids, Ocean Plan Table B metals for protection of marine life, Ocean Plan PAHs, pyrethroids, OP pesticides, ammonia, nitrate, phosphates, and critical life stage chronic toxicity for three species. In addition, within the range of the southern sea otter, indicator bacteria or some other measure of fecal contamination shall be analyzed.

3. Waterfront and Marine Operations: In addition to the above requirements for ocean receiving water monitoring, additional monitoring must be performed for marinas and boat launch and pier facilities:

a. For all marina or mooring field operators, in mooring fields with 10 or more occupied moorings, the ocean receiving water must be sampled for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

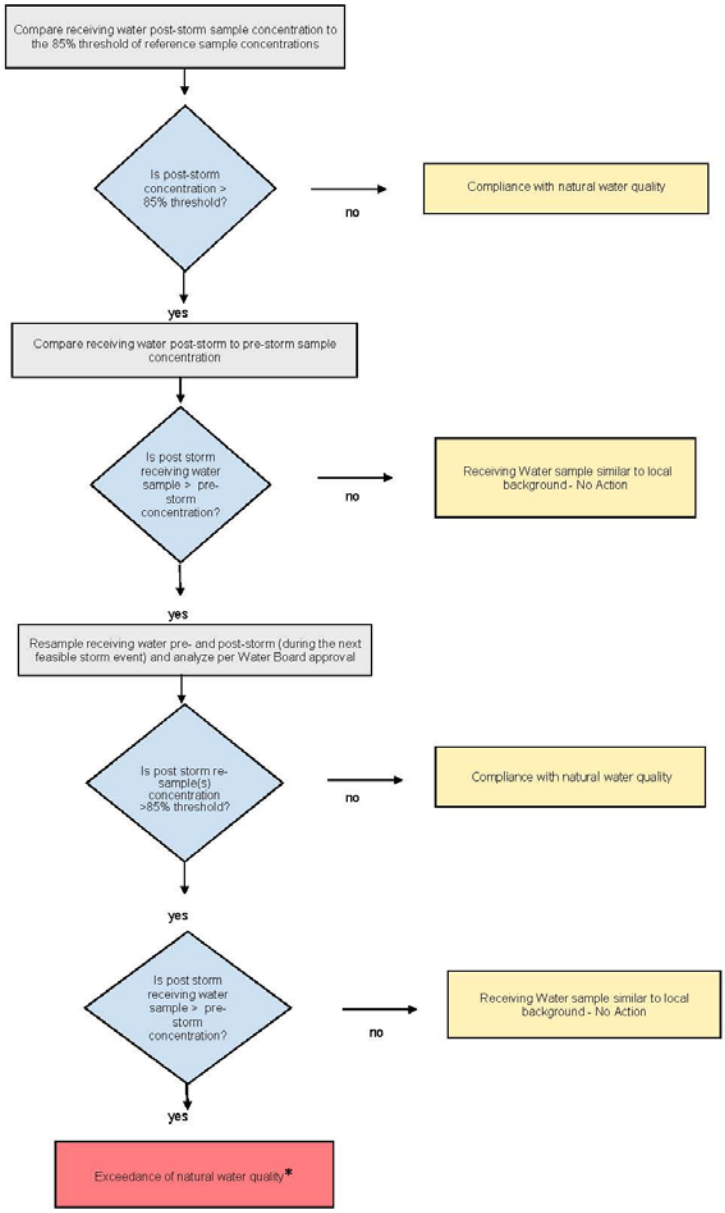
(1) For mooring field operators opting for an individual monitoring program (Section IV.B.1 above), this sampling must occur weekly (on the weekend) from May through October.

(2) For mooring field operators opting to participate in a regional integrated monitoring program (Section IV.B.2 above), this sampling must occur from May through October on a high weekend in each month. The Water Boards may allow a reduction in the frequency of sampling, through the regional monitoring program, after the first year of monitoring.

b. For all mooring field operators, the subtidal sediment (sand or finer, if present) within the mooring fields and below piers shall be sampled and analyzed for Ocean Plan Table B metals (for marine aquatic life beneficial use), acute toxicity, PAHs, and tributyltin. For sediment toxicity testing, only an acute toxicity test using the amphipod *Eohaustorius estuarius* must be performed. This sampling shall occur at least three times during a five (5) year period. For mooring field operators opting to participate in a regional integrated monitoring program, the Water Boards may allow a reduction in the frequency of sampling after the first sampling effort's results are assessed.

C. ASBS Flow Chart

Figure 2
ASBS Special Protections
Flowchart to Determine Compliance with Natural Water Quality



*** When an exceedance of natural water quality occurs, the Department must comply with section I.A.2.h of the Special Protections as well as the requirements of this Order. Note, when sampling data is available, end-of-pipe effluent concentrations will be considered by the Water Boards in making this determination.**

D. ASBS Monitoring Constituents

TABLE A
Monitoring Constituent List
(excerpted from California Ocean Plan dated 2009)

Constituent	Units
Grease and Oil	mg/L
Suspended Solids	Mg/L
Settleable Solids	mL/L
Turbidity	NTU
PH	

TABLE B
Monitoring Constituent List
(excerpted from California Ocean Plan dated 2009)

Constituent	Units
Arsenic	ìg/L
Cadmium	ìg/L
Chromium	ìg/L
Copper	ìg/L
Lead	ìg/L
Mercury	ìg/L
Nickel	ìg/L
Selenium	ìg/L
Silver	ìg/L
Zinc	ìg/L
Cyanide	ìg/L
Total Chlorine Residual	ìg/L
Ammonia (as N)	ìg/L
Acute Toxicity	TUa
Chronic Toxicity	TUc
Phenolic Compounds (non-chlorinated)	ìg/L
Chlorinated Phenolics	ìg/L
Endosulfan	ìg/L
Endrin	ìg/L
HCH	µg/L

Phase II Small MS4 Entities Authorized to Discharge to Areas of Special Biological Significance (ASBS)

Regional Board	Applicant	ASBS
North Coast Water Board	City of Trinidad	Trinidad Head
	County of Humboldt	King Range
	Humboldt Bay Harbor District	King Range
	Department of Parks and Recreation	Gerstle Cove
	Department of Parks and Recreation	Jughandle Cove
	Department of Parks and Recreation	King Range
	Department of Parks and Recreation	Trinidad Head
	Department of Parks and Recreation	Redwoods State and National Park
San Francisco Water Board	County of Marin	Duxbury Reef
	Defense, Department of (Vandenberg Air Force Base)	James V. Fitzgerald
	National Park Service	Point Reyes National Seashore
Central Coast Water Board	City of Monterey	Pacific Grove
	City of Pacific Grove	Pacific Grove
	City of Carmel by The Sea	Carmel Bay
	County of Monterey	Carmel Bay
	Department of Parks and Recreation	Año Nuevo
	Department of Parks and Recreation	Carmel Bay
	Department of Parks and Recreation	Julia Pfeiffer Burns
	Department of Parks and Recreation	Point Lobos
Los Angeles Water Board	Department of Parks and Recreation	Laguna Point to Latigo Point
Santa Ana Water Board	Department of Parks and Recreation	Irvine Coast

Community-Based Social Marketing (CBSM)
Education and Outreach Requirements

A. Public Education and Outreach Program

A.1 Compliance Participation Options

Within the first year of the effective date of the permit, all Permittees shall comply with the requirements in this Section by participating in one or more of the following:

(i) Contributing to a countywide storm water program, as determined appropriate by the Permittee members, so that the countywide storm water program conducts education and outreach on behalf of its members; or
(ii) Contributing to a regional education and outreach collaborative effort (a regional outreach and education collaborative effort occurs when all or a majority of the Permittees collaborate to conduct regional outreach and education. Regional education and outreach collaboration includes Permittees defining a uniform and consistent message, deciding how best to communicate the message, and how to facilitate behavioral changes. Then collaboratively apply what is learned through local jurisdiction groups, pooling resources and skills.); or
(iii) Fulfilling education and outreach requirements within their jurisdictional boundaries on their own; or
(iv) A combination of the previous options, so that all requirements are fulfilled.

Reporting – By the first year online Annual Report, the Permittee shall identify which compliance participation option it will use to comply with the public education and outreach requirements in this Section. For each public education and outreach requirement in this Section that the Permittee will comply with through contribution to a countywide storm water program or regional education and outreach collaborative effort, the Permittee shall include in the first year online Annual Report documentation, such as a written agreement, letter or similar document, which confirms the collaboration with other MS4s.

A.2. Public Education and Outreach

A.2.a. Public Education and Outreach

(i) **Task Description –** Within the second year of the effective date of the permit, the Permittee shall develop and implement a comprehensive storm water public education and outreach program. The public education and outreach program shall be designed to reduce pollutant discharges in storm water runoff and non-storm water discharges to the MS4 through behavior changes in target communities. The Public Education and Outreach Program shall (1) measurably increase the knowledge of targeted communities regarding the municipal storm drain system, impacts of urban runoff and non-storm water discharges on receiving waters, and potential BMP solutions for the target audiences and (2) measurably change the behavior of target audiences, thereby reducing pollutant releases to the MS4 and the environment.

(ii) **Implementation Level** –The Permittee shall, at a minimum:

(a) Develop and implement a public education strategy that establishes education tasks based on water quality problems, target audiences, and anticipated task effectiveness. The strategy must include identification of who is responsible for implementing specific tasks, a schedule for task implementation, and a budget for implementing the tasks. The strategy must demonstrate how specific high priority storm water quality issues in the community or local pollutants of concern are addressed. The Permittee shall use CBSM [1]strategies or equivalent.

(b) Implement surveys at least twice during the five year permit term to gauge the level of awareness and behavior change in target audiences and effectiveness of education tasks.

(c) Use of CBSM strategies or equivalent. The Public Education strategy shall at a minimum include the following Permittee actions:

(1) Research on barriers to desired behaviors and benefits of desired behaviors (ex. Literature review, observation, focus groups).
(2) Elicit commitment to implement desired behavior from target audience.
(3) Provide prompts reminding target audience of desired behavior.
(4) Use the concept of social norms/modeling of desired behavior.
(5) Use education messages that are specific, easy to remember, from a credible source, and appropriate for the target audience.
(6) Create incentives for the desired behavior.
(7) Remove barriers to the desired behavior.

(d) Development and conveyance of a specific storm water message that focuses on the following:
(1) Local pollutants of concern
(2) Target audience
(3) Behavior of concern
(4) Regional water quality issues

(e) Development and disseminate appropriate educational materials to target audiences and translate into applicable languages when appropriate (e.g. the materials can utilize various media such as printed materials, billboard and mass transit advertisements, signage at select locations, stenciling at storm drain inlets, radio advertisements, television advertisements, and websites);
(f) Utilization of public input (e.g., the opportunity for public comment, or public meetings) in the development of the program;

[1] CBSM: A systematic way to change the behavior of communities to reduce their impact on the environment. Realizing that simply providing information is usually not sufficient to initiate behavior change, CBSM uses tools and findings from social psychology to discover the perceived barriers to behavior change and ways of overcoming these barriers.

(g) Distribution of the educational materials, using whichever methods and procedures determined appropriate during development of the public education strategy, in such a way that is designed to convey the program's message to 20% of the target audience each year;
(h) Coordination with outreach programs for the Water Efficient Landscape Ordinance to explain the benefits of storm water-friendly landscaping;
(i) Technical and financial assistance and implementation guidance related to storm water-friendly landscaping;
(j) Development and conveyance of messages specific to reducing illicit discharges with information about how the public can report incidents to the appropriate authorities;
(k) Development and conveyance of messages specific to proper application of pesticides, herbicides, and fertilizers;
(l) Storm water education for school-age children. The Permittee may use California's Education and Environment Initiative Curriculum or equivalent.
(m) Reducing discharges from charity car washes, mobile cleaning and pressure washing operations, and landscape irrigation.

(iii) **Reporting** – By the second year online Annual Report and annually thereafter, report on the public education strategy and general program development and progress. By the fifth year online Annual Report, summarize changes in public awareness and behavior resulting from the implementation of the program and any modifications to the public outreach and education program. Report on the public education and CBSM strategies such as pilot programs, survey results, research on barriers to desired behaviors and benefits of desired behaviors, commitments from target audience to implement desired behavior, prompts, implementation of the social norms/modeling, education messages, incentives for desired behaviors, methods for removing barriers to behavior change, development of education materials, methods for educational material distribution, public input, Water Efficient Landscape Ordinance, technical and financial assistance for storm water friendly landscaping, reporting of illicit discharges, proper application of pesticides, herbicides, and fertilizers, elementary school education, reduction of discharges from charity car washes, mobile cleaning and pressure washing operations, and landscape irrigation efforts. Annually report number of trainings, describe the technical and financial program and implementation, and the study and results to date. For each whole five years of the permit life, submit the online Annual Report summarizing the changes in public awareness and behavior.

A.2.b. Construction Education and Outreach Program

(i) **Task Description –** Within the second year of the effective date of the permit, the Permittee shall develop and implement a construction outreach and education program for construction sites smaller than one acre. The construction outreach and education program shall be designed to reduce pollutant discharges in storm water runoff and non-storm water discharges to the MS4 through behavior changes in target communities. The multi-media program shall (1) measurably increases the knowledge of the construction

community regarding the municipal storm drain system, impacts of urban runoff and non-storm water discharges on receiving waters, and potential BMP solutions for the target audiences and (2) measurably changes the behavior of the construction community, thereby reducing pollutant releases to the MS4 and the environment.

(ii) **Implementation Level –**The program shall include, at a minimum:

(a) Development of a watershed-based inventory of the high priority residential and commercial construction sites within the Permittee's jurisdiction.

(b) Development and implementation of a construction outreach and education strategy that establishes measurable goals and prioritizes education tasks based on water quality problems, target audiences, and anticipated task effectiveness. The strategy must include identification of who is responsible for implementing specific tasks and attaining measurable goals, a schedule for task implementation, and a budget for implementing the tasks and meeting the measurable goals. The strategy must include measurable goals designed to demonstrate how specific high priority storm water quality issues in the community or local pollutants of concern are addressed. Establish who is responsible for specific tasks and goals and a budget for meeting the tasks and goals.

(c) Implementation of CBSM to address the MS4's highest priority water quality problems. For each high priority water quality problem, implementation of CBSM shall first be conducted on a pilot project level. CBSM techniques found to be effective at the pilot project level shall be implemented jurisdiction-wide by permit year four. Pilot project and jurisdiction level CBSM shall include the following Permittee actions:
(1) Research on barriers to desired behaviors and benefits of desired behaviors (ex. Literature review, observation, focus groups).
(2) Elicit commitment to implement desired behavior from construction community.
(3) Provide prompts reminding construction community of desired behavior.
(4) Use the concept of social norms/modeling of desired behavior.
(5) Use education messages that are specific, easy to remember, from a credible source, and appropriate for the target audience.
(6) Create incentives for the desired behavior.
(7) Remove barriers to the desired behavior.

(iii) **Reporting –** By the second year online Annual Report and annually thereafter, report program progress and mechanisms used for outreach and education including measureable increases in the knowledge of the construction community and measurable changes in the construction community's behavior. This includes a watershed-based inventory of high priority residential and commercial construction sites, outreach and education strategy and implementation, implementation of CBSM, pilot project, research on barriers to desired behaviors and benefits of desired behaviors, commitments from target audience to implement desired behavior, prompts, implementation of the social norms/modeling, education

messages, incentives for desired behaviors, methods for removing barriers to behavior change.

A.3. STAFF AND SITE OPERATOR TRAINING AND EDUCATION

A.3.a. Illicit Discharge Detection and Elimination Training

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and implement a training program for all Permittee staff who, as part of their normal job responsibilities, may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection to the storm drain system.

(ii) **Implementation Level** – The training program shall include at a minimum:
(a) Identification of an illicit discharge or illegal connection.
(b) Proper procedures for reporting and responding to the illicit discharge or illegal connection.
(c) Follow-up training shall be provided as needed to address changes in procedures, techniques, or staffing.
(d) The Permittee shall annually perform an assessment of their trained staff's knowledge of illicit discharge response and shall provide refresher training as needed.
(e) New staff that, as part of their normal job responsibilities may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection shall be trained no later than six months after the start of employment.
(f) Contact information, including the procedure for reporting an illicit discharge, shall be included in each of the Permittee's fleet vehicles that are used by field staff.
(g) The Permittee shall conduct focused education in identified illicit discharge flow areas based on identified illicit discharge(s).

(iii) **Reporting** - The Permittee shall document and maintain records of the training provided and the staff trained annually in the online Annual Report.

A.3.b. Construction Outreach and Education

1. Permittee Staff Training

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall ensure that all staff implementing the construction storm water program are adequately trained.

(ii) **Implementation Level** – The Permittee may conduct in-house training or contract with consultants. Training shall be provided to the following staff positions of the MS4:

(a) Plan Reviewers and Permitting Staff - Ensure staff and consultants are qualified individuals, knowledgeable in the technical review of local erosion and sediment control plans, and are certified pursuant

to a State Water Board sponsored program as a Qualified SWPPP Developer (QSD), or a designated person on staff possesses the QSD credential.

(b) Erosion Sediment Control/Storm Water Inspectors - The Permittee shall ensure inspectors are qualified individuals, knowledgeable in inspection procedures, and are certified pursuant to a State Water Board sponsored program as either (1) a *Qualified SWPPP Developer (QSD)* (2) a Qualified SWPPP Practitioner (QSP) or (3) a designated person on staff possesses each credential (QSD to supervise plan review, QSP to supervise inspection operations).

(c) Third-Party Plan Reviewers, Permitting Staff, and Inspectors - If the Permittee utilizes outside parties to conduct inspections and/or review plans, the Permittee shall ensure these staff are trained.

(iii) **Reporting** – By the second year of the permit term and annually thereafter, submit the following information:

(a) Training topics covered.
(b) Dates of training.
(c) Number and percentage of Permittee's staff, as identified in Sections a-c above, attending each training.
(d) Results of any surveys conducted to demonstrate the awareness and potential behavioral changes in the attendees.

2. Construction Site Operator Education

(i) **Task Description** – Within the third year of the effective date of the permit, the Permittee shall develop and distribute educational materials to construction site operators.

(ii) **Implementation Level** – The Permittee shall do the following:

(a) Each year, provide information on training opportunities for construction operators on BMP selection, installation, implementation, and maintenance as well as overall program compliance.
(b) Develop or utilize existing outreach tools (i.e. brochures, posters, etc.) aimed at educating construction operators on appropriate selection, installation, implementation, and maintenance of storm water BMPs, as well as overall program compliance.
(c) Distribute appropriate outreach materials to all construction operators who will be disturbing land within the MS4 boundary. The Permittee's contact information and website shall be included in these materials.
(d) Update the existing storm water website to include information on appropriate selection, installation, implementation, and maintenance of BMPs.

(iii) **Reporting –** By the third year online Annual Report and annually thereafter, include the following information:

(a) Training topics covered;
(b) Dates of training;
(c) Number and percentage of Permittee's operators, inspectors, and number of Contractors attending each training;
(d) Results of any surveys conducted to demonstrate the awareness and potential behavioral changes in the attendees.

A.3.c. Pollution Prevention and Good Housekeeping Staff Training

The Permittee shall train employees on how to incorporate pollution prevention/good housekeeping techniques into Permittee operations.

(i) **Task Description** – Within the second year of the effective date of the permit, the Permittee shall develop a bi-annual employee training program for appropriate employees involved in implementing pollution prevention and good housekeeping practices in the Pollution Prevention/Good Housekeeping for Permittee Operations sections of this General Permit. The Permittee shall determine the need for interim training during alternate years when training is not conducted, through an evaluation of employee Pollution Prevention/Good Housekeeping knowledge. All new hires whose jobs include implementation of pollution prevention and good housekeeping practices must receive this training within the first year of their hire date.

(ii) **Implementation Level** – The training program shall include the following:
(a) Bi-annual training for all employees implementing this program element. This bi-annual training shall include a general storm water education component, any new technologies, operations, or responsibilities that arise during the year, and the permit requirements that apply to the staff being trained. Employees shall receive clear guidance on appropriate storm water BMPs to use at municipal facilities and during typical O&M activities.
(b) A bi-annual assessment, occurring on alternate years between training, of trained staff's knowledge of pollution prevention and good housekeeping and shall revise the training as needed.
(c) A requirement that any contractors hired by the Permittee to perform O&M activities shall be contractually required to comply with all of the storm water BMPs, good housekeeping practices, and standard operating procedures described above.
(d) The Permittee shall provide oversight of contractor activities to ensure that contractors are using appropriate BMPs, good housekeeping practices and following standard operating procedures.

(iii) **Reporting –** By the second year online Annual Report and annually thereafter, summarize oversight procedures and identify and track all personnel requiring training and assessment and records.

Standard Provisions

1. General Authority

   Various storm water program components (e.g. IDDE) require enforceable controls on third party activities to ensure successful implementation of the program. Some non-traditional operators, however, may not have the necessary legal or regulatory authority to adopt enforceable controls. As with local governments that lack such authority, NTMS4s shall utilize the authority they do possess and seek cooperative agreements with local municipalities to implement enforceable controls.

2. Duty to Comply

   The Permittee shall comply with all conditions of this Permit. Any Permit noncompliance constitutes a violation of the CWA and the Porter-Cologne Water Quality Control Act, which may be grounds for enforcement action or denial of General Permit coverage. [40 CFR 122.41(a)]

   The Permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Permit has not yet been modified to incorporate the requirement.

   In the event that the Permittee is removed from coverage under the General Permit, the Permittee will be required to seek coverage under an individual or alternative general permit.

3. General Permit Actions

   This General Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a General Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not nullify any General Permit condition.

   If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under §307(a) of CWA for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this General Permit, this General Permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and Permittee will be so notified.

4. Enforcement

   a. The enforcement provisions contained in this section shall not act as a limitation on the statutory or regulatory authority of the State and Regional Water Board.

b. Any violation of the permit constitutes violation of the California Water Code and regulations adopted hereunder and the provisions of the Clean Water Act, and is the basis for enforcement, permit termination, permit revocation and reissuance, denial of an application for permit reissuance; or a combination thereof.

c. The State Water Board has authority to regulate discharges from a MS4 on a system-wide or jurisdiction-wide basis. [CWA Section 402(p) & 40 CFR 122.26(a)(v)]

d. The State and Regional Boards may impose administrative civil liability, may refer a discharger to the State Attorney General to seek civil monetary penalties, may seek injunctive relief or take other appropriate enforcement action as provided in the California Water Code or federal law for violation of Board orders.

e. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this order and permit.

f. Significant penalties may be imposed for violation of this General Permit, pursuant to CWC section 13385 and other State and federal statutes. Court-imposed liability may exceed $25,000 per day, and Regional Water Board's may impose administrative fines exceeding $10,000 per day. [40 CFR 122.41(a)(2)&(3)]

g. The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both. [40 CFR 122.41(k)(2)]

h. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or both. Higher penalties may be imposed for repeat offenders. [40 CFR 122.41(j)(5)]

5. Noncompliance Reporting

Permittees who cannot certify compliance and/or who have had other instances of noncompliance shall notify the appropriate Regional Water Board within 30 days. Instances of noncompliance resulting in emergencies (i.e., that endanger human health or the environment) shall be reported orally to the Regional Water Board within 24 hours from the time the discharger becomes aware of the circumstance and in writing to the Regional Water Board within five days of the occurrence. The notification shall identify the noncompliance event and an initial assessment of any

impact caused by the event, describe the actions necessary to achieve compliance, and include a time schedule indicating when compliance will be achieved. The time schedule and corrective measures are subject to modification by the Regional Water Board Executive Officer.

6. Duty to Mitigate

The Permittee shall take all responsible steps to minimize or prevent any discharge in violation of this General Permit that has a reasonable likelihood of adversely affecting human health or the environment. [40 CFR 122.41(d)]

7. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain any facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this General Permit and with the requirements of the storm water program. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance may require the operation of backup or auxiliary facilities or similar systems installed by the Permittee when necessary to achieve compliance with the conditions of this General Permit. [40 CFR 122.41(e)]

8. Property Rights

This General Permit does not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor does it authorize any infringement of federal, State, or local laws or regulations.[40 CFR 122.41(g)]

9. Duty to Provide Information

The Permittee shall furnish Regional Water Boards or U.S. EPA, during normal business hours, any requested information to determine compliance with this General Permit. The Permittee shall also furnish, upon request, copies of records required to be kept by this General Permit. [40 CFR 122.41(h)]

10. Inspection and Entry

Upon the presentation of credentials and other documents as may be required by law, the Permittee shall allow the State and Regional Water Boards, U.S. EPA, or municipal storm water management agency to enter upon the Permittee premises where a regulated facility or activity is located or conducted or where records are required to be kept under the conditions of this General Permit to [40 CFR 122.41(i)]:

a. Have access to and copy at reasonable times any records that are required to be kept under the conditions of this Permit;

b. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment) that are related to or may impact any storm water or non-storm water discharge; and

c. Conduct monitoring activities at reasonable times to ensure Permit compliance.

d. Photograph or videotape outdoor areas of the facility to document compliance or non-compliance with this Permit.

11. Signatory Requirements

All NOIs, certifications, reports, or other information prepared in accordance with this General Permit that are submitted to State or Regional Water Boards shall be signed by either a principal executive officer, ranking elected official, or duly authorized representative. The principal executive officer of a Federal agency includes the chief executive officer of the agency or the senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of U.S. EPA). For the military: any military officer or Department of Defense civilian, acting in an equivalent capacity to a military officer, who has been designated.

12. Certification

Any person signing documents under this General Permit shall make the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

13. Anticipated Noncompliance

The Permittee will give advance notice to the Regional Water Board of any planned changes in the regulated Small MS4 activity that may result in noncompliance with General Permit requirements.

14. Penalties for Falsification of Reports

Section 309(c)(4) of CWA provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this General Permit, including reports of compliance or noncompliance, shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years or by both.

15. Penalties for Violations of Permit Conditions

    a. Part 309 of CWA provides significant penalties for any person who violates a permit condition implementing Parts 301, 302, 306, 307, 308, 318, or 405 of CWA or any permit condition or limitation implementing any such section in a permit issued under Part 402. Any person who violates any permit condition of this General Permit is subject to a civil penalty not to exceed $27,500 per calendar day of such violation, as well as any other appropriate sanction provided by Part 309 of CWA.

    b. the California Water Code also provides for administrative, civil, and criminal penalties, which in some cases are greater than those under CWA.

16. Oil and Hazardous Substance Liability

    Nothing in this General Permit shall be construed to preclude the institution of any legal action against the Permittee or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject to under Part 311 of CWA.

17. Severability

    The provisions of this General Permit are severable; and, if any provision of this General Permit or the application of any provision of this General Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this General Permit shall not be affected thereby.

18. Reopener Clause

    This General Permit may be modified, revoked and reissued, or terminated for cause due to promulgation of amended regulations, or otherwise in accordance with 40 CFR sections 122.62, 122.63, 122.64, and 124.5.

19. Availability

    A copy of this General Permit and Annual Reports shall be made available for public review, program evaluation (audit) and inspection.

20. Transfers

    This General Permit is not transferable. A Permittee shall submit written notification to the appropriate Regional Water Board to terminate coverage of this General Permit.

21. Continuation of Expired Permit

    This General Permit expires five years from the date of adoption. This General Permit continues in force and in effect until a new General Permit is issued or the State Water Board rescinds this General Permit. Only those Small MS4s authorized to discharge under the expired General Permit are covered by the continued General Permit.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Entity**	**Impaired water body**	**Deliverables/Actions Required/Waste Load Allocations**
Region 1: North Coast Regional Water Board			
Laguna de Santa Rosa *Ammonia & Dissolved Oxygen* Effective Date: May 4, 1995 BPA: none Resolution No.: none	City of Cotati City of Rohnert Park City of Sebastopol Town of Windsor	Laguna de Santa Rosa	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Waste Reduction Strategy for the Laguna de Santa Rosa which includes TMDLs for nitrogen and ammonia to address low dissolved oxygen and high ammonia impairments. **Requirements for Implementing the Waste Reduction Strategy for the Laguna de Santa Rosa** Implement a storm water runoff program that is aimed at nutrient load reduction and pollution control through the execution of the provisions of this Phase II Small MS4 General Permit.
Shasta River *Temperature & Dissolved Oxygen* Effective Date: January 26, 2007 BPA: Action Plan for the Shasta River Watershed Temperature and Dissolved Oxygen Total Maximum Daily Loads Resolution No.: R1-2006-0052	City of Yreka	Shasta River	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Action Plan for the Shasta River Watershed Temperature and Dissolved Oxygen TMDLs. **Requirements for Implementing the Action Plan for the Shasta River Watershed Temperature and Dissolved Oxygen TMDLs** Within one year of approval of the Phase II Small MS4 General Permit, the City of Yreka shall develop a plan to minimize, control, and preferably prevent discharges of fine sediment, nutrients and other oxygen-consuming materials, and elevated water temperature waste discharge from affecting waters of the Shasta River and its tributaries. The plan shall be submitted to the Regional Water Board's Executive Officer for review, comment, and approval. Within four years of approval of the Phase II Small MS4 General Permit, the City of Yreka shall begin implementing the plan.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required
Region 2: San Francisco Regional Water Board			
Napa River *Sediment* Effective Date: January 20, 2011 BPA: Chapter 7, Water Quality Attainment Strategies including TMDLs Resolution No. R2-2009-0064	Napa County City of Napa Town of Yountville City of St. Helena City of Calistoga City of American Canyon	Napa River	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Napa River sediment TMDL. **TMDL Wasteload and Load Allocations** The Napa River sediment TMDL assigns to municipal storm water a wasteload allocation and load allocation for the roads source category. The sediment wasteload allocation is 600 tons/year and applies to storm water runoff discharges from municipalities' facilities associated with construction and/or maintenance activities. The load allocation 27,000 metric tons/year of sediment is for the road and stream crossings category and applies to stream crossings and storm water runoff discharges associated with operation of public and private roads, paved and upaved, within the watershed not otherwise covered by NPDES permits. Municipalities share this allocation with another entity (i.e., Caltrans). **Requirements for Implementing the Napa River Sediment TMDL Wasteload and Load Allocations** **A. Implementation of Sediment Wasteload Allocations** i. To attain the wasteload allocation, municipalities shall comply with the construction and maintenance requirements of this Order. **B. Implementation of Sediment Load Allocations** i. To attain the shared load allocation of 27,000 metric tons/year, municipalities shall determine opportunities to retrofit and/or reconstruction of road crossings to minimize road-related sediment delivery (≤500 cubic yards/mile per 20-year period) to stream channels. Specifically, to reduce road-related erosion and protect stream-riparian habitat conditions, municipalities shall by October 31, 2014: • Adopt and implement best management practices for maintenance of unimproved (dirt/gravel) roads • Conduct a survey of stream-crossings associated with paved public roadways • Develop a prioritized implementation plan for repair and/or replacement of high priority crossings/culverts. For paved roads, erosion and sediment control actions shall primarily focus on road crossings to meet the sediment load allocation.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required
Region 2: San Francisco Regional Water Board			
Sonoma Creek *Sediment* Effective Date: September 8, 2010 BPA: Chapter 7, Water Quality Attainment Strategies including TMDLs Resolution No. R2-2008-0103	County of Sonoma City of Sonoma	Sonoma Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Sonoma Creek sediment TMDL. **TMDL Wasteload and Load Allocations** The Sonoma Creek sediment TMDL assigns to municipal storm water a wasteload allocation and load allocation for the roads source category. The sediment wasteload allocation is 600 tons/year and applies to storm water runoff discharges from municipalities' facilities associated with construction and/or maintenance activities. The load allocation 2,100 tons/year of sediment is for the road and stream crossings category and applies to stream crossings and storm water runoff discharges associated with operation of public and private roads, paved and upaved, within the watershed not otherwise covered by NPDES permits. Municipalities share this allocation with another entity (i.e., Caltrans). **Requirements for Implementing the Sonoma Creek Sediment TMDL Wasteload and Load Allocations** **A. Implementation of Sediment Wasteload Allocations** i. To attain the wasteload allocation, municipalities shall comply with the construction and maintenance requirements of this Order. **B. Implementation of Sediment Load Allocations** i. To attain the shared load allocation of 2,100 tons/year, municipalities shall determine opportunities to retrofit and/or reconstruction of road crossings to minimize road-related sediment delivery to stream channels. Specifically, to reduce road-related erosion and protect stream-riparian habitat conditions, municipalities shall by October 31, 2014: • Adopt and implement best management practices for maintenance of unimproved (dirt/gravel) roads • Conduct a survey of stream-crossings associated with paved public roadways • Develop a prioritized implementation plan for repair and/or replacement of high priority crossings/culverts. For paved roads, erosion and sediment control actions shall primarily focus on road crossings to meet the sediment load allocation.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

<table>
<tr><th>TMDL
Effective Date/BPA/Res. No.</th><th>Municipality</th><th>Impaired Water body</th><th>Deliverables/Actions Required</th></tr>
<tr><td colspan="4">Region 2: San Francisco Regional Water Board</td></tr>
<tr><td rowspan="6">Napa River
Pathogens

Effective Date: February 29, 2008

BPA: Chapter 7, Water Quality Attainment Strategies including TMDLs

Resolution No. R2-2006-0079</td><td>Napa County</td><td rowspan="6">Napa River</td><td rowspan="6">Purpose of Provisions
The purpose of these provisions is to implement the requirements of the Napa River pathogens TMDL.

TMDL Wasteload Allocations
The Napa River pathogens TMDL assigns a wasteload allocation to municipal storm water as follows:

<table>
<tr><td colspan="2">E.coli (CFU/100 mL)</td><td colspan="2">Fecal coliform (CFU/100 mL)</td><td colspan="2">Total coliform (CFU/100 mL)</td></tr>
<tr><td>Geometric Mean</td><td>90th percentile</td><td>Geometric Mean</td><td>90th percentile</td><td>Geometric Mean</td><td>90th percentile</td></tr>
<tr><td><113</td><td><368</td><td><180</td><td><360</td><td><216</td><td><9,000</td></tr>
</table>
These allocations are applicable year-round and apply to any sources (existing or future) subject to regulation by NPDES permit.

Requirements for Implementing the Napa River Pathogens TMDL Wasteload Allocations

Municipalities shall, within 18 months of permit adoption :
i. Public Participation and Outreach. Educate the public regarding sources of fecal coliform and associated health risks of fecal coliform in surface waters. Educate the public regarding actions that individuals can take to reduce pathogen loading.

ii. Pet Waste Management. Develop and implement enforceable means of reducing/eliminating fecal coliform loading from pet waste.

iii. Illicit Discharge Detection and Elimination. Develop and implement strategies to detect and eliminate illicit discharges (whether mistaken or deliberate) of sewage to the Napa River.

iv. Pollution Prevention and Good Housekeeping. Develop and implement strategies to reduce/eliminate fecal coliform loading from streets, parking lots, sidewalks, and other urban areas that potentially collect and discharge fecal coliform to the Napa River.

v. Conduct baseline water quality monitoring to evaluate E.coli concentration trends in the Napa River and its tributaries. Table 7-g in Chapter 7, Water Quality Attainment Strategies, presents locations and frequency for the required baseline water quality monitoring.
vi. Report annually on water quality monitoring results and progress made on implementation of human and animal runoff reduction measures.</td></tr>
<tr><td>City of Napa</td></tr>
<tr><td>Town of Yountville</td></tr>
<tr><td>City of St. Helena</td></tr>
<tr><td>City of Calistoga</td></tr>
<tr><td>City of American Canyon</td></tr>
</table>

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

<table>
<tr><th>TMDL
Effective Date/BPA/Res. No.</th><th>Municipality</th><th>Impaired Water body</th><th>Deliverables/Actions Required</th></tr>
<tr><td colspan="4">Region 2: San Francisco Regional Water Board</td></tr>
<tr><td rowspan="2">Sonoma Creek
Pathogens

Effective Date: February 29, 2008

BPA: Chapter 7, Water Quality Attainment Strategies including TMDLs

Resolution No. R2-2006-0042</td><td>County of Sonoma</td><td rowspan="2">Sonoma Creek</td><td rowspan="2">Purpose of Provisions
The purpose of these provisions is to implement the requirements of the Sonoma Creek pathogens TMDL.

TMDL Wasteload Allocations
The Sonoma Creek pathogens TMDL assigns a wasteload allocation to municipal storm water as follows:

<table>
<tr><th colspan="2">E.coli (CFU/100 mL)</th><th colspan="2">Fecal coliform (CFU/100 mL)</th><th colspan="2">Total coliform (CFU/100 mL)</th></tr>
<tr><td>Geometric Mean</td><td>90th percentile</td><td>Geometric Mean</td><td>90th percentile</td><td>Geometric Mean</td><td>90th percentile</td></tr>
<tr><td><113</td><td><368</td><td><180</td><td><360</td><td><216</td><td><9,000</td></tr>
</table>
These allocations are applicable year-round and apply to any sources (existing or future) subject to regulation by NPDES permit.

Requirements for Implementing the Sonoma Creek Pathogens TMDL Wasteload Allocations

Municipalities shall, within 18 months of permit adoption:

i. Public Participation and Outreach. Educate the public regarding sources of fecal coliform and associated health risks of fecal coliform in surface waters. Educate the public regarding actions that individuals can take to reduce pathogen loading.
ii. Pet Waste Management. Develop and implement enforceable means of reducing/eliminating fecal coliform loading from pet waste.
iii. Illicit Discharge Detection and Elimination. Develop and implement strategies to detect and eliminate illicit discharges (whether mistaken or deliberate) of sewage to Sonoma Creek.
iv. Pollution Prevention and Good Housekeeping. Develop and implement strategies to reduce/eliminate fecal coliform loading from streets, parking lots, sidewalks, and other urban areas that potentially collect and discharge fecal coliform to Sonoma Creek.
v. Conduct baseline water quality monitoring to evaluate E.coli concentration trends in Sonoma Creek and its tributaries. Table 7-n in Chapter 7, Water Quality Attainment Strategies, presents locations and frequency for the required baseline water quality monitoring.
vi. Report annually on water quality monitoring results and progress made on implementation of human and animal runoff reduction measures.</td></tr>
<tr><td>City of Sonoma</td></tr>
</table>

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

<table>
<tr><th>TMDL
Effective Date/BPA/Res. No.</th><th>Municipality</th><th>Impaired Water body</th><th>Deliverables/Actions Required</th></tr>
<tr><td colspan="4">Region 2: San Francisco Regional Water Board</td></tr>
<tr><td>Tomales Bay
Pathogens

Effective Date: February 8, 2007

BPA: Chapter 4, Surface Water Protection and Management, Nonpoint Source Control

Resolution No. R2-2005-0046</td><td>Marin County</td><td>Tomales Bay,

Lagunitas Creek,

Walker Creek, and

Olema Creek</td><td>
Purpose of Provisions
The purpose of these provisions is to implement the requirements of the Tomales Bay pathogens TMDL.

TMDL Wasteload Allocations
The Tomales Bay pathogens TMDL assigns a wasteload allocation to municipal storm water as follows:

<table>
<tr><td colspan="3">Fecal Coliform[a]
(MPN/100 mL)</td></tr>
<tr><td colspan="2">For Direct Discharges to Tomales Bay</td><td>For Discharges to Major Tomales Bay Tributaries</td></tr>
<tr><td>Median[b]</td><td>90th percentile[c]</td><td>Log Mean[b]</td></tr>
<tr><td><14</td><td><43</td><td><200</td></tr>
</table>
[a] These allocations are applicable year-round and apply to any sources (existing or future) subject to regulation by NPDES permit.
[b] Based on a minimum of five consecutive samples equally spaced over a 30-day period.
[c] No more than 10% of total samples during any 30-day period may exceed this number

Requirements for Implementing the Tomales Bay Pathogens TMDL Wasteload Allocations

Municipalities shall, by within 18 months of permit adoption,:

i. Public Participation and Outreach. Educate the public regarding sources of fecal coliform and associated health risks of fecal coliform in surface waters. Educate the public regarding actions that individuals can take to reduce pathogen loading.

ii. Pet Waste Management. Develop and implement enforceable means of reducing/eliminating fecal coliform loading from pet waste.

iii. Illicit Discharge Detection and Elimination. Develop and implement strategies to detect and eliminate illicit discharges (whether mistaken or deliberate) of sewage to Tomales Bay.

iv. Pollution Prevention and Good Housekeeping. Develop and implement strategies to reduce/eliminate fecal coliform loading from streets, parking lots, sidewalks, and other urban areas that potentially collect and discharge fecal coliform to Tomales Bay.

v. Report annually on water quality monitoring results and progress made on implementation of human and animal runoff reduction measures.
</td></tr>
</table>

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

<table>
<tr><th>TMDL
Effective Date/BPA/Res. No.</th><th>Municipality</th><th>Impaired Water body</th><th>Deliverables/Actions Required</th></tr>
<tr><td colspan="4">Region 2: San Francisco Regional Water Board</td></tr>
<tr><td rowspan="4">Richardson Bay
Pathogens

Effective Date: December 18, 2009

BPA: Chapter 7, Water Quality Attainment Strategies including TMDLs

Resolution No. R2-2008-0061</td><td>Marin County</td><td rowspan="4">Richardson Bay</td><td rowspan="4">Purpose of Provisions
The purpose of these provisions is to implement the requirements of the Richardson Bay pathogens TMDL.

TMDL Wasteload Allocations
The Richardson Bay pathogens TMDL assigns a wasteload allocation to municipal storm water as follows:

<table>
<tr><th colspan="2">Fecal Coliform[a]
(MPN/100 mL)</th></tr>
<tr><th>Median[b]</th><th>90th Percentile[c]</th></tr>
<tr><td><14</td><td><43</td></tr>
</table>
[a] These allocations are applicable year-round.
[b] based on a minimum of five consecutive samples equally spaced over a 30-day period
[C] No more than 10% of total samples during any 30-day period may exceed this number

Requirements for Implementing the Richardson Bay Pathogens TMDL Wasteload Allocations

Municipalities shall, by within 18 months of permit adoption:

i. Public Participation and Outreach. Educate the public regarding sources of fecal coliform and associated health risks of fecal coliform in surface waters. Educate the public regarding actions that individuals can take to reduce pathogen loading.

ii. Pet Waste Management. Develop and implement enforceable means of reducing/eliminating fecal coliform loading from pet waste.

iii. Illicit Discharge Detection and Elimination. Develop and implement strategies to detect and eliminate illicit discharges (whether mistaken or deliberate) of sewage to Richardson Bay.

iv. Pollution Prevention and Good Housekeeping. Develop and implement strategies to reduce/eliminate fecal coliform loading from streets, parking lots, sidewalks, and other urban areas that potentially collect and discharge fecal coliform to Richardson Bay.

v. Report annually on progress made on implementation of pathogen reduction measures.</td></tr>
<tr><td>City of Mill Valley</td></tr>
<tr><td>City of Tiburon</td></tr>
<tr><td>City of Belvedere</td></tr>
<tr><td></td><td>City of Sausalito</td><td></td><td></td></tr>
</table>

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required
Region 2: San Francisco Regional Water Board			
Urban Creek *Diazinon & Pesticide Toxicity* Effective Date: May 16, 2007 BPA: BPA – Chapter 3, Toxicity Resolution No. R2-2005-0063	Marin County City of Mill Valley City of Belvedere Town of Corte Madera Town of Fairfax City of Larkspur City of Mill Valley City of Novato Town of Ross Town of San Anselmo City of San Rafael City of Sausalito Town of Tiburon	Arroyo Corte Madera del Presidio, Corte Madera Creek, Coyote Creek (Marin Co.), Gallinas Creek, Miller Creek, Novato Creek, San Antonio Creek, and San Rafael Creek	**Purpose of Provision** The purpose of the following provisions is to prevent the impairment of urban streams by pesticide-related toxicity. This provision implements requirements of the TMDL for Diazinon and Pesticide Related Toxicity for Urban Creeks in the San Francisco Bay Region. Pesticides of concern include: organophosphorous pesticides (chlorpyrifos, diazinon, and malathion); pyrethroids (bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin); carbamates (e.g., carbaryl); and fipronil. **Wasteload Allocations** Diazinon: 100 ng/l Toxicity: 1.0 TUa (acute toxicity units) and 1.0 TUc (chronic toxicity units) **Requirements for Implementing the Wasteload Allocations** Urban runoff management agencies' responsibilities for addressing the allocations set above will be satisfied by complying with the requirements set forth below. Permittees may coordinate with the Bay Area Storm water Management Agencies Association, the Urban Pesticide Pollution Prevention Project, the Urban Pesticide Committee, and other agencies and organizations in carrying out these activities. **A. Adopt a Pesticide-Related Toxicity Control Program** To prevent the impairment of urban streams by pesticide-related toxicity, adopt an Integrated Pest Management Policy (IPM) or Ordinance, applicable to all the permittees' operations and property, as described in the Basin Plan amendment (Implementation Section) for this TMDL. The IPM Policy or Ordinance shall be adopted by the permittee's governing body within 18 months of permit adoption. **B. Implement the Pesticide-Related Toxicity Control Program** Implementation actions shall include: • Ensure all municipal employees who apply or use pesticides within the scope of their duties are trained in the IPM practices and policy/ordinance. • Require all contractors to implement the IPM policy/ordinance. • Keep the County Agricultural Commissioners informed of water quality issues related to pesticides and of violations of pesticides regulations (e.g., illegal handling) associated with storm water management. • Conduct outreach to residents and pest control applicators on less toxic methods of pest control. • Keep records of the permittees' own use of pesticides of concern and the pesticide use by the permittees' hired contractors. Report on pesticide use when requested by the Regional Water Board. • Monitor water and sediment for pesticides and associated toxicity in urban creeks via an individual or regional program designed to answer the following questions: o Are the TMDL toxicity targets being met? Is toxicity observed in urban creeks caused by a pesticide?

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

	County of Sonoma City of Petaluma City of Sonoma	Petaluma River, and Calabazas Creek	○ Is urban runoff the source of any observed toxicity in urban creeks? ○ How does observed pesticide-related toxicity in urban creeks (or pesticide concentrations contributing to such toxicity) vary in time and magnitude across urban creek watersheds, and what types of pest control practices contribute to such toxicity? ○ Are actions already being taken to reduce pesticide discharges sufficient to meet the targets, and if not, what should be done differently?

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
TMDL and Implementation Plan for Pathogens for Morro Bay and Chorro and Los Osos Creeks Effective Date: 11/19/2003 BPA: Chapter 4 Resolution No. R3-2003-0060	City of Morro Bay County of San Luis Obispo	Morro Bay Chorro Creek Los Osos Creek Pennington Creek San Bernardo Creek San Luisito Creek Walters Creek Warden Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Morro Bay (Chorro and Los Osos Creeks) Pathogen TMDL. **TMDL Wasteload Allocations** The City of Morro Bay and County of San Luis Obispo are assigned the following wasteload allocations: 1) for discharges to Los Osos Creek, Chorro Creek, and their tributaries, the fecal coliform geometric mean concentration shall not exceed 200 MPN/100 mL over a 30-day period nor shall 10% of the samples exceed 400 MPN/100 mL over any 30-day period. 2) For discharges to Morro Bay, the fecal coliform geometric mean concentration of 14 MPN/100 mL must be achieved and no more than 10% of the samples may be over 43 MPN/100 mL. **Provisions for Implementing TMDL** Within one year of adoption of this Order, the City of Morro Bay and County of San Luis Obispo shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4's wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment interim targets and wasteload

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
			allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved by November 19, 2013.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
Watsonville Slough Total Maximum Daily Load and Implementation Plan for Pathogens Effective Date: 11/20/2006 BPA: Chapter 4 Resolution No. R3-2006-0025	City of Watsonville	Watsonville Slough Struve Slough Harkins Slough Gallighan Slough Hanson Slough	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Watsonville Slough Pathogen TMDL. **TMDL Wasteload Allocations** The City of Watsonville and the County of Santa Cruz are assigned the following concentration based wasteload allocation: Fecal coliform concentration, based on a minimum of five samples for any 30-day period, shall not exceed a log mean of 200 MPN per 100mL, nor shall more than ten percent of total samples collected during any 30-day period exceed 400 MPN per 100mL. These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocations as measured in receiving water. The City of Watsonville is assigned allocations in the following water bodies: Watsonville, Struve, Harkins, Gallighan and Hanson Sloughs. The County of Santa Cruz is assigned allocation in the following water bodies: Watsonville, Struve and Harkins Sloughs. **Provisions for Implementing the TMDL** The City and County public participation and outreach efforts must include the following tasks: a) Educating the public about sources of fecal coliform and its associated health risks in surface waters; and b) Identifying and promoting specific actions that responsible parties can implement to reduce pathogen loading from sources such as homeless encampments, agricultural field workers, and homeowners who contribute waste from domestic pets. The County of Santa Cruz and City of Watsonville shall implement practices that will assure their allocation is achieved. By June 30, 2013, the County of Santa Cruz and City of Watsonville shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
	County of Santa Cruz		5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment, including public education and participation items identified above. All allocations shall be achieved by November 20, 2016.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
TMDL for Fecal Coliform in Pajaro River, San Benito River, Llagas Creek, Tequesquita Slough, San Juan Creek, Carnadero/Uvas Creek, Bird Creek, Pescadero Creek, Tres Pinos Creek, Furlong (Jones) Creek, Santa Ana Creek, Pachecho Creek Effective Date: 07/12/2010 BPA: Chapter 4 Resolution No. RB3-2009-0008	County of Santa Cruz City of Hollister City of Morgan Hill City of Gilroy	Pajaro River San Benito River Llagas Creek Tequesquita Slough San Juan Creek Carnadero/Uvas Creek Bird Creek Pescadero Creek Tres Pinos Creek Furlong (Jones) Creek Santa Ana Creek Pachecho Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Pajaro River, San Benito River, Llagas Creek, Tequesquita Slough, San Juan Creek, Carnadero/Uvas Creek, Bird Creek, Pescadero Creek, Tres Pinos Creek, Furlong (Jones) Creek, Santa Ana Creek, and Pachecho Creek Fecal Coliform TMDL. **TMDL Wasteload Allocations** The Cities of Hollister, Morgan Hill, Gilroy and Watsonville and the Counties of Monterey, Santa Clara and Santa Cruz are assigned the following concentration based wasteload allocation: Fecal coliform concentration, based on a minimum of five samples for any 30-day period, shall not exceed a log mean of 200 MPN per 100mL, nor shall more than ten percent of total samples collected during any 30-day period exceed 400 MPN per 100mL. These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocations as measured in receiving water. The Counties of Santa Cruz, Santa Clara and Monterey and the Cities of Hollister, Morgan Hill, Gilroy and Watsonville are assigned allocations in the following water bodies: Pajaro River, San Benito River, Llagas Creek and Tequisquita Slough. **Provisions for Implementing the TMDL** Within one year of adoption of this Order, the Cities of Hollister, Morgan Hill, Gilroy and Watsonville and the Counties of Monterey, Santa Clara and Santa Cruz shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, anderic analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
	City of Watsonville County of Monterey County of Santa Clara		identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 7. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 8. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 9. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 10. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 11. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 12. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved by July 12, 2023.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
Morro Bay TMDL for Sediment (including Chorro Creek, Los Osos Creek, and the Morro Bay Estuary) Effective Date: 12/3/2003 BPA: Chapter 4 Resolution No. R3-2002-0051	County of San Luis Obispo	Morro Bay Los Osos Creek Chorro Creek Dairy Creek Pennington Creek San Luisito Creek San Bernardo Creek Warden Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the Morro Bay TMDL for sediment. **TMDL Wasteload and Load Allocations** The County of San Luis Obispo is assigned a wasteload allocation of 5,137 tones/year of sediment. This allocation represents a 50% reduction in sediment loading relative to 2003 levels. The aggregated sediment discharge from all storm water outfalls into Morro Bay, or any tributary that has the potential to discharge sediment to Morro Bay, shall not exceed the allocation. **Provisions for Implementing the TMDL** The County of San Luis Obispo shall implement practices that will assure their allocation is achieved, including identifying and implementing specific road sediment control measures. Within one year of adoption of this Order, the County of San Luis Obispo shall develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions it will take to attain its wasteload allocation. The Wasteload Allocation Attainment Program shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
			allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. The allocations shall be achieved by December 3, 2053.
San Lorenzo River TMDL for Sediment (Including Carbonera Creek, Lompico Creek, and Shingle Mill Creek) Effective Date: 12/18/2003 BPA: Chapter 4 Resolution No. R3-2002-0063	County of Santa Cruz	San Lorenzo River and Carbonera, Lompico, and Shingle Mill Creeks	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the San Lorenzo River TMDL for sediment. **TMDL Wasteload and Load Allocations** The County of Santa Cruz, City of Santa Cruz, and City of Scotts Valley are assigned the following wasteload allocations: sediment discharges from public roads to the San Lorenzo River shall be reduced by 27%, sediment discharges from public roads to Lompico Creek shall be reduced by 24%, sediment discharges from public roads to Carbonera Creek shall be reduced by 27%, sediment discharges from public roads to Shingle Mill Creek shall be reduced by 27%. **Provisions for Implementing the TMDL** The County of Santa Cruz, City of Santa Cruz, and City of Scotts Valley shall implement practices that will assure their allocation is achieved, including identifying and implementing specific road sediment control measures. By June 30, 2013, the County of Santa Cruz, City of Santa Cruz, and City of Scotts Valley shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
	City of Santa Cruz City of Scotts Valley		3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. The allocations shall be achieved by December 18, 2028.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

<table>
<tr><th>TMDL
Effective
Date/BPA/Res. No.</th><th>Municipality</th><th>Impaired Water body</th><th>Deliverables/Actions Required/Wasteload Allocations</th></tr>
<tr><td colspan="4">Region 3: Central Coast Regional Water Board</td></tr>
<tr><td rowspan="3">Pajaro River TMDL and Implementation Plan for Sediment including Llagas Creek, Rider Creek, and San Benito River

Effective Date: 11/27/2006

BPA: Chapter 4

Resolution No. R3-2005-0132</td><td>City of Morgan Hill</td><td rowspan="3">Tres Pinos

San Benito River

Llagas Creek

Uvas Creek

Upper Pajaro River

Corralitos Creek (including Rider Creek),

Mouth of Pajaro River</td><td rowspan="3">Purpose of Provisions
The purpose of these provisions is to implement the requirements of the San Lorenzo River TMDL for sediment.

TMDL Wasteload and Load Allocations
The City of Morgan Hill, City of Gilroy, City of Hollister, and the City of Watsonville shall not discharge sediment to the following water bodies in excess of the values shown:
<table><tr><th>Major Subwatershed</th><th>Metric tons per year</th></tr><tr><td>Tres Pinos</td><td>1</td></tr><tr><td>San Benito</td><td>100</td></tr><tr><td>Llagas</td><td>787</td></tr><tr><td>Uvas</td><td>139</td></tr><tr><td>Upper Pajaro</td><td>161</td></tr><tr><td>Corralitos (including Rider Creek)</td><td>284</td></tr><tr><td>Mouth of Pajaro River</td><td>191</td></tr></table>The allocations represent a 90% reduction in sediment loading to each water body from urban roads.

Provisions for Implementing the TMDL
1. The Cities of Morgan Hill, Gilroy, Hollister, and Watsonville shall implement practices that will assure their allocation is achieved.

The allocations shall be achieved by November 27, 2051.</td></tr>
<tr><td>City of Gilroy

City of Hollister</td></tr>
<tr><td>City of Watsonville</td></tr>
</table>

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
San Luis Obispo Creek Total Maximum Daily Load and Implementation Plan for Pathogens Effective Date: 7/25/2005 BPA: Chapter 4 Resolution No. R3-2004-0142	City of San Luis Obispo County of San Luis Obispo Cal Poly State University	San Luis Obispo Creek Stenner Creek Brizziolari Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the San Luis Obispo Creek TMDL for Pathogens. **TMDL Wasteload Allocations** The City of San Luis Obispo, the County of San Luis Obispo, and Cal Poly State University-San Luis Obispo, are assigned a concentration based wasteload allocation for fecal coliform equal to 200 MPN/100mL, measured as a log mean of five samples taken in a 30-day period from impaired water body receiving waters, nor shall more than 10% of the total samples during any 30-day period exceed 400 MPN per 100mL in receiving waters; storm water discharge cannot cause or contribute to exceedance of the allocations. The City of San Luis Obispo is assigned these allocations in the following water bodies: San Luis Obispo Creek, Stenner Creek. The County of San Luis Obispo is assigned these allocations in the following water bodies: San Luis Obispo Creek. Cal Poly State University-San Luis Obispo is assigned these allocations in the following water bodies: Stenner Creek, Brizziola **Provisions for Implementing the TMDL** The City of San Luis Obispo, County of San Luis Obispo, and Cal Poly State University are required to implement best management practices specifically targeting fecal coliform loading. Required actions include development and implementation of: public education regarding fecal coliform sources and associated health risk, enforceable means of addressing pet waste and wild animals that are attracted to storm water infrastructure, elimination of illicit discharges. Within one year of adoption of this Order, the City of San Luis Obispo, County of San Luis Obispo, and Cal Poly State University shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
			BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL Schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved no later than July 25, 2015.
San Luis Obispo Creek TMDL and Implementation Plan for Nitrate-Nitrogen Effective Date: 8/04/2006	City of San Luis Obispo	San Luis Obispo Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the San Luis Obispo Creek TMDL for Nitrate. **TMDL Wasteload Allocations** Urban storm water from the City of San Luis Obispo, County of San Luis Obispo, and Cal Poly State

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
BPA: Chapter 4 Resolution No. R3-2005-0106	County of San Luis Obispo		University shall not cause an increase in receiving water nitrate concentration greater than the increase in nitrate concentration resulting from their discharge in 2006 (when the TMDL became effective). In 2006, the nitrate concentration of storm water discharge was 0.3 mg/L-N. The City of San Luis Obispo, County of San Luis Obispo, and Cal Poly State University were achieving their allocations at the time the TMDL became effective; these municipalities shall implement measures to assure continued compliance with their allocations. **Provisions for Implementing the TMDL** The City of San Luis Obispo, County of San Luis Obispo, and Cal Poly State University shall implement best management practices that specifically address the reduction or elimination of nutrient loading. The City of San Luis Obispo, County of San Luis Obispo, and Cal Poly State University shall submit reports required by their storm water permits and in those reports outline best management practices implemented to assure ongoing compliance with their allocations.
	Cal Poly State University		

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
TMDL for Fecal Coliform in Corralitos and Salsipuedes Creeks Effective Date: OAL approval anticipated early 2011 BPA: Chapter 4 Resolution No. R3-2009-0009	County of Santa Cruz	Corralitos Creek Salsipuedes Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the TMDL for Fecal Coliform in Corralitos/Salsipuedes Creeks **TMDL Wasteload Allocations** The County of Santa Cruz and the City of Watsonville are assigned the following concentration based wasteload allocation: Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200 MPN per 100 mL, nor shall more than 10 percent of samples collected during any 30-day period exceed 400 MPN per 100 mL. These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocations as measured in receiving water. The County of Santa Cruz and the City of Watsonville are assigned allocations in the following water bodies: Corralitos Creek and Salsipuedes Creek. **Provisions for Implementing the TMDL** Within one year of adoption of this order, the County of Santa Cruz and the City of Watsonville shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
	City of Watsonville		6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved no later than September 8, 2024.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
TMDL for Fecal Coliform in the Lower Salinas River Watershed Effective Date: OAL approval anticipated in 2011 BPA: Chapter 4 Resolution No. R3-2010-0017	County of Monterey	Lower Salinas River Old Salinas River Estuary Tembladero Slough Salinas Reclamation Canal Alisal Creek Gabilan Creek Salinas River Lagoon (North) Santa Rita Creek Quail Creek Towne Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the TMDL for fecal coliform in the Lower Salinas River Watershed. **TMDL Wasteload Allocations** The County of Monterey is assigned the following concentration based wasteload allocation for fecal coliform: Fecal coliform concentration, based on a minimum of five samples for any 30-day period, shall not exceed a log mean of 200 MPN per 100mL, nor shall more than ten percent of total samples collected during any 30-day period exceed 400 MPN per 100mL. These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocation as measured in receiving water. **Provisions for Implementing the TMDL** Within one year of adoption of this Order, the County of Monterey shall develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions it will take to attain its wasteload allocation. The Wasteload Allocation Attainment Program shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
			discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved no later than December 20, 2024.
TMDL for Pathogens in San in San Lorenzo River Estuary, San Lorenzo River, Branciforte Creek, Camp Evers Creek, Carbonera Creek, and Lompico Creek	City of Santa Cruz County of Santa Cruz City of Scotts Valley	San Lorenzo River Estuary San Lorenzo River Branciforte Creek	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the TMDL for Pathogens in San Lorenzo River Estuary, San Lorenzo River, Branciforte Creek, Camp Evers Creek, Carbonera Creek, and Lompico Creek. **TMDL Wasteload Allocations** The City of Santa Cruz, County of Santa Cruz and the City of Scotts Valley are assigned the following concentration based wasteload allocation for fecal coliform: based on a minimum of not less than five samples for any 30-day period, fecal coliform shall not exceed a log mean of 200 MPN per 100 mL, nor shall more than 10 percent of samples collected during any 30-day period exceed 400 MPN per 100 mL.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
Effective Date: OAL approval pending; anticipated March 2011 BPA: Chapter 4 Resolution No. R3-2009-0023		Camp Evers Creek Carbonera Cree Lompico Creek	These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocations as measured in receiving water. The City of Santa Cruz is assigned allocations in San Lorenzo River Estuary, San Lorenzo River, Branciforte Creek, and Carbonera Creek. The County of Santa Cruz is assigned allocations in San Lorenzo River, Branciforte Creek, Lompico Creek, and Carbonera Creek, The City of Scotts Valley is assigned allocations in Camp Evers Creek and Carbonera Creek. **Provisions for Implementing the TMDL** By June 30, 2013, the County of Santa Cruz and the Cities of Santa Cruz and Scotts Valley shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
			BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved no later than June 8, 2024.
TMDL for Pathogens in Soquel Lagoon, Soquel Creek, and Noble Gulch Effective Date: 9/15/2010 BPA: Chapter 4 Resolution No. R3-2009-0024	City of Capitola County of Santa Cruz	Soquel Lagoon Soquel Creek Noble Gulch	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the TMDL for Pathogens in Soquel Lagoon, Soquel Creek, and Noble Gulch. **TMDL Wasteload Allocations** The City of Capitola and the County of Santa Cruz are assigned the following concentration based wasteload allocation for fecal coliform: based on a minimum of not less than five samples for any 30-day period, fecal coliform shall not exceed a log mean of 200 MPN per 100 mL, nor shall more than 10 percent of samples collected during any 30-day period exceed 400 MPN per 100 mL. These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocations as measured in receiving water.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
			The City of Capitola is assigned allocations in Soquel Lagoon. The County of Santa Cruz is assigned allocations in Soquel Creek and Noble Gulch. **Provisions for Implementing the TMDL** By June 30, 2013, the City of Capitola and the County of Santa Cruz shall each develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions they will take to attain their wasteload allocations. The Wasteload Allocation Attainment Programs shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL Schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors. 4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Wasteload Allocations
Region 3: Central Coast Regional Water Board			
			implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved by September 15, 2023.
TMDL for Pathogens in Aptos Creek, Valencia Creek, and Trout Gulch Effective Date: 10/29/2010 BPA: Chapter 4 Resolution No. R3-2009-0025	County of Santa Cruz	Aptos Creek Valencia Creek Trout Gulch	**Purpose of Provisions** The purpose of these provisions is to implement the requirements of the TMDL for Pathogens in Aptos Creek, Valencia Creek, and Trout Gulch. **TMDL Wasteload Allocations** The County of Santa Cruz is assigned the following concentration based wasteload allocation for fecal coliform: based on a minimum of not less than five samples for any 30-day period, fecal coliform shall not exceed a log mean of 200 MPN per 100 mL, nor shall more than 10 percent of samples collected during any 30-day period exceed 400 MPN per 100 mL. These wasteload allocations are receiving water allocations; storm water discharge cannot cause or contribute to exceedance of the allocations as measured in receiving water. The County of Santa Cruz is assigned allocations in Aptos Creek, Valencia Creek, and Trout Gulch. **Provisions for Implementing the TMDL** By June 30, 2013, the County of Santa Cruz shall develop, submit, and begin implementation of a Wasteload Allocation Attainment Program that identifies the actions it will take to attain its wasteload allocation. The Wasteload Allocation Attainment Program shall include: 1. A detailed description of the strategy the MS4 will use to guide BMP selection, assessment, and implementation, to ensure that BMPs implemented will be effective at abating pollutant sources, reducing pollutant discharges, and achieving wasteload allocations according to the TMDL schedule. 2. Identification of sources of the impairment within the MS4's jurisdiction, including specific information on various source locations and their magnitude within the jurisdiction. 3. Prioritization of sources within the MS4's jurisdiction, based on suspected contribution to the impairment, ability to control the source, and other pertinent factors.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	**Municipality**	**Impaired Water body**	**Deliverables/Actions Required/Wasteload Allocations**
Region 3: Central Coast Regional Water Board			
			4. Identification of BMPs that will address the sources of impairing pollutants and reduce the discharge of impairing pollutants. 5. Prioritization of BMPs, based on suspected effectiveness at abating sources and reducing impairing pollutant discharges, as well as other pertinent factors. 6. Identification of BMPs the MS4 will implement, including a detailed implementation schedule. For each BMP, identify milestones the MS4 will use for tracking implementation, measurable goals the MS4 will use to assess implementation efforts, and measures and targets the MS4 will use to assess effectiveness. MS4s shall include expected BMP implementation for future implementation years, with the understanding that future BMP implementation plans may change as new information is obtained. 7. A quantifiable numeric analysis demonstrating the BMPs selected for implementation will likely achieve, based on modeling, published BMP pollutant removal performance estimates, best professional judgment, and/or other available tools, the MS4's wasteload allocation according to the schedule identified in the TMDL. This analysis will most likely incorporate modeling efforts. The MS4 shall conduct repeat numeric analyses as the BMP implementation plans evolve and information on BMP effectiveness is generated. Once the MS4 has water quality data from its monitoring program, the MS4 shall incorporate water quality data into the numeric analyses to validate BMP implementation plans. 8. A detailed description, including a schedule, of a monitoring program the MS4 will implement to assess discharge and receiving water quality, BMP effectiveness, and progress towards any interim targets and ultimate attainment of the MS4s' wasteload allocation. The monitoring program shall be designed to validate BMP implementation efforts and quantitatively demonstrate attainment of interim targets and wasteload allocations. If the approved TMDL does not explicitly include interim targets, the MS4 shall establish interim targets (and dates when stormwater discharge conditions will be evaluated) that are equally spaced in time over the TMDL compliance schedule and represent measurable, continually decreasing MS4 discharge concentrations or other appropriate interim measures of pollution reduction and progress towards the wasteload allocation. At least one interim target and date must occur during the five-year term of this Order. The MS4 shall achieve its interim targets by the date it specifies in the Wasteload Allocation Attainment Program. If the MS4 does not achieve its interim target by the date specified, the MS4 shall develop and implement more effective BMPs that it can quantitatively demonstrate will achieve the next interim target. 9. A detailed description of how the MS4 will assess BMP and program effectiveness. The description shall incorporate the assessment methods described in the CASQA Municipal Storm water Program Effectiveness Assessment Guide. 10. A detailed description of how the MS4 will modify the program to improve upon BMPs determined to be ineffective during the effectiveness assessment. 11. A detailed description of information the MS4 will include in annual reports to demonstrate adequate progress towards attainment of wasteload allocations according to the TMDL schedule. 12. A detailed description of how the MS4 will collaborate with other agencies, stakeholders, and the public to develop and implement the Wasteload Allocation Attainment Program. 13. Any other items identified by Integrated Report fact sheets, TMDL Project Reports, TMDL Resolutions, or that are currently being implemented by the MS4 to control its contribution to the impairment. All allocations shall be achieved October 29, 2023.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 5: Central Valley Regional Water Board			
Lower San Joaquin River *Diazinon & Chlorpyrifos* Effective Date: December 20,2006 BPA: Chapter 3 Resolution No.: R5-2005-0138	City of Madera (including the area known as Bonadelle Ranchos-Ma and Madera Acres) City of Merced City of Turlock County of San Joaquin County of Madera County of Merced County of Stanislaus County of Tulare City of Atwater City of Ceres City of Delhi City of Hughson City of Keyes City of Livingston City of Los Banos City of Patterson City of Winton	San Joaquin River from Mendota Dam to Vernalis	**Purpose of Provisions:** The purpose of these provisions is to implement the Lower San Joaquin River Diazinon and Chlorpyrifos Control Program **Wasteload Allocations:** The wasteload allocations for NPDES permitted municipal storm water dischargers shall not exceed the sum (S) of one (1) as defined below: $$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$ where CD = diazinon concentration CC = chlorpyrifos concentration WQOD = acute or chronic diazinon water quality objective (0.160 and 0.100 ug/L, respectively) WQOC = acute or chronic chlorpyrifos water quality objective. (0.025 and 0.015 ug/L, respectively) For the purpose of calculating the sum (S) above, non-detectable concentrations are considered to be zero. **Provisions for implementing the Control Program:** Dischargers not meeting wasteload allocations will be required by the Executive Officer to submit a management plan describing actions that will be taken to reduce diazinon and chlorpyrifos discharges to meet the applicable allocations. The Executive Officer may require revisions to the management plans if compliance with wasteload allocations are not attained or the management plan is not likely to attain compliance. Management plans may be submitted by individual dischargers or discharger groups. In determining compliance with the waste load allocations, the Regional Water Board will consider data or information submitted by the discharger regarding diazinon and chlorpyrifos inputs from sources outside of the jurisdiction of the permitted discharge. Dischargers must consider weather a proposed alternative to diazinon or chlorpyrifos has the potential to degrade ground or surface water. If the alternative has the potential to degrade groundwater, alternative pest control methods must be considered. If the alternative has the potential to degrade surface water, control measures must be implemented to ensure the applicable water quality objectives and State and Regional Water Boards' policies are not violated, including State Water Resources Control Board Resolution 68-16.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 5: Central Valley Regional Water Board			
Lower San Joaquin River *Diazinon & Chlorpyrifos* **continued**	City of Oakdale City of Ripon City of Riverbank City of Salida		**Compliance with wasteload allocations:** 01 December 2010
Sacramento and San Joaquin Delta Diazinon & Chlorpyrifos Effective Date: October 10, 2006 BPA: Chapter 31 Resolution No.: R5-2006-0061 **Sacramento and San Joaquin Delta** *Diazinon & Chlorpyrifos* **continued**	City of Lathrop City of Rio Vista City of Tracy County of San Joaquin City of Davis City of Dixon City of French Camp City of Lodi City of Manteca City of Morada City of Vacaville City of West Sacramento City of Woodland	Sacramento-San Joaquin Delta Waterways	**Purpose of Provisions:** The purpose of these provisions is to implement the Control Program for Diazinon and Chlorpyrifos Runoff into the Sacramento-San Joaquin Delta Waterways **Wasteload Allocations:** The wasteload allocations for NPDES permitted municipal storm water dischargers shall not exceed the sum (S) of one (1) as defined below: $$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$ where CD = diazinon concentration CC = chlorpyrifos concentration WQOD = acute or chronic diazinon water quality objective (0.160 and 0.100 ug/L, respectively) WQOC = acute or chronic chlorpyrifos water quality objective. (0.025 and 0.015 ug/L, respectively) For the purpose of calculating the sum (S) above, non-detectable concentrations are considered to be zero. **Provisions for implementing the Control Program:** Dischargers not meeting wasteload allocations will be required by the Executive Officer to submit a management plan describing actions that will be taken to reduce diazinon and chlorpyrifos discharges to meet the applicable allocations. The Executive Officer may require revisions to the management plans if compliance with wasteload allocations are not attained or the management plan is not likely to attain compliance. Management plans may be submitted by individual dischargers or discharger groups. In determining compliance dates for wasteload allocations, the Regional Water Board will consider data or information submitted by the discharger regarding diazinon and chlorpyrifos inputs from sources outside of the jurisdiction of the permitted discharge.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 5: Central Valley Regional Water Board			
Sacramento and San Joaquin Delta *Diazinon & Chlorpyrifos* **continued**			To address pesticide impairment of receiving waters, Permittees shall create and implement a Regional Board-approved Pesticide Plan that addresses their own use of pesticides including diazinon and chlorpyrifos, and to the extent authorized by law, the use of such pesticides by other sources within their jurisdictions. The goal of the Pesticides Plan is to reduce the discharge of pesticides from municipal storm water systems to receiving waters. The Permittees shall identify and promote within the context of integrated pest management (IPM) programs, the use of pest management practices that minimize the risk of pesticide impacts on surface water quality resulting from urban runoff discharges. IPM shall be integrated into the Permittee municipal operations and promoted to residents, businesses, and public agencies through the public outreach program. Permittees shall complete an assessment to determine the diazinon and chlorpyrifos levels in receiving waters. Monitoring may be done in conjunctions with other municipalities and/or discharges in the Central Valley. Permittees are responsible for providing the necessary information. The information may come from the dischargers' monitoring efforts; monitoring programs conducted by State or federal agencies or collaborative watershed efforts; or from special studies that evaluate the effectiveness of management practices. The purposes of the study are to evaluate compliance with established water quality objectives applicable to diazinon and chlorpyrifos for the receiving water and to determine compliance with wasteload allocations. In cases where the Permittees are not in compliance with the wasteload allocations, the Regional Water Board may request additional assessments and documentation of control program effectiveness. Assessment shall also consider whether alternatives to diazinon and chlorpyrifos are causing surface water quality impacts and if toxicity impairment is being caused or contributed to due to synergistic effects of multiple pollutants. Modifications to these requirements may be made through approval from the Executive Officer in order to facilitate discharger participation in the Delta Regional Monitoring Program. **Compliance with wasteload allocations:** 01 December 2011

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 5: Central Valley Regional Water Board			
Sacramento and Feather Rivers *Diazinon & Chlorpyrifos* Effective Date: May 3, 2007 BPA: Attachment 1 Resolution No.: R5-2007-0034 **Sacramento and Feather Rivers** *Diazinon & Chlorpyrifos* **continued**	City of Anderson City of Chico City of Marysville Olivehurst CDP City of Red Bluff South Yuba City County of Butte County of Colusa County of Shasta County of Sutter City of Live Oak City of Lincoln City of Linda City of Loomis City of Redding City of Roseville City of Rocklin County of Yuba	Sacramento River from Shasta Dam to I Street Bridge Feather River from Fish Barrier Dam to Sacramento River	**Purpose of Provisions:** The purpose of these provisions is to implement the Control Program for Diazinon and Chlorpyrifos Runoff into the Sacramento and Feather Rivers **Wasteload Allocations:** The wasteload allocations for NPDES permitted municipal storm water dischargers shall not exceed the sum (S) of one (1) as defined below: $$S = \frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$ where CD = diazinon concentration CC = chlorpyrifos concentration WQOD = acute or chronic diazinon water quality objective (0.160 and 0.100 ug/L, respectively) WQOC = acute or chronic chlorpyrifos water quality objective. (0.025 and 0.015 ug/L, respectively) For the purpose of calculating the sum (S) above, non-detectable concentrations are considered to be zero. **Provisions for implementing the Control Program:** Dischargers not meeting wasteload allocations will be required by the Executive Officer to submit a management plan describing actions that will be taken to reduce diazinon and chlorpyrifos discharges to meet the applicable allocations. The Executive Officer may require revisions to the management plans if compliance with wasteload allocations are not attained or the management plan is not likely to attain compliance. Management plans may be submitted by individual dischargers or discharger groups. In determining compliance with the waste load allocations, the Regional Water Board will consider data or information submitted by the discharger regarding diazinon and chlorpyrifos inputs from sources outside of the jurisdiction of the permitted discharge. Dischargers must consider weather a proposed alternative to diazinon or chlorpyrifos has the potential to degrade ground or surface water. If the alternative has the potential to degrade groundwater, alternative pest control methods must be considered. If the alternative has the potential to degrade surface water, control measures must be implemented to ensure the applicable water quality objectives and State and Regional Water Boards' policies are not violated, including State Water Resources Control Board Resolution 68-16. **Compliance with wasteload allocations**: 11 August 2008

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 5: Central Valley Regional Water Board			
Lower San Joaquin River San Joaquin River, Stockton DWSC TMDL *Organic Enrichment and Low Dissolved Oxygen* Effective Date: February 27, 2007 BPA: Chapter IV-37.01 Resolution No.: R5-2005-005	County of San Joaquin City of French Camp City of Ceres City of Oakdale City of Patterson City of Riverbank City of Ripon City of Lathrop City of Turlock City of Manteca City of Livingston City of Los Banos County of Stanislaus City of Empire City of Keyes City of Salida City of Hughson County of Merced City of Atwater City of Merced City of Delhi City of Winton	Lower San Joaquin River (Stockton DWSC)	**Purpose of Provisions:** The purpose of these provisions is to implement the requirements of the San Joaquin River Dissolved Oxygen TMDL. **Wasteload Allocations:** Waste load allocations for all NPDES-permitted discharges of oxygen demanding substances were set at the corresponding effluent limitations applicable on 28 January 2005. **Provisions for Implementing the Control Program:** Waste load allocations and permit conditions for new or expanded point source discharges in the SJR Basin upstream of the DWSC, including NPDES and storm water, will be based on the discharger demonstrating that the discharge will have no reasonable potential to cause or contribute to a negative impact on the dissolved oxygen impairment in the DWSC. **Compliance with waste load allocations:** December 31, 2011 **Compliance with implementation provisions:** Ongoing

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 5: Central Valley Regional Water Board			
Delta TMDL *Methylmercury* Effective Date: Pending Resolution No.: R5-2010-0043 **Delta TMDL** *Methylmercury* **continued**	City of Lathrop City of Rio Vista City of Tracy City of Lodi County of San Joaquin County of Solano City of West Sacramento County of Yolo	Sacramento-San Joaquin Delta Waterways	**Purpose of Provisions:** The purpose of these provisions is to implement the requirements of the Delta methylmercury TMDL. **Wasteload Allocations (methylmercury g/yr):** Lodi (City of) 0.053 San Joaquin (County of) 1.486 Rio Vista (City of) 0.0078 Solano (County of) 0.062 West Sacramento (City of) 0.64 Yolo (County of) 0.124 Lathrop (City of) 0.097 Tracy (City of) 0.65 **Provisions for Implementing the Control Program:** Implement BMPs to control erosion and sediment discharges with the goal of reducing mercury discharges. **Compliance with implementation provisions:** Ongoing
Clear Lake TMDL *Nutrients* Effective Date: 6/23/2006 BPA: Chapter IV-37.04 Resolution No.: R5-2006-0060	County of Lake City of Clearlake City of Lakeport	Clear Lake	**Purpose of Provisions:** The purpose of these provisions is to implement the requirements of the Clear Lake TMDL. **Wasteload Allocations:** County of Lake, City of Clearlake and City of Lakeport combined 2,000 kg phosphorus/yr **Provisions for Implementing the Control Program:** Storm water permittees will work with staff to develop and implement a plan to collect the information needed to determine what factors are important in controlling nuisance blooms and to recommend what control strategy should be implemented. Plan was submitted in 2008. **Compliance with waste load allocations:** **June 2017**

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res.No.	**Municipality**	**Impaired Water Body**	**Deliverables/Actions Required/Waste Load Allocations**
Region 6: Lahontan Regional Water Board			
Middle Truckee River Watershed, Placer, Nevada and Sierra Counties *Sediment* Effective Date: May 14, 2008 BPA: Section 4.13 Resolution No.: R6T-2008-0019	City of Truckee	Truckee River	**Purpose of Provisions:** The purpose of these provisions is to implement the requirements of the Middle Truckee River Watershed TMDL. **Urban Areas Wasteload Allocations:** 4,936 tons per year of total suspended sediment load. **Non-urban Wasteload Allocations:** 35,392 tons per year of total suspended sediment load. **Provisions for Implementing the Control Program:** 1. Road sand application best management practices (BMPs) and recovery tracking - Road sand is applied using BMPs and recovered to the maximum extent practicable. 2. Dirt roads maintained or decommissioned - Identified dirt roads with inadequate erosion control structures are rehabilitated and maintained, or decommissioned. Focus on dirt roads with high potential for sediment delivery to surface waters (e.g., within 200 feet of watercourse). 3. Legacy sites restoration and best management practices implementation - Identified legacy sites are restored or storm water BMPs are implemented to prevent erosion and sedimentation to surface waters. **Compliance with waste load allocations:** target of 25 milligrams per liter, or less, of suspended sediment is estimated for 2028 (i.e., 20 years after the adoption of the TMDL in 2008).
	County of Placer		

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

<table>
<tr><th>TMDL
Effective Date/BPA/Res.No.</th><th>Municipality</th><th>Impaired Water Body</th><th>Deliverables/Actions Required/Waste Load Allocations</th></tr>
<tr><td colspan="4">Region 9: San Diego Regional Water Board</td></tr>
<tr><td rowspan="4">Chollas Creek
Dissolved Copper, Lead, and Zinc

Effective Date: October 22, 2008

Resolution No.
R9-2007-0043</td><td>City of San Diego</td><td rowspan="4">Chollas Creek</td><td rowspan="4">WLA
WLA for point sources is concentration-based, equals to 90% of Numeric Target value (generated from the CTR equations) after applying 10% of Margin of Safety.

TMDLs = WLAs = CTR WQOs * 0.9

Wasteload Allocations for dissolved copper, lead, and zinc
<table><tr><th>Metal</th><th>WLA for Acute Conditions – One-Hour Average = Loading Capacity* MOS</th><th>WLA for Chronic Conditions – Four-Day Average =Loading Capacity*MOS</th></tr><tr><td>Copper</td><td>(0.96) * {e^ [0.9422 * ln (hardness) - 1.700]}*0.9</td><td>(0.96) * {e^[0.8545 * ln (hardness) - 1.702]}*0.9</td></tr><tr><td>Lead</td><td>[1.46203 – 0.145712 * ln (hardness)] * {e^ [1.273 * ln (hardness) - 1.460]} * 0.9</td><td>[1.46203 – 0.145712 * ln (hardness)] * {e^[{1.273 * ln (hardness)} - 4.705]} * 0.9</td></tr><tr><td>Zinc</td><td>(0.978) * {e^ [0.8473 * ln (hardness) + 0.884]} * 0.9</td><td>(0.986) * {e^[0.8473 * ln (hardness) + 0.884]} * 0.9</td></tr></table>
WLAs are regulated through San Diego Municipal Storm Water Permit (MS4 Permit) under Order No. R9-2007-0001. The municipal Copermittees regulated by this permit that have jurisdiction in the Chollas Creek watershed are the City of San Diego, the City of Lemon Grove, the City of La Mesa, County of San Diego, and the San Diego Unified Port District. These municipal Copermittees have responsibility for virtually all discharges to and from the municipal storm water conveyance system in the watershed through mechanisms such as enforcing existing or adopting new local ordinances, implementing waste load reduction plans and conducting public outreach/education programs.

Over a 20-year compliance period:
<table><tr><th>Years</th><th>Allowable Exceedance (% above)</th></tr><tr><td>1</td><td>100</td></tr><tr><td>10</td><td>20</td></tr><tr><td>20</td><td>0</td></tr></table></td></tr>
<tr><td>City of Lemon Grove</td></tr>
<tr><td>City of La Mesa</td></tr>
<tr><td>County of San Diego</td></tr>
</table>

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res.No.	Municipality	Impaired Water Body	Deliverables/Actions Required/Waste Load Allocations
Region 9: San Diego Regional Water Board			
Bacteria Project I – Twenty Beaches and Creeks in the San Diego Region (Including Tecolote Creek) *Indicator Bacteria* Effective Date: April 4, 2011 Resolution No. R9-2010-0001			*Waste Load Allocations for Municipal MS4*

Watershed	Fecal Coliform WLA (Billion MPN/year)		Enterococcus WLA (Billion MPN/year)		Total Coliform WLA (Billion MPN/year)	
	Wet Weather	Dry Weather	Wet Weather	Dry Weather	Wet Weather	Dry Weather
San Joaquin Hills / Laguna Hills HSAs (901.11 and 901.12)	37,167	227	66,417	40	880,652	1,134
Aliso HAS (901.13)	477,069	242	735,490	40	8,923,264	1,208
Dana Point HAS ((01.14)	152,446	92	219,528	16	3,404,008	462
Lower San Juan HAS (901.27)	1,156,419	1,665	1,385,094	275	16,093,160	8,342
San Clemente HA (901.30)	192,653	192	295,668	33	3,477,739	958
San Luis Rey HU (901.00)	914,026	1,058	1,300,235	185	14,373,954	5,289
San Marcos HA (904.50)	6,558	26	23,771	5	298,430	129
San Dieguito HU (905.50)	798,175	1,293	1,763,603	226	16,660,538	6,468
Miramar Reservoir HA (906.10)	6,703	7	8,109	1	171,436	36
Scripps HA (906.30)	101,253	119	232,035	21	3,447,764	594
Tecolote HA (906.5)	126,806	234	471,211	39	5,136,598	1,171
Mission San Diego/Santee HSAs (907.11	221,117	1,506	890,617	248	10,790,520	7,529

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res.No.	Municipality	Impaired Water Body	Deliverables/Actions Required/Waste Load Allocations
			and 907.12) **Chollas HAS (908.22)** **252,479** **398** **802,918** **66** **9,880,784** **1,991** Over a 10+ year compliance period Years / Exceedance Frequency Reduction (%)* P1 P2 P3 5 50 6 50 7 50 10+ 100 100 100 P1 = Priority 1 P2 = Priority 2 P3 = Priority 3 *For both dry & wet weathers

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Santa Monica Bay Beaches Bacteria Effective Date: July 15, 2003 BPA: Chapter 7-4 Resolution Nos.: 2002-04 (dry weather) 2002-022 (wet weather) R12-007 revision		Santa Monica Bay	
Upper Santa Clara River Chloride TMDL Effective Date: May 4, 2005 BPA Chapter 7-6 Resolution Nos.: R04-004, R06-016 revision, and R08-012 revision		Santa Clara River	
Los Angeles River Nitrogen and Related Effects TMDL Effective Date: March 23, 2004 BPA Chapter 7-8 Resolution Nos.: R03-009 and R03-016 revision		Los Angeles River	

[1] 'Municipality' and 'Deliverables/Actions Required/Waste Load Allocations' headers deliberately left blank. Los Angeles Regional Board TMDL region specific requirements are currently under development and will be completed one year from the effective date of the permit. Please see Fact Sheet discussion for details.

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Santa Clara River Nitrogen Compounds TMDL Effective Date: March 23, 2004 BPA Chapter 7-9 Resolution No.: R03-11		Santa Clara River	
Malibu Creek Bacteria TMDL Effective Date: January 24, 2006 BPA Chapter 7-10 Resolution Nos.: 2004-019R R12-009 revision		Marina del Rey	
Los Angeles Harbor Bacteria TMDL (Inner Cabrillo Beach and Main Shop Channel) Effective Date: March 10, 2005 BPA Chapter 7-11 Resolution No.: 2004-011		Dominguez Channel Watershed Management Area	
Calleguas Creek Watershed Toxicity TMDL Effective Date: March 24, 2006 BPA Chapter 7-17 Resolution No.: 2005-010		Calleguas Creek Watershed	

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Calleguas Creek Organochlorine Pesticides, Polychlorinated Biphenyls, and Siltation Effective Date: March 24, 2006 BPA Chapter 7-16 Resolution No.: 2005-009		Calleguas Creek Watershed	
Calleguas Creek Metals and Selenium TMDL Effective Date: 3/26/2007 BPA Chapter 7-19 Resolution No.: 2006-012		Calleguas Creek	
Ballona Creek Bacteria TMDL Effective Date: April 27, 2007 BPA Chapter 7-21 Resolution Nos.: 2006-11 R12-008 revision		Ballona Creek	
Santa Monica Bay Marine Debris TMDL Effective Date: March 20, 2012 BPA Chapter 7-34 Resolution No.: 2010-010		Santa Monica Bay	

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Los Angeles and Long Beach Harbors and Toxics and Metals TMDL Effective Date: March 23, 2012 BPA Chapter 7-40 Resolution No.:2011-008		Los Angeles and Long Beach Harbors	
Los Angeles River Bacteria TMDL Effective Date: March 23, 2012 BPA Chapter 7-39 Resolution No.: R10-007		Los Angeles River	
Santa Clara River Esturay and Reaches 3, 5, 6 and 7 Bacteria Effective Date:3/21/2012 BPA Chapter 7-36 Resolution No. R10-006		Santa Clara River	
Santa Clara Reach 3 Chloride TMDL Effective Date : June 18, 2003 Established by USEPA		Santa Clara River	

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Malibu Creek Nutrients TMDL Effective Date : March 21, 2003 Established by USEPA		Malibu Creek	
Ballona Creek Wetlands TMDL for Sediment and Invasive Exotic Vegetation TMDL Effective Date : March 26, 2012 Established by USEPA		Ballona Creek	
Santa Monica Bay TMDL for DDTs and PCBs Effective Date : March 26, 2012 Established by USEPA			
Avalon Beach Bacteria TMDL Effective Date: April 5, 2012 Cease and Desist Order No. R4-2012-0077		Avalon Beach	
Los Angeles River and Tributaries Metals TMDL Effective Date: November 3, 2011 BPA: Chapter 7-13 Resolution No.: R10-003		Los Angeles River	

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Ballona Creek Metals TMDL Effective Date: October 29, 2008 BPA: Chapter 7-12 Resolution No.: 2007-015		Ballona Creek	
San Gabriel River and Impaired Tributaries Metals and Selenium TMDL Effective Date: March 26, 2007 USEPA Established		San Gabriel River	
Los Cerritos Channel Metals TMDL Effective Date: March 17, 2010 USEPA Established		Los Cerritos Channel	
Ballona Creek Estuary Toxic Pollutants TMDL Effective Date: January 11, 2006 BPA: Chapter 7-14 Resolution No.: 2005-008		Ballona Creek and Ballona Creek Estuary	
Ballona Creek Trash Effective Date: 8/28/2002 BPA: Chapter 7.3 Resolution No.:2001-014 2004-023 (revision)		Ballona Creek	

ATTACHMENT G – Region Specific Requirements

Regional Water Board Approved TMDLs where urban runoff is listed as a source

TMDL Effective Date/BPA/Res. No.	Municipality	Impaired Water body	Deliverables/Actions Required/Waste Load Allocations
Region 4[1]: Los Angeles Regional Board			
Los Angeles River trash Effective Date: 9/23/2008 BPA Chapter 7-2 Resolution No.:07-012		Los Angeles River	
Ventura River Estuary Trash Effective Date:3/6/2008 BPA Chapter 7-25 Resolution No.:07-008		Ventura River Estuary	
Malibu Creek Trash Effective Date:7/7/2009 BPA Chapter 7-30 Resolution No.:R4-2008-007		Malibu Creek	

Acronyms & Abbreviations

ASBS	Area of Special Biological Significance
BMP	Best Management Practices
CASQA	California Stormwater Quality Association
CEDEN	California Environmental Data Exchange Network
CFR	Code of Federal Regulations
CGP	Construction General Permit
CWA	Clean Water Act
DEM	Digital Elevation Model
DMA	Drainage Management Area
GIS	Geographic Information System
GPS	Global Positioning System
IGP	Industrial General Permit
LID	Low Impact Development
LUP	Linear Utility Project
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
SMARTS	Storm Water Multi-Application, Reporting, and Tracking System
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
QAPP	Quality Assurance Project Plan
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Preparer
USEPA	United States Environmental Protection Agency

Glossary

Activism – is the practice of action or involvement as a means of achieving goals.

At the Point of Discharge(s) – Means in the surf zone immediately where runoff from an outfall meets the ocean water (a.k.a., at point zero).

Beneficial Uses - The Uses of water of the state protected against degradation, such as domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation and preservation of fish and wildlife, and other aquatic resources or preserves.

Catch Basin - A catch basin (a.k.a., storm drain inlet) is an inlet to the storm drain system that typically includes a grate or curb inlet where storm water enters the catch basin and a sump to capture sediment, debris and associated pollutants. Catch basins act as pretreatment for other treatment practices by capturing large sediments. The performance of catch basins at removing sediment and other pollutants depends on the design of the catch basin (e.g., the size of the sump), and routine maintenance to retain the storage available in the sump to capture sediment.

Common Plan or Development or Sale – U.S. EPA regulations include the term "common plan of development or sale" to ensure that acreage within a common project does not artificially escape the permit requirements because construction activities are phased, split among smaller parcels, or completed by different owners/developers. In the absence of an exact definition of "common plan of development or sale," the State Water Board is required to exercise its regulatory discretion in providing a common sense interpretation of the term as it applies to construction projects and permit coverage. The common plan of development is generally a contiguous area where multiple, distinct construction activities may be taking place at different times under one plan. A plan is generally defined as any piece of documentation or physical demarcation that indicates that construction activities may occur on a common plot. Such documentation could consist of a tract map, parcel map, demolition plans, grading plans, or contract documents. Any of these documents could delineate the boundaries of a common plan area. However, broad planning documents, such as land use master plans, conceptual master plans, or broad-based CEQA or NEPA documents that identify potential projects for an agency or facility are not considered common plans of development. An overbroad interpretation of the term would render meaningless the clear "one acre" federal permitting threshold and would potentially trigger permitting of almost any construction activity that occurs within an area that had previously received area-wide utility or road improvements.

Community Based Social Marketing (CBSM) - A systematic way to change the behavior of communities to reduce their impact on the environment. Realizing that simply providing information is usually not sufficient to initiate behavior change, CBSM uses tools and findings from social psychology to discover the perceived barriers to behavior change and ways of overcoming these barriers.

Construction Site - Any project, including projects requiring coverage under the General Construction Permit, that involves soil disturbing activities including, but not limited to, clearing, grading, paving, disturbances to ground such as stockpiling, and excavation.

Design Storm – For purposes of these Special Protections, a design storm is defined as the volume of runoff produced from one inch of precipitation per day or, if this definition is inconsistent with the discharger's applicable storm water permit, then the design storm shall be the definition included in the discharger's applicable storm water permit.

Direct Discharge - A discharge that is routed directly to waters of the United States by means of a pipe, channel, or ditch (including a municipal storm sewer system), or through surface runoff.

Discharge of a Pollutant - The addition of any pollutant or combination of pollutants to waters of the United States from any point source, or any addition of any pollutant or combination of pollutants to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation. The term includes additions of pollutants to waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

Discharger - Any responsible party or site owner or operator within the Permittees' jurisdiction whose site discharges storm water runoff, or a non-storm water discharge.

Detached Single-family Home Project - The building of one single new house or the addition and/or replacement of impervious surface associated with one single existing house, which is not part of a larger plan of development.

Dry Weather – Refers to season where prolonged dry periods occur; in California's Mediterranean climate, it usually corresponds to the period between May and September.

Erosion - The physical detachment of soil due to wind or water. Often the detached fine soil fraction becomes a pollutant transported storm water runoff. Erosion occurs naturally, but can be accelerated by land disturbance and grading activities such as farming, development, road building, and timber harvesting.

Erosion Control Measures – Measures used to minimize soil detachment. These may include:

- Vegetation, either undisturbed or planted (e.g., grasses, wildflowers), and
- other materials, such as
    - straw (applied over bare soil, crimped into soil);
    - protective erosion control blankets;
    - fiber (applied as mulch or hydromulch); and
    - mulch (avoid plastics if possible).

Sediment Control Measures – Measures used to trap and/or retain detached soil before discharging to receiving waters. These may include:

- fiber rolls (e.g., keyed-in straw wattles, compost rolls);
- silt fence;
- retention basins; and
- active treatment systems.

Flood Management Facilities – Facilities or structures designed for the explicit purpose of controlling flood waters safely in or around populated areas. (e.g., dams, levees, bypass areas). Facilities or structures designed for the explicit purpose of controlling flood waters safely in or around populated areas (e.g., dams, levees, bypass areas). Flood management facilities do not include traditional stormwater conveyance structures (e.g. stormwater sewerage, pump stations, catch basins, etc.)

Grading - The cutting and/or filling of the land surface to a desired slope or elevation.

Healthy Watershed - Healthy watersheds are watersheds that function well ecologically and are sustainable. They support healthy, diverse aquatic habitat, have healthy riparian areas and corridors with sufficient vegetative buffer area to minimize land pollutant runoff into surfaces waters, sufficient cover and canopy to maintain healthy habitat, and have near natural levels of sediment transport. Surface waters meet water quality objectives, and sediments are sufficiently low in pollutants to provide for healthy habitat. Groundwaters are near natural levels in quantity and quality, for water supply purposes and for base flow for sustaining creek habitat and migratory fish routes. A Healthy Watershed sustains these characteristics through measures that ensure the dynamics that provide these healthy factors and functions are protected. For example, watersheds must be protected, through low impact development or other forms of protection, from hydromodification that adversely affects recharge areas' function or creeks' bed or bank stability. Creek buffer/riparian areas must be protected from land disturbance activities. Healthy sustainable watersheds use less energy for imported water, have fewer greenhouse gas emissions, and a lesser carbon footprint than unhealthy watersheds.

Hotspot - Hotspots are specific operations and areas in a sub watershed that may generate high storm water pollution. Hotspots are high priority sites.

Hydromodification - Modification of hydrologic pathways (precipitation, surface runoff, infiltration, groundwater flow, return flow, surface-water storage, groundwater storage, evaporation and transpiration) that results in negative impacts to watershed health and functions.

HUC 12 Watershed - The hydrologic unit code (HUC) is the “address” of the watershed. The HUC is the numerical code of the USGS watershed classification system used to identify the watersheds, or drainage basins, at various scales. The HUC organizes watersheds by a nested size hierarchy, so large scale watershed boundaries for an entire region may be assigned a two-digit HUC, while small scale, local watershed boundaries (within the larger regional watershed) may be assigned a 12-digit HUC. A HUC-12 watershed averages 22 square miles in size.

Illicit Discharge - Any discharge to a municipal separate storm sewer (storm drain) system (MS4) that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. The term illicit discharge includes all non-storm water discharges not composed entirely of storm water and discharges that are identified under the Discharge Prohibitions section of this General Permit. The term illicit discharge does not include discharges that are regulated by an NPDES permit (other than the NPDES permit for discharges from the MS4).

Impaired Waterbody - A waterbody (i.e., stream reaches, lakes, waterbody segments) with chronic or recurring monitored violations of the applicable numeric and/or narrative water quality criteria. An impaired water is a water that has been listed on the California 303(d) list or has not yet been listed but otherwise meets the criteria for listing. A water is a portion of a surface water of the state, including ocean, estuary, lake, river, creek, or wetland. The water currently may not be meeting state water quality standards or may be determined to be threatened and have the potential to not meet standards in the future. The State of California's 303(d) list can be found at http://www.swrcb.ca.gov/quality.html.

Impervious Surface - A surface covering or pavement of a developed parcel of land that prevents the land's natural ability to absorb and infiltrate rainfall/storm water. Impervious surfaces include, but are not limited to; roof tops, walkways, patios, driveways, parking lots, storage areas, impervious concrete and asphalt, and any other continuous watertight pavement or covering. Landscaped soil and pervious pavement, including pavers with pervious openings and seams, underlain with pervious soil or pervious storage material, such as a gravel layer sufficient to hold the specified volume of rainfall runoff are not impervious surfaces.

Industrial Development - Development or redevelopment of property to be used for industrial purposes, such as factories, manufacturing buildings, and research and development parks.

Infill Site - A site in an urbanized area where the immediately adjacent parcels are developed with one or more qualified urban uses or at least 75% of the perimeter of the site adjoins parcels that are developed with qualified urban uses and the remaining 25% of the site adjoins parcels that have previously been developed for qualified urban uses and no parcel within the site has been created within the past 10 years.

Joint Storm Water Treatment Facility - A storm water treatment facility built to treat the combined runoff from two or more Regulated Projects.

Linear Underground/Overhead Projects (LUPs) - Include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquiescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio, or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, (a) those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities); and include, but are not limited to, (b) underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/ or pavement repair or replacement, and stockpile/borrow locations.

Low Impact Development – A sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which collects and conveys storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility, Low Impact Development (LID) takes a different approach by using site design and storm water management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall. LID has been a proven approach in other parts of the country and is seen in California as an alternative to conventional storm water management.

Marine Operations – Marinas or mooring fields that contain slips or mooring locations for 10 or more vessels.

Maximum Extent Practicable (MEP) - The minimum required performance standard for implementation of municipal storm water management programs to reduce pollutants in storm water. Clean Water Act § 402(p)(3)(B)(iii) requires that municipal permits "shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants." MEP is the cumulative effect of implementing, evaluating, and making corresponding changes to a variety of technically appropriate and economically feasible BMPs, ensuring that the most appropriate controls are implemented in the most effective manner. This process of implementing, evaluating, revising, or adding new BMPs is commonly referred to as the iterative process.

Mixed-use Development or Redevelopment - Development or redevelopment of property to be used for two or more different uses, all intended to be harmonious and complementary. An example is a high-rise building with retail shops on the first 2 floors, office space on floors 3 through 10, apartments on the next 10 floors, and a restaurant on the top floor.

Municipal Separate Storm Sewer System (MS4) - The regulatory definition of an MS4 (40 CFR 122.26(b)(8)) is "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created to or pursuant to state law) including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States. (ii) Designed or used for collecting or conveying storm water; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."

In practical terms, operators of MS4s can include municipalities and local sewer districts, state and federal departments of transportation, public universities, public hospitals, military bases, and correctional facilities. The Storm water Phase II Rule added federal systems, such as military bases and correctional facilities by including them in the definition of small MS4s.

National Pollutant Discharge Elimination System (NPDES) - A national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of the CWA.

Natural Ocean Water Quality - The water quality (based on selected physical, chemical and biological characteristics) that is required to sustain marine ecosystems, and which is without apparent human influence, *i.e.*, an absence of significant amounts of: (a) man-made constituents (*e.g.,* DDT); (b) other chemical (*e.g.,* trace metals), physical (temperature/thermal pollution, sediment burial), and biological (*e.g.*, bacteria) constituents at concentrations that have been elevated due to man's activities above those resulting from the naturally occurring processes that affect the area in question; and (c) non-indigenous biota (*e.g.,* invasive algal bloom species) that have been introduced either deliberately or accidentally by man. Discharges "*shall not alter natural ocean water quality*" as determined by a comparison to the range of constituent concentrations in reference areas agreed upon via the regional monitoring program(s). If monitoring information indicates that *natural ocean water quality* is not maintained, but there is sufficient evidence that a discharge is not contributing to the alteration of natural water quality, then the Regional Water Board may make that determination. In this case, sufficient information must include runoff sample data that has equal or lower concentrations for the range of constituents at the applicable reference area(s).

New Development - New Development means land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision on an area that has not been previously developed.

Non-Traditional Small MS4 - Federal and State operated facilities that can include universities, prisons, hospitals, military bases (e.g. State Army National Guard barracks, parks and office building complexes.)

Notice of Intent (NOI) - The application form by which dischargers seek coverage under General Permits, unless the General Permit requires otherwise.

Nuisance - Anything that meets all of the following requirements: (1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; (2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; (3) occurs during, or as a result of, the treatment or disposal of wastes.

Open Channel - Flow within a distinct natural or modified channel, calculated as flow velocity times channel cross-sectional area.

Outfall - A point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States. Specific to Ocean Plan monitoring, outfalls include those measuring 18 inches or more in diameter.

Parking Lot - Land area or facility for the parking or storage of motor vehicles used for business, commerce, industry, or personal use.

Permittee/Permittees - Municipal agency/agencies and Non-traditional Small MS4s that are named in and subject to the requirements of this General Permit.

Permit Effective Date – July 1, 2013. The date at least 100 days after General Permit adoption, provided the Regional Administrator of U.S. EPA Region 9 has no objection.

Pervious Pavement - Pavement that stores and infiltrates rainfall at a rate that exceeds conventional pavement.

Point Source - Any discernible, confined, and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operations, landfill leachate collection systems, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant - Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 *et seq.*)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

Pollutants of Concern - Pollutants of concern found in urban runoff include sediments, non-sediment solids, nutrients, pathogens, oxygen-demanding substances, petroleum hydrocarbons, heavy metals, floatables, polycyclic aromatic hydrocarbons (PAHs), trash, and pesticides and herbicides.

Pollution - An alteration of the quality of the waters of the state by waste to a degree which unreasonably affects the beneficial uses of the water or facilities which serve those beneficial uses.

Potable Water - Water that is safe for domestic use, drinking, and cooking.

Prioritized BMPs – BMPs installed and/or implemented to address pollutants of concern. Where pollutant(s) of concern are undocumented or unidentified, prioritized BMPs are defined as BMPs installed and/or implemented to address common pollutants of concern (see pollutants of concern definition).

Priority Storm Drain Inlets - Storm drain inlets that drain to sensitive receiving water bodies or water bodies with history of illegal dumping. Storm drain inlets that are located in areas where the maximum number of citizens are exposed (this may include areas of high foot traffic).

QAPrP - Quality Assurance Project Plan

Receiving Water – Surface water that receives regulated and unregulated discharges from activities on land.

Redevelopment - Land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. Redevelopment does not include trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.

Regulated Project – Refers to projects subject to the new and redevelopment standards in Section E.11 in this Order.

Regulated Small MS4 - A Small MS4 that discharges to a water of the United States (U.S.) or to another MS4 regulated by an NPDES permit and has been designated as regulated by the State Water Board or Regional Water Board under criteria provided in this Order.

Residential Housing Subdivision - Any property development of multiple single-family homes or of dwelling units intended for multiple families/households (e.g., apartments, condominiums, and town homes).

Retrofitting - Improving pollution and/or flow control at existing developments and facilities to protect or restore beneficial uses and watershed functions.

Riparian Areas – Plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent waterbodies. Riparian areas have one or both of the following characteristics: 1) distinctively different vegetative species than adjacent areas, and 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms. Riparian areas are usually transitional between wetland and upland.

Rural Area - Encompasses all population, housing, and territory not included within an urban area.

Sediments - Solid particulate matter, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Sensitive Waterbody - Receiving waters which are a priority to protect. They include: 1) Areas of Special Biological Significance (ASBS), 2) areas providing or known to provide habitat for chinook and coho salmon and steelhead, and 3) beaches that serve more than 50,000 people between April 1 and October 31 and are adjacent to flowing storm drains or creeks.

Separate Implementing Entity (SIE) – An entitiy that a permittee may utilize to satisfy one or more of the permit obligations. SIE may include a flood control agency, a Phase I permittee, a storm water consulting firm, etc.

Small MS4 – An MS4 that is not permitted under the municipal Phase I regulations, and which is “owned or operated by the United States, a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity….” (40 CFR §122.26(b)(16)).

Smart Growth Projects – Projects that produce multiple-benefits such as economic, social and environmental benefits. Smart growth projects commonly include high density development projects that result in a reduction of runoff volume per capita as a result of reduced impervious surface.

Solid Waste - All putrecible and nonputrecible solid, semisolid, and liquid wastes as defined by California Government Code Section 68055.1(h).

Source Control - Land use or site planning practices, or structural or nonstructural measures, that aim to prevent runoff pollution by reducing the potential for contact with rainfall runoff at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff.

Surface Drainage - Any above-ground runoff (sheet, shallow concentrated, and open channel) that flows into the storm drain system.

Standard Industrial Classification (SIC) - A federal system for classifying establishments by the type of activity, in which they are engaged, using a four-digit code.

Storm Drain System - The basic infrastructure in a municipal separate storm sewer system that collects and conveys storm water runoff to a treatment facility or receiving water body.

Storm Water – Storm water is generated when precipitation from rain and snowmelt events flows over land or impervious surfaces and does not percolate into the ground. As storm water flows over the land or impervious surfaces, it accumulates debris, chemicals, sediment or other pollutants that could adversely affect water quality if the storm water is discharged untreated.

Storm Water Treatment System - Any engineered system designed to remove pollutants from storm water runoff by settling, filtration, biological degradation, plant uptake, media absorption/adsorption or other physical, biological, or chemical process. This includes landscape-based systems such as grassy swales and bioretention units as well as proprietary systems.

Structural Controls - Any structural facility designed and constructed to mitigate the adverse impacts of storm water and urban runoff pollution.

Subwatershed – An area approximately 10,000 to 40,000 acres in area identified by Hydrologic Unit Code 12 in the federal Watershed Boundary Dataset.

Surface Water Ambient Monitoring Program (SWAMP) - The State Water Board's program to monitor surface water quality; coordinate consistent scientific methods; and design strategies for improving water quality monitoring, assessment, and reporting.

Time of Concentration – The time it takes the most hydraulically-remote drop of water to travel through the watershed to a specific point of interest.

Total Maximum Daily Loads (TMDLs) - The maximum amount of a pollutant that can be discharged into a waterbody from all sources (point and nonpoint) and still maintain water quality standards. Under CWA section 303(d), TMDLs must be developed for all waterbodies that do not meet water quality standards even after application of technology-based controls, more stringent effluent limitations required by a state or local authority, and other pollution control requirements such as BMPs.

Targeted Audience: Group(s) of people the Permittee has targeted to receive educational message.

Trash and Debris - Trash consists of litter and particles of litter. California Government Code Section 68055.1 (g) defines litter as all improperly discarded waste material, including, but not limited to, convenience food, beverage, and other product packages or containers constructed of steel, aluminum, glass, paper, plastic and other natural and synthetic materials, thrown or deposited on the lands and waters of the state, but not including the properly discarded waste of the primary processing of agriculture, mining, logging, sawmilling, or manufacturing.

Treatment - Any method, technique, or process designed to remove pollutants and/or solids from polluted storm water runoff, wastewater, or effluent.

Urban Rural Interface - The urban/rural interface is identified as the geographical location at which urban land use and rural land use interact.

Urbanized Area - A densely settled core of census tracts and/or census blocks that have population of at least 50,000, along with adjacent territory containing non-residential urban land uses as well as territory with low population density included to link outlying densely settled territory with the densely settled core. It is a calculation used by the Bureau of the Census to determine the geographic boundaries of the most heavily developed and dense urban areas. From the Phase II final rule (Revised June 2012) http://www.epa.gov/npdes/pubs/fact2-2.pdf Data utilized in this Order was derived from 2010 U.S. Census Data.

Waste - Includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.

Waste Load Allocation -The portion of a receiving water's total maximum daily load that is allocated to one of its existing or future point sources of pollution. Waste load allocations constitute a type of water quality-based effluent limitation.

Water Efficient Landscape Ordinance - The Model Water Efficient Landscape Ordinance (Title 23, Division 2, Chapter 2.7 of the California Code of Regulations) took effect January 1 2010 and is designed to: (1) promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible; (2) establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects; (3) establish provisions for water management practices and water waste prevention for existing landscapes; (4) use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount; (5) promote the benefits of consistent landscape ordinances with neighboring local and regional agencies; (6) encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure; and (7) encourage local agencies to designate the necessary authority that implements and enforces the provisions of the Model Water Efficient Landscape Ordinance or its local landscape ordinance.

Water Quality Control Plan (Basin Plan) –The Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State within each Region, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives and discharge prohibitions. Basin Plans are adopted and approved by the State Water Board, U.S. EPA, and the Office of Administrative Law where required.

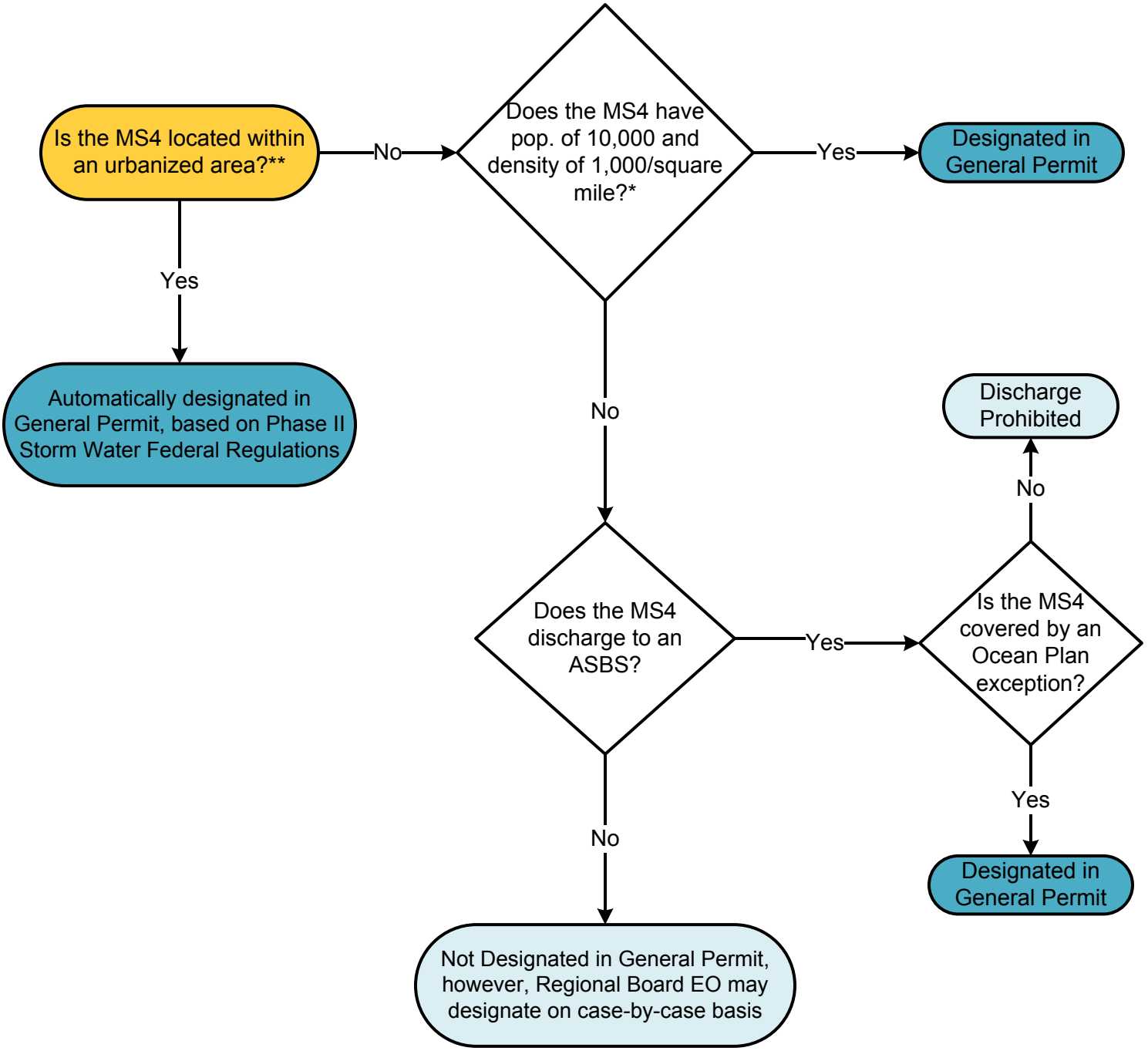
Water Quality Objectives - The limits or levels of water quality elements or biological characteristics established to reasonably protect the beneficial uses of water or to prevent pollution problems within a specific area. Water quality objectives may be numeric or narrative.

Water Quality Standards - State-adopted and U.S. EPA-approved water quality standards for waterbodies. The standards prescribe the use of the waterbody and establish the water quality criteria that must be met to protect designated uses. Water quality standards also include the federal and state anti-degradation policy.

Watershed Management Zone – Post-construction management zones based on common key watershed processes and receiving water type (creek, marine nearshore waters, lake, etc).

Watershed Processes – Functions that are provided by watersheds, including but not limited to, groundwater recharge, sediment supply and delivery, streamflow, and aquatic habitat.

Draft Phase II Small MS4 General Permit
Designation Flow Chart
February 5, 2013



*Current designation based on U.S. Decennial Census Date 2010.
** Assumes MS4 population greater than 5000.

Phase II Permit Traditional Small MS4 Monitoring Flow Chart

February 5, 2013

