5 RESPONSE TO COMMENTS

5.1 INTRODUCTION

This section includes all comments received during the public review period on the Draft IS/MND and the responses to those comments. A total of eight comment letters were received in response to the Draft IS/MND for PG&E's Fulton-Fitch Mountain Reconductoring Project.

5.2 INDEX TO COMMENTS AND RESPONSES

Comment letters received during the public comment period are listed below in Table 5.2-1. Comment letters are organized by correspondent group and then organized chronologically according to the date they were received. Each comment letter has been assigned a letter and number designation and each comment within that letter has been numbered.

Table 5.2-1 Comments on Draft IS/MND

Commenter *Date Received*	Index Code	Topic(s)	Page(s)
Agency Comments (A)			
Caltrans Patricia Maurice, District Branch Chief *August 21, 2017*	A-1	• Caltrans policies • Transportation Management Plan • Transportation Permit • Encroachment Permit	5-4
Tribal Government Comments (T)			
Middletown Rancheria Stephanie Reyes, Middletown Rancheria Tribal Historic Preservation Department *August 4, 2017*	T-1	• Handling of previously undiscovered cultural and tribal cultural resources	5-9
Stewarts Point Rancheria Kashia Band of Pomo Indians Lorin W. Smith, Jr., Tribal Historic Preservation Officer *August 22, 2017*	T-2	• Project not in territory and no concerns	5-11
Federated Indians of Graton Rancheria Buffy McQuillen, Tribal Heritage Preservation Officer *September 5, 2017*	T-3	• Tribal cultural resource monitoring • Handling of previously undiscovered cultural and tribal cultural resources	5-13

5 RESPONSE TO COMMENTS

Commenter *Date Received*	Index Code	Topic(s)	Page(s)
Public Comments (P)			
Landowner Representative Laurie Marshall, Syufy Enterprises *July 25, 2017*	P-1	• Property access	5-16
Landowner Anonymous #1 *July 29, 2017*	P-2	• Power line voltage • Visual impacts from poles • Potential health hazards from falling conductor and chemically treated poles • Property access	5-18
Landowner Anonymous #2 *August 22 and 23, 2017* *(posted August 21 and 22, 2017)* Note: Some content and exhibits referenced in the comment letter were not included.	P-3	• PG&E easements and access rights • Economic and financial issues • Conservation easements • Project information, communication, and transparency • Helicopters • Ground equipment and access routes • Vegetation impacts and restoration • Ground disturbance and soil stabilization • Monitoring and enforcement • Hazards and safety • Geology and soils setting • Geology and soil hazards • Erosion and soil stability • Cultural resources • Noise impacts • Electricity and phone service disruptions • CPUC dispute resolution process	5-20
Applicant			
PG&E David Thomas, PG&E Senior Land Planner *August 21, 2017*	PG&E-1	• Project description details • Biological resources setting and impact analysis • Paleontological resources analysis • Estimated truck trips in the Southern Segment • Mandatory findings of significance	5-230

5.3 COMMENTS AND RESPONSES

The CPUC considered all comments and is providing responses in this document. The entire text of each comment letter is included below. Comments within each letter are numbered (e.g., A-1, A-2) and responses immediately follow the comments. If text revisions were made to the IS/MND based on the comments, the revisions are provided with the response to the specific comment and are indicated in the text of this Final IS/MND with ~~strikeout~~ for deletions of text and in underline for new text.

5.4 CHANGES TO THE DRAFT IS/MND

The Draft IS/MND was revised in response to comments. Revisions included:

- Editorial changes
- Minor changes to mitigation measures
- Technical clarifications and corrections

The minor modifications and clarifications presented in this Final IS/MND do not contain new significant information as defined in CEQA Guidelines Section 15088.5, that would otherwise require recirculation of the MND or preparation of an Environmental Impact Report (EIR).

5.5 AGENCY COMMENTS

This section contains comments received from public agencies and the CPUC's responses to those comments. Responses follow each comment letter.

5.5.1 Comment Letter A-1

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
www.dot.ca.gov

Serious Drought. Help save water!

August 21, 2017

04-SON-2016-00171
SCH# 2017072049
SON-101- PM25.124

Ms. Lisa Orsaba
California Public Utilities Commission
Energy Division
505 Van Ness Avenue, 4th Floor
San Francisco, CA 94102

Fulton-Fitch Mountain Reconductoring Project – Mitigated Negative Declaration (MND)

Dear Ms. Orsaba:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above-referenced project. In tandem with the Metropolitan Transportation Commission's (MTC) Sustainable Communities Strategy (SCS), Caltrans mission signals a modernization of our approach in evaluating and mitigating impacts to the State Transportation Network (STN). Caltrans' *Strategic Management Plan 2015-2020* aims to reduce Vehicle Miles Travelled (VMT) by tripling bicycle and doubling both pedestrian and transit travel by 2020. Our comments are based on the MND. Additional comments may be forthcoming pending final review. A-1.1

Project Understanding

The applicant proposes to replace 9.8 miles of power lines and eight miles of poles between the Fulton and Fitch Mountain Substations, and modify the latter. The project spans from Pacific Gas and Electric Company's (PG&E) Fulton Substation on River Road adjacent to US 101 to the Fitch Mountain Substation on Bailhache Avenue in Healdsburg. The objective of this project is to improve service reliability for PG&E customers in Sonoma County. Access to the project will be provided via the US 101 on- and off-ramps at Healdsburg Avenue and River Road. A-1.2

Transportation Management Plan

Please identify whether any construction staging adjacent to US 101 is anticipated. If it is determined that traffic restrictions and detours might be needed on or near US 101, a Transportation Management Plan (TMP) may be required from the developer for approval by Caltrans prior to construction. Lane or shoulder closure charts for any work which interferes with operations of US 101 shall be submitted to Caltrans for review and approval. TMPs must be prepared in accordance with the California *Manual on Uniform Traffic Control Devices*. Further A-1.3

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

information is available for download at the web address below. Please ensure that such plans are also prepared in accordance with the TMP requirements of the Sonoma County and the City of Healdsburg. For further TMP assistance, please contact Juliana Gum of the Office of Operations Strategies at (510) 286-4579.
http://www.dot.ca.gov/hq/traffops/engineering/mutcd/pdf/camutcd2014/Part6.pdf.

A-1.3

Transportation Permit
Project work that requires movement of oversized or excessive load vehicles on the STN requires a transportation permit that is issued by Caltrans. To apply, a completed transportation permit application with the determined specific route(s) for the shipper to follow from origin to destination must be submitted to: Caltrans Transportation Permits Office, 1823 14th Street, Sacramento, CA 95811-7119. See the following website for more information: http://www.dot.ca.gov/hq/traffops/permits.

A-1.4

Encroachment Permit
The applicant will be required to apply for and obtain an encroachment permit for any work within Caltrans ROW prior to construction. As part of the encroachment permit process, the applicant must provide appropriate CEQA environmental approval, where applicable, for potential environmental impacts within the ROW. The applicant is responsible for quantifying the environmental impacts of the improvements within Caltrans ROW (project-level analysis) and completing appropriate avoidance, minimization and mitigation measures. Any improvements/mitigation measure affecting the operations of US 101 requires Caltrans review and approval. The applicant can schedule an encroachment pre-application meeting with Arun Guduguntla at arun.guduguntla@dot.ca.gov.

To apply for an encroachment permit, please complete an encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW, and submit to the following address: David Salladay, District Office Chief, Office of Permits, California Department of Transportation, District 4, P.O. Box 23660, Oakland, CA 94623-0660. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment permit process. See the website linked below for more information: http://www.dot.ca.gov/hq/traffops/developserv/permits.

A-1.5

Ms. Orsaba, California Public Utilities Commission
August 21, 2017
Page 3

Should you have any questions regarding this letter, please contact Stephen Conteh at (510) 286-5534 or stephen.conteh@dot.ca.gov.

Sincerely,

for Jeanette Ramirez

PATRICIA MAURICE
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

"Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability"

5.5.2 Response to Letter A-1

A-1.1 Caltrans' policies and approach for evaluating and mitigating impacts to the State Transportation Network are acknowledged.

A-1.2 Caltrans' summary of the project is accurate.

A-1.3 One construction staging area (SA/LZ-1) would be located in a field that is immediately adjacent to US 101 and the Caltrans ROW. The staging area is located northeast of US 101 and east Lavell Road, between Maddux Ranch Regional Park and US 101 (refer to Appendix A). The staging area would be accessed via Lavell Road. Direct access from US 101 would not occur, therefore, a Transportation Management Plan (TMP) for access off or detours on US 101 is not anticipated.

Short-term traffic restrictions on US 101 would be necessary on two separate occasions when guard structures in the Caltrans ROW are installed and removed. PG&E would conduct work within the Caltrans ROW during nighttime hours per Caltrans requirements. Mitigation in the IS/MND (MM Traffic-1 on page 3.15-26 of the Draft IS/MND) requires construction traffic management; however, PG&E would prepare a TMP if required to receive an encroachment permit from Caltrans. The need for an encroachment permit is addressed in Table 2.8-1 of the Draft IS/MND on page 2-52. The TMP, if required, would be prepared in accordance with the California Manual on Uniform Traffic Control Devices and the TMP requirements of the Sonoma County and the City of Healdsburg.

A-1.4 Table 2.8-1 in *Section 2: Project Description* of the IS/MND has been edited to state that PG&E may also be responsible for obtaining a Transportation Permit for moving oversized or excessive load vehicles on the state transportation network, as follows:

Regulatory Authority	Agency	Jurisdiction/Purpose	Project Requirements
Transportation Permit	Caltrans	Movement of oversized or excessive load vehicles on the state transportation network	If oversized or excessive equipment will be used, a transportation permit would be obtained from Caltrans prior to transporting oversized construction equipment and materials

A-1.5 Table 2.8-1 in *Section 2: Project Description* of the IS/MND states that PG&E would obtain a standard encroachment permit from Caltrans prior to conducting any work within the Caltrans ROW. MM Traffic-1 also specifies this requirement.

5.6 TRIBAL GOVERNMENT COMMENTS

This section contains comments received from tribal governments and the CPUC's responses to those comments. Responses follow each comment letter.

5.6.1 Comment Letter T-1

Middletown Rancheria
Tribal Historic Preservation Department
P.O. Box 1035
Middletown, CA 95461

July 21, 2017 Via Electronic Mail

Ms. Lisa Orsaba
State of California
Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

Re: NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLERATION: Pacific Gas and Electric Company's Fulton-Fitch Mountain Reconductoring Project In Sonoma County, California

Dear Ms. Orsaba:

The Middletown Rancheria (Tribe) is in receipt of your letter regarding the Fulton-Fitch Mountain Reconductoring Project.

Though we have no specific comments at this time, should any new information or evidence of human habitation be found as the project progresses, we request that all work cease and that you contract us immediately. We do have a process to protect such important and sacred resources. T-1.1

Thank you for the opportunity to provide comments to the above referenced project. The Tribe looks forward to continuing to be a part of the archaeological processes.

Nothing herein should be construed to be a waiver of or limitation of any of the Tribe's rights in law, in equity, or otherwise. All rights, claims and remedies are specifically reserved.
Sincerely,

Stephanie L. Reyes
Tribal Historic Preservation Officer

Phone (707) 987-3670 ext 115 *Fax (707) 987-9091*

5.6.2 Response to Letter T-1

T-1.1 The comment is acknowledged. MM Cultural-1 in *Section 3.5: Cultural Resources* of the Draft IS/MND addresses the concerns of the commenters by requiring notification of tribes within 48 hours of a discovery thought to be a tribal cultural resource.

5.6.3 Comment Letter T-2

From: lorin@stewartspoint.org
To: fulton2fitch@panoramaenv.com
Subject: PG&E"s Fulton-Fitch Mountain Reconductoring Project
Date: Tuesday, August 22, 2017 5:06:15 PM

To Whom It May Concern;

The Proposed Reconductoring Project in Sonoma County is out of the Aboriginal Territory of the Stewarts Point Rancheria Kashia Band of Pomo Indians.

We do not have any concerns or comments at this time.

Thank You,

Lorin W. Smith, Jr.
Tribal Historic Preservation Officer
1420 Guerneville Road, Suite 1
Santa Rosa CA 95403
Email: lorin@stewartspoint.org
Office: 707-591-0580 x 105
Cell: 707-321-7064

5.6.4 Response to Letter T-2

T-2.1 The comment is acknowledged.

5.6.5 Comment Letter T-3

Aaron Lui

From: THPO@gratonrancheria.com
Sent: Wednesday, September 06, 2017 1:40 PM
To: Aaron Lui
Cc: Lisa Orsaba
Subject: RE: PG&E Fulton Fitch Mountain Reconductoring Project, Sonoma County

Follow Up Flag: Follow up
Due By: Friday, July 06, 2018 4:00 PM
Flag Status: Flagged

Thank you for the information. I understand the formal comment period has passed. We are not seeking any significant changes to the IS/MND. I reviewed the proposed mitigations and they seem appropriate. The Tribe would like to be notified when the project is being implemented and given the opportunity to look at the cultural site and confirm that it is protected from ground disturbance. The Tribe would also like to be notified if a site is found that was not identified during the survey work to appropriately assess TCR's, and of course determine the best course forward of any TCR's. It doesn't seem appropriate for an archaeologist to determine data recovery for TCR's. T-3.1

Thank you and we appreciate receiving the information for this project. T-3.2

Respectfully,
Buffy McQuillen, THPO
Federated Indians of Graton Rancheria

From: Aaron Lui [mailto:aaron.lui@panoramaenv.com]
Sent: Wednesday, September 06, 2017 10:48 AM
To: THPO@gratonrancheria.com
Cc: Lisa Orsaba <lisa.orsaba@cpuc.ca.gov>
Subject: RE: PG&E Fulton Fitch Mountain Reconductoring Project, Sonoma County

Good morning Ms. McQuillen,

Ms. Orsaba asked me to respond to your email below. The files you requested can be downloaded using the following password and link. The relevant mitigation measures are located at the end of the cultural resources section (word document).

- Password: [redacted]
- https://[redacted]

Please note that the formal comment period ended on August 21st and we are in the process of finalizing the IS/MND. If you have any questions, please let us know as soon as possible.

Thank you,

Aaron Lui, Environmental Scientist
Panorama Environmental, Inc.
1 Embarcadero Center, Suite 740
San Francisco, CA 94111
d.650.340.4836 | o.650.373.1200
www.panoramaenv.com

1

From: "THPO@gratonrancheria.com" <THPO@gratonrancheria.com>
Date: September 5, 2017 at 4:28:06 PM PDT
To: "Lisa Orsaba (lisa.orsaba@cpuc.ca.gov)" <lisa.orsaba@cpuc.ca.gov>
Subject: PG&E Fulton Fitch Mountain Reconductoring Project, Sonoma County

Dear Lisa Orsbaba,

Thank you for notifying the Federated Indians of Graton Rancheria about the PG&E Fulton Fitch Mountain Reconductoring Project, Sonoma County, a project within the Tribe's Ancestral Territory. Please provide the full cultural report and proposed mitigation requirements to theTribal Heritage Preservation Office by email at thpo@gratonrancheria.com.

Sincerely,
Buffy McQuillen
Tribal Heritage Preservation Officer (THPO)
Native American Graves Protection and Repatriation Act (NAGPRA)
Office: 707.566.2288; ext. 137
Cell: 707.318.0485
FAX: 707.566.2291

Antonette Tomic
THPO Administrative Assistant
Federated Indians of Graton Rancheria
6400 Redwood Drive, Suite 300
Rohnert Park, CA 94928
Office: 707.566.2288, ext. 143
Fax: 707.566.2291
atomic@gratonrancheria.com

please consider our environment before printing this email.

5.6.6 Response to Letter T-3

T-3.1 The CPUC will notify commenter when PG&E begins construction on the project (currently scheduled for July 2018).

T-3.2 MM Cultural-1 in *Section 3.5: Cultural Resources* includes provisions for notifying regionally affiliated tribes of any resource discoveries that show signs of prehistoric Native American culture, as well as the minimum experience and qualifications of the cultural resources specialist making such determinations. Preservation in place and complete avoidance would be the preferred method of mitigation for discovered resources. Data recovery would only occur if the resource could not be avoided and other suitable mitigation options were not available, as determined by a qualified specialist and in coordination with CPUC. MM Cultural-1 in the Draft IS/MND also identifies that "…if the cultural resources specialist/archaeologist determines that the resource could be a tribal cultural resource, he or she shall, within 48 hours of the discovery, notify each Native American tribe identified by the NAHC to be traditionally and culturally affiliated with the geographic area of the project site of the discovery. The responding tribes shall be given an opportunity to participate in determining the appropriate mitigation methods in consultation with the CPUC." This provision allows the tribe to participate in the course of action taken, if the resource is a TCR.

5.7 PUBLIC COMMENTS

This section contains comments received from the public and the CPUC's responses to those comments. Responses follow each comment letter.

5.7.1 Comment Letter P-1

From: Laurie Marshall
To: fulton2fitch@panoramaenv.com
Subject: Access on Shiloh Ridge Road?
Date: Tuesday, July 25, 2017 2:38:12 PM

Good afternoon, I work for Joe and Michelle Syufy. They are the homeowners at 4400 Shiloh Ridge Road, Santa Rosa. I wanted to make sure you have it noted that they have several horses on their property. For the safety of all horses and humans, any access needs to be arranged in advance of anyone entering the property. P-1.1

Please confirm your access needs as well as any timeline you have at this time.

Laurie Marshall
Executive Department
Syufy Enterprises
150 Pelican Way
San Rafael CA 94901
Ph. 415-448-8335
Fax 415-448-8345

www.peacockgapgolfclub.com
www.peacockgapclubhouse.com
www.syresproperties.com
www.sywest.com
www.tomatina.com
www.trivalleygolf.com
www.villasport.com
www.westwinddi.com

5.7.2 Response to Letter P-1

P-1.1 The comment is acknowledged. Specific requests regarding access should be directed to PG&E.

5.7.3 Comment Letter P-2

From: [redacted]
To: fulton2fitch@panoramaenv.com
Cc: [redacted]
Subject: Fulton-Fitch Mountain Reconductoring Project {PGE} #A 15-12-005
Date: Saturday, July 29, 2017 2:31:49 PM

Attn: CPUC
I recently received a letter about the Fulton-Fitch Mountain Project and I request that my name and address remain confidential!
I have review copies of the CPUC draft at the Windsor Regional Library and I do have 3 concerns.

1) When the original right away was agreed on it was for 60-kV transmission lines and now the lines are changing to 230-kV. I have great concern about health hazards as our home is near by and there is a large distance between poles which has the potential of breaking, also since the usage is changing it seems the land owners should be compensated as the original agreement has changed!!! Why should each land owner live with this health hazard because of Sonoma County's growth with out some kind of compensation to us? P-2.1

2) Also reviewing Picture Figure 3.1-12 Kop# visual simulation at the library it has had no changes, last Fall I was told it was at Engineering to change the poles to one pole accommodating our transformer to the one pole which would eliminate one eye score and a very outdated wood post, which is probably treated with creosote which is another health hazard. P-2.2

3) My third issue is we have a very expensive concrete drive way and do not want any heavy equipment using it during such a big project, I feel the drive way is well away from PGE right away so I need to have an acknowledgment that it will not be used with equipment larger than a Pickup truck!!! P-2.3

Sincerely,
Parcel #[redacted]

5.7.4 Response to Letter P-2

P-2.1 PG&E has not proposed to change and increase any of the existing power line voltages. The existing 60-kV line would remain a 60-kV line. PG&E would replace old conductor with new higher rated conductor along this line, so it would have greater stability during potential overload conditions. In the Southern Segment only, conductor on an existing 230-kV transmission line would be replaced for spacing purposes. The normal load conditions on the 230-kV line would also remain the same.

P-2.2 The visual simulations in the IS/MND are meant to be representative examples of pre- and post-project conditions, and do not necessary reflect PG&E's agreements with individual landowners. Requests regarding specific pole locations, including follow up regarding previous discussions, should be directed to PG&E.

P-2.3 PG&E has identified anticipated vehicle access routes to pole locations, which include existing roads, driveways, and other overland routes (refer to the maps in Appendix A). The analysis in the IS/MND addresses environmental impacts that could occur during vehicle access, as required by the CEQA. Specific requests regarding access should be directed to PG&E.

5.7.5 Comment Letter P-3

[redacted]

August 18, 2017

California Public Utilities Commission
ATTN: Fulton-Fitch Mountain Reconductoring Project
c/o Panorama Environmental, Inc.
One Embarcadero Center, Suite 740
San Francisco, CA 94111

Re: Affected landowner repsonse to
the Initial Study/Mitigated Negative Declaration
of the above PG&E project

To the staff of Panorama Environmental:

We are [redacted] Weston, the managing owners of the Sotoyome Highlands Preserve (AKA Weston Ranch). The Fulton-Fitch Mountain 60 kV transmission line of PG&E traverses 3,383.3 feet (per PG&E's survey) of the southwestern portion of this 1,160.42 acre property.

AS INDIVIDUAL RESPONDENTS, WE REQUEST CONFIDENTIALITY AND WISH THE WITHHOLDING OF OUR NAMES AND ADDRESS FROM PUBLIC REVIEW.

A. INTRODUCTION

The transmission line has 6 poles located on this property: 3 (#'s 74, 75 and 76) on a lower elevation (ranging in elevation from about 510 to 550 feet) and 3 (#'s 77, 78 and 79) on a higher elevation (ranging in elevation from about 630 to 685 feet). The closest pole from the ranch entrance on Perinoli Road (#77) is only 1200 feet away (as the eagle flies), the farthest pole (#74) is only 1894 feet away.

The upper group of poles is very easy to access by conventional ground construction equipment: #77 is situated right by the road and #'s 78 and 79 only short distances away by a wide, open road atop a low knoll. The use of helicopters is not necessary.

The lower group of poles is easily accessible by a well-preserved dirt road providing already established branch routes to the poles. This road was originally developed by PG&E in 1947 as part of the construction of the tranmission line. It was also used to construct and reconstruct the 12 kV distribution line running perpendicular to the transmission line and providing electricity to the Weston ranch headquarters.

A1

P-3.1

P-3.2

From the original construction of the transmission line in 1947 through repairs and replacements over time until the middle of 2016, PG&E personnel expressed no problem with continuing to utilize the established upper and lower route to the poles.

P-3.2

A Brief History of One Landowner's Interaction with PG&E

Since 2011, the Westons have asked PG&E what they have planned for the Weston property in order to accomplish their goal of reconductoring the Fulton-Fitch Mountain 60 kV transmission line.

The Westons have received very little information from PG&E and their consultants over the years. The DRAFT IS/MND has some very disturbing information for the Weston property as to how this project will be conducted. However, this disturbing information is still not set out in any kind of helpful manner, especially since PG&E reserves the right to make changes up to the time of construction.

The Westons can only conclude that the CPUC and PG&E really don't want landowners such as the Westons to know in advance of construction all of the ramifications that this project will have on their property.

This all seems rather strange since replacing poles and stringing new wires should be a straightforward construction project.

P-3.3

In an onsite meeting with Senior Planner Nathan Lishman and his Construction Manager in March of 2016, the following information was conveyed:

1. that helicopters would be used for most of the construction,
2. that the use of helicopters for construction was a pilot project,
3. that only one vehicle, a UTV, would be driven on the Weston 1.7 mile easement road and then onto the Weston property,
4. that the 70 year old access road, an existing PG&E road, would not require very much vegetation clearance for use by a UTV and
5. that PG&E had no interest in the rest of the PG&E road which at one time extended southeast to a poorly maintained PG&E gate in the long boundary fencing that the Westons have with Windsor Oaks (the property to the south).

P-3.4

A2

These PG&E officials acted as if the whole point to using helicopters was to limit the need for the usual PG&E line truck construction. Because they didn't talk about the need for more overland routes or alternate routes, it appeared to the Westons that PG&E vehicles invading their property might be minimal.

Some heavily redacted material was sent to the Westons before this March meeting, but it did not provide any definite information as to what PG&E had in store for the Weston property.

However, the Biological Resources Technical Report dated July 2012 (but not made public until October 2016) states as follows: "The majority of excavations will be completed using an auger mounted on an excavator. The excavator runs on tracks and is smaller than a line truck, which allows it to access overland routes on steep terrain and in wooded areas. (page 4 & 5)

"It is anticipated that additional support vehicles will be required at the pole replacement sites. Additional vehicles may include, but not be limited to, pick-up trucks, bucket trucks, all-terrain vehivles, backhoes, and graders. (page 5)

"Project work areas will be accessed via a combination of existing access roads, pedestrian trails, and overland travel. Access routes are shown on maps in Appendix A from where they extend from existing paved roads... Because the power line runs through rangeland, vineyards, and parklands, there are existing PG&E right-of-way dirt access roads which run to or near many of the poles. However, improvements are to include grading the roads, laying rock and vegetation pruning and removal. Grading is generally required to improve and widen existing roads and create turnarounds and work areas. For the purpose of this report, access roads are considered to be 12 feet wide to allow for passage of large reconductoring vehicles. (page 5 & 6)

"Pole replacement sites will be accessed by overland travel. Overland travel is defined as access where there is no pre-existing road or path, or the access is substantially overgrown indicating any pre-existing path is not regularly accessed. Where overland travel is required to access a pole replacement site, the route to the pole which minimizes the distance traveled and impact to surrounding vegetation and terrain will be

P-3.4

P-3.5

P-3.6

A3

identified. Use of the excavator on overland travel routes is anticipated to result in some ground disturbance as a result of the tracks on the vehicle. However, it is anticipated that any ground disturbance along overland access routes will be repaired and no new roads will be established for the project. (page 6)

"There are eleven locations where access roads cross seasonal watercourses or seasonal wetlands. Drainage crossings are shown on the maps in Appendix A ... It is understood that temporary materials such as fiberglass mats, steel plates, or temporary bridges will be placed across the water features during project access to avoid and minimize travel disturbance." (page 6)

This brief sample of quotations from a 2012 PG&E document shows how PG&E officials withheld important information from affected landowners 4 years after the general scope of the construction project had been decided upon.

Concerning Field Surveys in the Biological Resources Technical Report: "For the purpose of the biological surveys, unless otherwise stated... the 'survey area' is defined as a 500-foot wide corridor exending 250-feet on either side of the project alignment... In addition to this corridor, the survey area includes access routes and landing zones (LZ)/staging areas which fall outside of the 500-foot corridor around the alignment." (page 12)

This "study area" appears to the Westons to be a de facto easement width which, of course depends on how many overland ground routes PG&E wants to use on a landowner's property and how many helicopter touchcown zones they want. This 500 feet on the Weston property is approximately 39 acres and with the added area around the various access routes that PG&E has arbitrarily chosen perhaps 50 acres altogether.

As stated above, the Biological Resources document is dated July 2012 but was not published until October 19, 2016.

Right after receiving in December 2015 a copy of PG&E's Application for a Permit to Construct from the CPUC, Richard Weston accessed the CPUC website and subscribed as an interested party eligible to recive updates from time to time on the progress of this PG&E project. In response, Richard received copies of the application's process serving but absolutely nothing else during the past 2 years, aside from the few perfunctory legal

A4

P-3.6

P-3.7

P-3.8

notices sent to all landowners along the project route. Exchanging a few e-mails with the planner Lishman was not very informative and reliable (like his site visit). The Westons were forced to deciphering information pertinent to their property from the online welter of CPUC deficiency notices and PG&E responses that irregularly passed back and forth between the two.

P-3.8

It appears that all of the important features of this PG&E project were set out in 2012, presumably by these biological consultants who told the Westons at the time in 2012 that they knew nothing at all about the project. One of these biologists later wrote concerning the Weston property in the "Water Crossing Mapping" dated January 15, 2016 (dated December 2015 at the bottom of the pages): "Weston Ranch (Poles 74-79) The access road to the Weston Ranch is an improved, gravel road with multiple culverts and one bridge crossing over a perennial stream with standing water within the mapped riparian woodland RIW012. The bridge is lined with PG&E cones, covered with steel plates, and flagged with signage stating "No Wide Heavy Trucks". Poles 74 through 76 are accessible only by foot or with small off-highway vehicles along an overland route beginning at the Weston Ranch driveway. Poles 77 through 79 may be accessed with standard-sized vehicles and equipment." (page 4)

So, as stated above it is apparently the biologists, not civil engineers, who have determined how PG&E will use access roads on a landowner's property.

P-3.9

In October of last year, Lishman arranged an onsite meeting with the Westons to "inspect pole sites". Without prior notice, he brought along a large group of PG&E employees and contractors and a TRC consultant who were led along the existing PG&E road leading to Poles 74, 75 and 76. Only afterward were the Westons casually informed that PG&E wanted to impose a new road which would allow heavy vehicles and equipment to drive through the front yard of the Westons' hilltop home and down a steep unstable slope to Pole 76.

When the Westons protested, Lishman acknowledged that the Westons objected to the route down their scenic hill. But in the meantime the TRC consultant had climbed this same hill and was peering down at the group.

P-3.10

A5

This meeting was more of a social occasion for these PG&E employees, contractors and consultant.

The Westons received a last minute phone message about another PG&E visit to be held in February 2017. This was supposed to be a hike from a new ineptly built PG&E gate on the southern fenceline with Windsor Oaks Winery (the same gate which Lishman disavowed an interst in in March 2016), all the way along the tranmission line to the next neighboring property (Mathy). However there isn't any gate in that western boundary fence. Since the PG&E planner and consultant were not listening to the Westons, it seemed pointless to meet with them again.

In the last week, the chain on the second gate at the Weston front entrance has been cut and removed by yet another PG&E employee. This is at least the third time that the side gate has been opened after the chain was cut. Apparently, the last occasion was for PG&E surveyors who left surveyor pins and stakes on the premises without a courtesy notification. Unfortunately, when they opened the second gate which had not been moved for a number of years, the road drainage ditch was damaged.

Such breaking and entering is not necessary because the PG&E meter reader has the combination to the main gate lock. Also, when PG&E visitors give us advance notice or bother to call the phone number listed on the gates, we gladly ensure that the main gate will be opened. Because of trespassing problems, we don't want to see strangers wandering around our property.

This response is being mailed by USPS Certified Mail on August 21, 2017.

[redacted]

P-3.10

P-3.11

P-3.12

P-3.13

A6

B. PG&E'S RIGHT-OF-WAY EASEMENT

This section is in response to the IS/MND's Project Description: 2.6 Construction: 2.6.2 Work Areas and Access: PG&E Easements and Access Rights and Ground Access (Access Routes), pp 2-20 - 2-22 (an important topic that is hidden away and downplayed in this voluminous IS/MND document).

The full text of this public utility easement signed and recorded in 1947 (Book 759, Pages 170-171, S.C.R.) is presented in Exhibit B-1.

The first party to the transaction, Miller M. McNear and Kathleen McNear, husband and wife, were the landowners who sold the ranch to the Weston Family in 1958. Pacific Gas and Electric Company wrote the easement contract and made the McNears sign it, so any ambiguities in its language should be construed by a court in favor of the landowners.

The initial, major granting clause of the contract describes in detail the physical components of the transmission line (poles, wires and pole accessories) that PG&E will have the right to erect, construct, reconstruct, etc,. but the adjunct right-of-way is simply described as "therealong", not thereabouts," the aforementioned poles and wires.

In the metes and bounds description of the route of the poles, the width of the easement is not specified.

The following section of the easement states the terms of the agreement start with granting PG&E the right "(a) of ingress to and egress from such facilities and [PG&E's] facilities on adjacent lands by a practicable route or routes across [the Westons'] premises". The term "a practicable route or route," is used because the transmission line passes through several neighboring properties and PG&E wanted an access road that followed it as closely and as practicably as possible. Therefore, the road that was built gave access on the McNear (now Weston) property to and from the contiguous property on the southeast (now owned by Windsor Oaks Winery) and the 2 contiguous properties on the northwest (now owned by Mathy and by St. Francis Winery). Grant School Road (now known as Perinoli Road) provided PG&E's primary access to the McNear (Weston) property. As stated in Section A, the PG&E road leading to and from the southeast is still serviceable. The road also starting at Perinoli Road in the Front Pasture but going in the opposite direction up into the narrow valley between Poles

B1

P-3.14

79 and 80 has not been maintained at all during the past 70 years and several insurmountable obstructions have developed.

The word "practicable" is defined in the American Heritage Dictionary of the English Language (4th ed.) as "1. Capable of being effected, done, or put into practice; feasible. 2. Usable for a specified purpose: a practicable way of entry." One of the definitions of "impracticable" is "unfit for passage: 'roads inpracticable in winter'."

The Law Dictionary Online (Black's Law Dictionary): "What is practicable? Any idea or project which can be brought to fruition or reality without any unreasonable demands."

Oxford English Dictionary: "1. Able to be done or put into practice successfully; 1.1 Able to be used; useful."

After such long-term use of the 2 access routes to the poles here (from 1947 to 2011, the date of the last reconstruction), PG&E has demonstrated the practicability of those routes and should be satisfied with the scope of access rights permitted under the current right-of-way easement.

This right is limited by the following condition: "that in exercisig such right of ingress and egress [PG&E] shall, whenever practicable, use existing roads or lanes, and shall repair any damage caused by its use thereof."

During the intervening years, PG&E has complied with this condition by accessing its poles on the McNear (Weston) Ranch via an existing gravel entrance road (Grant School Rd. (Perinoli Rd)) and via two dirt roads (one for the upper poles and the other for the lower) that the McNears allowed PG&E to construct as branches from the main access. (Actually the Westons made some minor improvements to the latter roads which PG&E accepted as faciltating constuction work on the poles.)

According to the American Heritage Dictionary of the English Language, the work "repair" has two meanings that apply to the situation where PG&E damages the landowners' premises while exercising its access rights: "1. to restore to sound condition after damage or injury; fix: 'repaired the broken watch'... 4. to make up for or compensate for (a loss or wrong, for example)." The Westons prefer that they receive the benefit of the second meaning of repair for a number of reasons, one of which is that it accords

B2

P-3.14

with the use of "indemnify" in the next paragraph of the contract (see discussion below).

The section of the easement agreement containing its specific provisions continues as follows:

(b) The right "to erect, maintain and use gates in all fences which now cross or shall hereafter cross the right or rights of way hereby granted." The historic 2 access routes do not cross any fences, so there has never been any problem with gates not being closed or opened properly by PG&E personnel, especially when livestock are grazing in the pastures. However, the replacement routes now being proposed by PG&E involve breaching a boundary deer fence with Windsor Oaks Winery and twice breaching an exclusionary fence around our home site that keeps out destructive and even dangerous wild animals. But only equivocal mention is made in PG&E's IS/MND for the installation of gates.

(c) The right "to trim, and/or to cut and clear away, any trees and brush whenever, in the judgment of [PG&E], the same shall be necessary for the convenient and safe exercise of the rights hereby granted."

P-3.14

This right is limited by the following condition: "that all trees which [PG&E] shall cut or remove, if valuable for either timber or wood, shall continue to be the property of [the Westons], but all tops, lops, brush and slash shall be burned or removed by [PG&E]."

Obviously, the Westons do not want the brush to be burned onsite. They would prefer that the brush be left for the Westons to form small shelter piles for benefiting wildlife. If chipped, the chips should be spread out on the ground. All of the cut timber or wood, considered valuable by the Westons, shall be left on the premises by PG&E and its employees and contractors.

The following paragraph has this important provision: "[PG&E] shall indemnify [the Westons] against any and all loss and damage which may be caused by the exercise of said right of ingress or egress, or by any wrongful or negligent act or omission of [PG&E] or its agents, or employees, in the exercise of any of the rights hereby granted." The Westons construe this sentence to mean that PG&E shall insure the Westons against any and all loss and damage which may be caused by PG&E's exercise of its ingress and egress rights (under any and all circumstances), or,

B3

more particularly, which may be caused by any wrongful or negligent act or omission of PG&E or its employees, contractors, agents, or anyone under PG&E's control in the exercise of any of the rights hereby granted.

The dictionary definition of "indemnify" is twofold: "1. To protect against damage, loss, or injury; insure. 2. To make compensation to for damage, loss, or injury suffered." The "hold harmless" provision of this easement should include both definitions. The Westons have a number of concerns about the imminent occurrence of property damage, personal injury, financial loss, environmental degradation, fair market value decrease, disruption of normal living routine, and abrogation of legal property rights -- all resulting from PG&E's proposed reconductoring/reconstruction project as set forth in the CPUC Initial Study.

This CEQA document describes some, but by no means all, of the adverse environmental impacts that will be significant in the absence of PG&E's implementing a long list of mitigation measures (APM's and MM's). However, the Westons are skeptical that these mitigation measures will either avoid negative environmental effects or will accomplish their transformation into less than significant ones because they suspect that many of the APM's and MM's will prove to be illusory, arbitrarily (not scientifically) determined, incomplete, ineffective, impracticable, and/or even tokenistic and superficially compliant with CEQA without any real substance. But we do not have the time now to go through the APM's/MM's, dissect them and explain their failings.

The CPUC's Mitigation Monitoring and Reporting Program contains Subsection 4.5 Dispute Resolution which makes the assumption that, although the imposition of mitigation measures on PG&E by the CPUC is a condition of PG&E's being granted a permit to construct by the CPUC, the landowners affected by the construction (and also the general public) will be required to resolve any dispute with PG&E solely through a time-consuming 4-step procedure of filing complaints with officials of the CPUC, acting not as a judiciary or an arbitration board but as self-contained government agency arbiters who have usurped the proper role of the judicial branch of government. The landowners will not be signatories to the permit contract negotiated exclusively between CPUC and PG&E.

B4

P-3.14

P-3.15

P-3.16

P-3.17

Another problem with CPUC's DISPUTE RESOLUTION is that landowners making complaints about property damages or environmental degradations have narrow grounds for complaining. Because the PTC contract has been set in concrete after the public was granted a mere 30 days to comment on the IS/MND, the only topic open to discussion is how well PG&E is implementing the mitigation measures negotiated solely between the two parties to the contract. Since PG&E is allowed to not only cause the damages but also to monopolize their repair with little if any informational imput allowed from affected landowners, the terms of the PTC contract cannot be reopened to investigate, with the help of the landowners, the following topics:

P-3.17

(1) Whether PG&E's evaluation of the kind and extent of damage on a particular property is accurate;

(2) whether the curative methods of PG&E and CPUC for remedying the bad environmental effects are working well enough or should be replaced with alternative methods that have better probabilities of success in the near future;

(3) whether the mitigation measures prescribed in the beginning have been flexible, adaptive and site specific enough to overcome any difficulties that arose;

P-3.18

(4) and whether the restoration project will become so prolonged as to unreasonably burden further the landowner with crews of workers getting in his way with vehicles and equipment and restricting land use on his property.

Because of our frustating experience of working with PG&E since 2011 in regard to this project (see Section A's discussion), the Westons would much prefer an alternative method of environmental damage rectification. We have lived on this property for almost 60 years and are well acquainted with its natural history. PG&E and TRC personnel, on the other hand, have very limited knowledge and do not possess the qualifications to find the right regionally-qualified and experienced ecocsystem restoration companies and conservation biologist consultants for the work of implementing scientifically-sound, site-specific mitigation measures on the Weston Ranch. We are also the contact persons for CPUC and PG&E's necessary interaction with the Sonoma County Agricultural Preservation and Open Space

P-3.19

B5

District, which hold a conservation easement over the whole property (the easement was originally partly agricultural and partly natural history but has evolved into being purely naturalistic at present).

After we interviewed and evaluated three expert companies acceptable to CPUC, PG&E and us, PG&E could hire one of the three to satisfy its mitigation repair responsibilities under the PTC contract.

The next paragraph of the easement agreement begins with this important statement: "In the exercise of such rights [PG&E] shall avoid unreasonable interference with such use by [Westons] of said premises as is consistent with the full enjoyment of said rights by [PG&E]." PG&E can have the full enjoyment of the rights granted to it by the easement, BUT ONLY IF PG&E complies with the three strict limits placed on those rights by the same agreement (especially the prohibition against causing damage with impunity). Also, PG&E must avoid unreasonable interference with the Westons' longstanding use of the property they own.

"Unreasonable interference" means the act of hindering, obstructing, or impeding other people which is irrational and immoderate and exceeds a normal, usual, reasonable, or proper limit.

The ways by which PG&E threatens to unreasonably interfere with the Westons' residential, conservationist and investment uses of their property include, but are not limited, to the following:

(i) PG&E's construction activities are scheduled to spend 10-12 months in the vicinity of the Weston Ranch but will probably take longer because of winter storm delays and the likelihood that the property will suffer much damage that will require 3 years or more to repair. During that time the Westons, who have only 2-wheel drive vehicles, will have to somehow share the only access road to their home with many PG&E vehicles of all sizes coming and going at irregular times.

Perinoli Road is an old, 2.2 mile long, single-lane, gravel, unpaved road with steep grades and twisty blind bends in places (not a safe road for anything but very light traffic). The road now has proper drainage ditches and culverts in order that winter storm water cannot rush down the road and scour the surface. But PG&E is only interested in cutting back vegetation to accommodate its wide vehicles and not in retaining storm water damage prevention or hiring a road engineer to mitigate the driving

B6

P-3.19

P-3.20

hazards the Westons will have to face while negotiating this dangerous route.

In addition, the Westons have a 30-foot wide surveyed, mapped, deeded and recorded right-of-way easement and maintenance/repair agreement over 1.7 miles of the road that passes through St. Francis Winery's property. St. Francis has probably not told PG&E about this easement, which prohibits any closure or obstruction of the road against the Westons (dominant tenement). This problem for the Westons will likely arise if PG&E undertakes to repair two damaged sections: an old poured-in-place concrete box culvert and a road slumpage from a landslide along a creek.

(ii) One of the 3 new access roads that PG&E is trying to impose on the Westons goes way outside of the 500-foot wide study area and main construction swath, then turns back to access Pole 76 downslope to the south, invades the fenced-off landscaped yard of the Westons' home situated atop a scenic hill, destroys two mature, majestic valley oaks, proceeds down the high steep headscarp of a large landslide whose runout traveled as far as Pole 76's location, destroys a large, spreading colorful buckeye tree, tramples and compacts our septic system's leach field (in the only location where the civil engineer designer found would comply with county regulations), and continues its inexorable progress over the landslide debris flow's characteristic downward hummocky ground surface (often called "melted ice cream topography". Finally, this road will bring sundry types of construction equipment and vehicles to Poles 76 and 75.

This hillspope is obviously too steep, erodible and unstable, especially during the rainy season. The Westons have successfully stabilized it by planting a thick protective cover of the rhizomatous bunchgrass, Phalaris aquatica. But PG&E's imposition of heavy construction traffc on the slope will rapidly destroy the grass cover and reactivate the erosion and landsliding. The damage will be made worse by PG&E's bulldozing the road route so that the road surface will be level and smooth (temporarily) for PG&E's vehicles.

The Westons have not been granted an explanation by PG&E for why this destructive route was revealed to them in Octover 2016 and repeated in February 2017. Eventhough this spring Richard sent the PG&E planner, Lishman, 6 long e-mails about the road in an attempt to elicit an

B7

P-3.20

explanation or rationale from him, we have not yet received any reply at all. The existing access road and routes to Poles 76, 75 and 74 have been acceptable to PG&E for 70 years. They actually access those poles with shorter distances and with less environmental degradation (see discussion in Section C).

The Westons are in their seventies with only fair health. Obviously, we are going to have to endure for a year or so privacy, safety and health problems:

* PG&E contractor ground crews (totalling 5-50 men) will be entering our yard and private living space at unpredictable times (even in the early morning and early evening). These men will be complete strangers whose movements and activities we can't predict (trash, profanity, bathroom requests, etc.). The road through our yard will not be enclosed with fencing.

The two breeches of the yard's perimeter fencing caused by PG&E will probably not be gated, or if they are, keeping them closed will probably not be regulated by the workers' foreman. This perimeter fencing is important for acting as an exclusionary barrier for destructive and even dangerous wild animals such as rabid skunks, wild boars and mountain lions (who have been seen right outside our house on occasion). Actually, this problem with wild animals have led us to begin building a much stronger fence, one that is electrified, that will encompass a larger, more defensible protective zone around our home.

* PG&E has assured the CPUC (but not the landowners) that that company will repair any damages to the land involved in the construction zone (assuming that PG&E admits to causing them and they occur within the purview of the fixed APM's and MM's contained in the PTC contract with the CPUC). But the construction activities will commence in July 2018 and continue through the summer, fall and into the winter and the time for repairs will not take place until May to June 2019. During the intervening months when there could be much rain in this area, the delay in making necessary repairs to damages already caused or still being caused by nonstop work will exacerbate the erosion and instability of damaged areas, especially steep hillsides with poor soils and geolgy and lack of vegetative ground cover. CPUC and PG&E should bear in mind that the Weston

B8

P-3.20

P-3.21

P-3.22

Ranch had 75.9 inches of rain last year, almost all of that total being concentrated from late October through February (especially January).

So the Westons feel they have cause to worry that PG&E's irrational destabilizing of the steep hillslope with its poor soil, poor geology and grass removal just below their house may end up reactivating the landslide and undermining their house (the lip of the headscarp is only 50' from the house).

Indeed last winter despite the well grassed slopes in the canyon between Poles 77 and 76 two earth flows appeared in February at the time same time as the landslide on Perinoli Road occurred after 23.18 inches of rain in January and another 18.7 inches in February. One of these flows was about 30 feet below the already mentioned headscarp.

The Westons also don't want to lose their irreplaceable leach field and have to live with a portatoilet.

(iii) Enduring at close quarters the loud noises (noise pollution) caused by ground construction trucks and equipment passing within their yard only a few feet from their home will be made far worse by the even louder noises generated by medium-sized and large-sized helicopters also operating in close proximity to their home. See Section G for a discussion of the significant helicopter noise distrubance and how it has been over simplified and downplayed by CPUC's IS/MND for PG&E.

One of that document's mitigated measures is to shut up affected landowners within their houses with all of the doors and windows closed, even during heat spells in the summer and fall construction period. If any of these landowners (and their tenants) do not own adequate air conditioning systems, CPUC should require in a corollary MM that PG&E provide such A/C systems free of charge.

Another MM in the IS/MND will allow PG&E to evict landowners and tenants who live too close to the helicopter LZs and the TDZs for their health not to suffer. Instead, CPUC should have negotiated with PG&E MMs that would have required the PG&E helicopter vendor, PJ Helicopters of Redding, (1) to use only those choppers in its fleet that meet the FAA's stage 3 airworthiness certificate noise limits; (2) use its medium-sized notar helicopter; (3) comply with noise reduction recommendations made by the HAI's Fly Neighborly publication and by the various helicopter model

B9

P-3.22

P-3.23

P-3.24

manufacturers; (4) distribute without charge the same hearing protection gear as worn by helicopter pilots; et cetera.

As the managing owners of the Weston Ranch, Richard and Carolyn Weston have to act as watchguards to protect the property 365 days a year because there is always the possibility of the recurrence of trespassing, poaching, squatting and vandalism incidents that occurred in the past. Therefore, they cannot be hustled out of their home by PG&E.

P-3.24

(iv) Another example of PG&E's unreasonable interference with our ability to remain in our home is the threatened disruption of the electricity and telephone supply lines to not only our 2-bedroom house but also to the rest of the ranch headquarters, including the 3-bedroom main house used by the other 4 family owners, a studio apartment for a ranch employee, a 2-bedroom house for another ranch employee, 2 large multi-use barns requiring electricity, a tractor shed requiring electricity, a horse barn requiring electricity, a well pump for the domestic water system and an electric booster pump for moving the water from the large holding tank to the pressure tanks. The interruption of the supply lines will be near Pole 75 where these lines pass underneath and at right angles to the transmission line.

The telephone cable with lines for the residences was only recently installed by AT&T to replace a very old cable that finally failed completely. The Westons had to spend 6 months putting pressure on the AT&T repair/construction department to allow the replacement. If PG&E damages the new cable, then we will pressure both AT&T and PG&E to restore telephone service ASAP! Using cell phones is not an acceptable substitute for land line service because in our location cellular reception is often beset with disruptive static (because of the proximity of the transmission line perhaps). We also need to use a land line phone to send business faxes.

Regarding the Westons' 12 kV distribution line being taken out of service during the 12-month construction period, PG&E's IS/MND facile solution to the problem ("small trailer-mounted generators may be used to provide power to customers and facilities connected to the feeder line," p. 2-38) would work undue hardship on the Weston Family and is impracticable and unacceptable. We have 5 electrical accounts with PG&E and

P-3.25

B10

the buildings and pump facilities served are spread out over several acres. With the 3 houses, the generators would have to be more that small (our house, for example, would need a 11,000 kW generator, at least). Trailer-mounted generators would have to be placed outside of 6 buildings, where they would make a lot of noise (even when idling). Only one house has a propane fuel tank, so the other buildings would have to have generators running on gasoline, which needs to be refilled often (even during stormy, rainy nights). Eventhough our electrical service would be shut down, we would still have to pay PG&E the minimal charge of $10 every month for each of our accounts with that company.

However, during the PG&E visit in October 2016, a considerate member of the company (perhaps an engineer), Fanuel Aberra, promised to include a better solution in the specifications for the transmission line project. It didn't involve constructing a guard pole structure but instead using a bucket truck to shield the two minor lines underneath the transmission line. But considering how the statements and promises of PG&E personnel are always shifting back and forth, the Westons do not feel any confidence in PG&E to follow through on this particular point.

P-3.25

(v) After almost 60 years of becoming very familiar with this property -- vistas, landforms, natural scenery, native plants and animals -- the Westons have become very attached to working for its preservation and conservation. In the 1990's we enlisted the aid of local conservation groups, prominent viticulturists, Healdsburg Tribune, Press Democrat, Sonoma Land Trust, Healdsburg City Council, and the Sonoma County Agricultural Preservation and Open Space District (led by the Board of Supervisors) -- all of these supporters helped us to secure (against land developer opposition) a conservation easement in perpetuity with Sonoma County. This easement is still in effect and many people in the community still admire the beauty of the property and see its potential to become someday a recreational source of public pleasure and enjoyment.

Unfortunately, along comes PG&E, the great facilitator of land development in the County, with profit-seeking plans to dramatically reconstruct and expand a trasmission line passing through some of the remaining rural land in the region. More megawattage means more profit,

P-3.26

B11

eventhough voters in Healdsburg rejected growth-inducing Measure R last November.

Needless to say, the Westons are not convinced that after PG&E's reconstruction project has caused the significant environmental damage that the CPUC Initial Study admits, a cost-cutting, profit-seeking investor-owned company like PG&E will spend the necessary time and money to mitigate and repair all the damages that will be caused despite the ostensible display of APMs and MMs.

The Westons will be very disheartened to see that after having spent the last 20 years in the successful passive restoration of their preserve's natural features, PG&E will come along and leave the landscape in an ugly mess. PG&E is commiting an unreasonable interference with the landowners' use of their property as a nature preserve.

P-3.26

Returning to the last paragraph of the easement agreement, the second sentence, reads: "[The Westons], however, shall not erect or construct any building or other structure, or drill or operate any sort of well, or permit others so to do, within 25 feet of the route herein before described." This is the only specified limit on the landowner's right to use property burdened by this PG&E easement.

The CPUC IS/MND discussion of PG&E easements and access right (page 2-20) does not give the landowner much information but does reveal how supremely confident PG&E is that without anticipating any landowner opposition, it can choose to update its existing easements in the Northern Segment to bring them in conformance with current company practices. But that course of action does not seem necessary at this time because in general PG&E believes that its existing centerline easements (with no specified widths) are adequate to construct the proposed project because they provide secondary access rights to maintain and upgrade existing utility lines in the project alignment. PG&E ignores the fact that these secondary access rights have limitations placed on them by the language of the easements (the Westons assume that their predecessors-in-interest, the McNears, signed a standardized easement form). Also, 70 years of historical easement usage by PG&E has refined away any original ambiguity in the easement language. Of course, the landowner will want to retain as many

P-3.27

B12

property ownership rights as possible by interpreting the easement in a conservative way, whereas PG&E will push a liberal reformation of this legal document. Now that PG&E can use UTVs on the ground and helicopters in the air which can go anywhere and master any type of terrain, PG&E will try to appropriate rights to as much territory along the project route as possible.

PG&E realizes that at least some landowners will oppose PG&E's usurpation of their rights but does not want the possibility of serious legal snafus developing during construction to cause any delay in CPUC's acting on its PTC application. Therefore, PG&E makes several assurances to the CPUC. Any easement updates or modifications would be successfully pursued by PG&E through landowner agreements and if there were any recalcitrant land rights issues, they would assuredly be resolved in subsequent negotiations even after construction is permitted by the CPUC. PG&E is in control. If necessary, PG&E could make the new easements for work areas and access routes more palatable to stubborn landowners by labeling them "temporary".

Easements along the Southern Segment vary in width from 42 to 82 feet, most of which are 80 feet wide, though 2 230 kV circuits on towers are involved. In contrast, easements along the Northern Segment now will have defacto widths of 500 feet or more, with no acquiescence obtained from landowners in the form of new agreements. The IS/MND does not provide any explicit justification for PG&E's suddenly assuming such an extensive increase in its presense on lands along the transmission line. Perhaps the reader is supposed to be impressed (and overwhelmed) with the Project Description's copiously detailed, elaborately discussed 78-page account of every component of this militarylike operation (which is after all only the reconductoring of a 60kV subtransmission line). Why has a project which was supposed to cost only $3-5 million at the CAISO approval stage in 2008 expanded to $17.5 million or more in the December 2015 PTC application? The IS/MND does not give any idea of what the cost estimate now is, just a bloated description. Regarding the latest project maps showing the Weston Ranch, much of the space within the Study Area seems to be filled with new access routes that are unnecessary and even destructive and helicopter touchdown zones that are unusable because of oversteep slopes or hazardous

P-3.27

P-3.28

P-3.29

B13

commercial construction on the land until the easement's location is precisely specified. A mortgage lender will not finance a project when there is a possibility that the preexisting easement owner might construct a pipeline, for example, through a proposed building. Even if a regulatory agency might not allow such construction, lenders fear uncertainty and open ended potential expenses. Lenders will likely condition any loan on corrective action. Correcting easement location problems may be expensive and time consuming when undertaken after the fact."

P-3.29

B14

SECTION C: PG&E's GROUND AND AERIAL ROUTES

This section is the Westons' response to the IS/MND's Project Description's discussion of the ground and access routes that PG&E plans to impose on the Weston property during its transmission line reconstruction.

GROUND ACCESS:

There has been some discussion of PG&E's access roads/routes in Section A.

Exhibit C-3 (2 pages), from TRC's Attachment C - Wetland Delineation, shows (1) the historic (70-year-old), precedent-setting ground routes that PG&E chose to access Poles 74, 75 and 76 by its own constructed dirt road with two overland branches and (2) the short hilltop route right off the gravel entrance road that provided quick access to Poles 77, 78 and 79 and that because of the topography is more of a natural road than an overland route. During the 3/25/16 and 10/28/16 field trips when planner Lishman and other PG&E personnel visited the Weston Ranch, these two simple, straight-forward routes were used and discussed and apparently considered still adequate for PG&E's vehicles and equipment. Since the Westons feel the same way as the PG&E representatives evidently felt then and since PG&E has not provided the Westons with any convincing explanation (or any explanation at all) why in late 2016 a convoluted, environmentally-damaging system of access routes was invented, we are marking the historic lower-elevation routes with flagged poles to show that we very much want these routes preserved (with one minor modification) and the three new ones dropped.

P-3.30

Exhibit C-3 (Page 1) correctly depicts the PG&E road that leads down from Perinoli Road and along a secondary creek to the crossing of the main creek as an existing access route (maybe requiring improvements). East of the crossing PG&E should leave its old road leading southeast to the gated entrance to Windsor Oaks Winery. Instead, construction ground crews should travel directly over a grassy field by a modified overland access route to Pole 74. This modification will avoid the unnecessary cutting back of scenic oak branches overhanging the old road.

Several years ago the Westons had to protect the first part of the PG&E road from marauding wild pigs by placing cobblestones and cut branches (now

C1

well decayed) in hog wallows that were eroding the road. However, such minor reparative work, which has stabilized the road surface, should pose no travel hindrance for PG&E UTV's.

But if PG&E is not satisfied that the current condition of the road will allow all-weather passage by its vehicles and equipment, the Westons suggest that PG&E adopt the simple inexpensive road improvement recommendations that we acquired from the following 3 expert sources:

(1) Curtis & Associates, Healdsburg. Use of Farm Roads for Accessing PG&E Poles (letter report dated July 12, 2012 by Gordon Meininger, P.E.). Exhibit C-4.

(2) Sonoma Resource Conservation District, Santa Rosa. Recommendations for New Road and Stream Crossing Installations (letter report dated March 21, 2016 by Kevin Cullinen, Project Manager). Exhibit C-5.

(3) Sonoma County Agricultural Commissioner's Office, Santa Rosa, Best Management Practices for Agricultural Erosion and Sediment Control, Chapter Two - Roads (2013). Exhibit C-6.

The upper watershed of Sotoyome Creek is located on this ranch and the PG&E road crosses its main tributary (in terms of length and volume of flow). However, this channel is only seasonally intermittent, so PG&E crews should have little trouble in crossing it.

P-3.30

Right before the creek crossing, the branch road access to Poles 75 and 76 crosses a subsidiary creek by means of a corrugated steel culvert of sufficient diameter that the Westons installed as a replacement in 1998 for PG&E's convenience. The branch road climbs up the wooded hillslope to the poles by means of a slightly diagonal route that takes advantage of clearance among slow-growing oak trees that do not require much maintainance trimming back of branches to keep the route open. During the March 2016 walk through this short woodland, Brando Pintane, PG&E construction foreman, agreed that there would be no problem for his crews with this established route.

Exhibit C-1 presents an enlarged topographic map derived from the 1993 USGS 7.5' Healdsburg Quadrangle map. On it are shown:

(1) the accurate locations of the creeks forming the upper watershed of Sotoyome Creek on this property;

C2

(2) the 12 kV distribution line coming from the south to service the ranch headquarters upslope (the telephone land line, not shown here, is closely subparallel to the electric distribution line, both lines passing under the transmission line just east of Pole 75); and

(3) the 5 ground access routes serving this PG&E transmission line reconstruction project, 2 of which are longstanding and established and are therefore acceptable to the Westons and 3 of which have been recently imposed upon the property and are unacceptable for several reasons (noncompliance with the right-of-way easement contract, threat of environmental damages to the property, invasion of residents' privacy and quietude, etc.).

Access Route #1 is Perinoli Road (formerly Grant School Road), which has been partially described in Sections A and B. We now have more to say about this road:

During 2016, aerial photo maps (e.g., the PG&E Fulton-Fitch Mountain Reconductoring Project, Figure A-1 Detail Maps, pertaining to the Weston Ranch), Perinoli Road is depicted and labeled as "existing paved". Refer to Exhibits C-2b, c and d. However, this road has never been paved with asphalt. Photographic Exhibit C-8.13 clearly shows that the road is only covered with gravel. Therefore, in the Project Description's Table 2.6-1 (Access Routes and Establishment Requirements), Perinoli Road should not be in the Existing Paved Type that necessitates a vegetation clearing width of 20 feet; as an Existing Unpaved Type, it should have no more than 16 feet of clearance, so that the scenic riparian vegetation growing along the road in the St. Francis creek area can be spared somewhat.

The IS/MND completely fails to mention that Perinoli (Grant School) Road is an historic old road (dating back to the 1870's at least and designated by the CRHR as P-49-03451/CA-SON-25624). Without bothering to disclose the name or the road, PG&E's PTC application PEA described it as an historic road resource depicted on the 1877 Thompson Historical Atlas of Sonoma County. This road "consists of a segment of an old private freight road between the cities of Healdsburg and Santa Rosa [and also Calistoga]. The Russian River flooded on a seasonal basis, making travel along flat lands by horse-drawn wagons difficult. This road was constructed by John Grant [an early owner of what is now the Weston Ranch] to allow freight traffic

C3

P-3.30

P-3.31

between the two towns. The route went over the hill [of this ranch] until it met up with Chalk Hill Road at the east end." This same story (with some ellaboration) was told to the Westons by their predecessors-in-interest, the McNears, who had owned the ranch since the turn of the century.

With references in chain-of-title deeds, old maps and surveys prove that this road follows the same alignment with the same gravel-dirt surface as it did 140 years ago. The following are examples of such documents (all accessible to the public):

* 1877 Thompson Historical Atlas of Sonoma County, Map Number 100
* 1890 Breadboard Map (Sonoma County Recorder's Office)
* 1908 Sonoma County Road Map
* 1914 Map of the Sandborn & Hotle's Subdivision of The Rowland Ranch near Healdsburg, California (Map Book 31, Pages 24-27)
* 1914 Broadsheet Advertisement (30"x30" in size with subdivision map surrounded by photographs of ranch life at that time), displayed at main residence on ranch
* 1914 FIELD NOTES for the above subdivsion map by J.C. Parsons, land surveyor (and Santa Rosa city engineer)
* 1915 Soils Map of Russian River Watershed (U.S. Dept. of Agriculture, Bureau of Soils, and University of California Agricultural Experiment Station)
* 1940 USGS 7.5'Healdsburg Quadrangle Topographic Map
* 1945 California State Division of Forestry Sonoma County Map (and 1956 Map)
* 1948 Geologic Map of the Healdsburg Quadrangle, California (William Kelso Gealey)
* 1953 Thomas Bros. Popular Atlas Sonoma County
* 1955 USGS 7.5' Healdsburg Quadrangle Topo Map

GRANT DEEDS (with legal descriptions):
* 1881 Grants to Rowland (Book 77: Page 443, re road easement)
* 1881 Bailhache to Grant (77: 445, quitclaim)
* 1881 Grants to Rowland (77: 447, ranch fee)
* 1884 Grants and Ross to Rowland and McClendon (90: 348, easement survey)
* 1892 Grant to Rowlands (140: B61, reference to easement)
* 1900 Rowlands to Farnsworth (192: 245, same as above)
* 1908 Rowlands to Bank of Healdsburg (252: 152, forced sale)
* 1909 Rowland to Bank of Healdsburg 254: 5, (same as above)
* 1910 Bank of Healdsburg to J.A. McNear (269: 13, sale)
* 1910 J.A. McNear to Geo. P. McNear (269: 17, (transfer of title)
* 1920 McNears to Proctors (381: 496, sale)
* 1947 Proctor to Miller McNear (732: 187, sale)
* 1958 McNears to Weston (1634: 495, sale)

C4

P-3.31

This unpaved road, providing the Westons with their only access to the outside, could be easily damaged if PG&E's construction crews transported over it large vehicles, equipment and materials that placed too heavy a burden on it. AT&T repair/construction crews respect this weight limitation.

The Westons have done almost all of the maintenance regravelling and regrading since 1996.

Access Route #2 has already been adequately described in this section and in Section A.

Access Routes 3 and 4 will undoubtedly cause the most environmental damage during the 12-month long construction operations because PG&E is ignoring the obvious natural fragility of the biotic and abiotic features of the route locations.

Regarding Access Route 3, serious disincentives exist for PG&E's trying to turn a steep, erodible, unstable hill like the Westons' homesite into a roadway for moving heavy vehicles and equipment downslope and upslope between the entrance road and Poles 75 and 76.

P-3.32

In Planner Lishman's 6/13/16 response to our 4/13/16 questionnaire concerning several unclear and troubling aspects of PG&E's project, he informed us that the heaviest piece of equipment to travel on the access routes would be tracked utility task vehicle (UTV) which would weigh 35,000 pounds or thereabouts (depending on the auger attachment) and would be as large as 12 feet high and 12 feet wide. He neglected to disclose whether this large machine would have steep or rubber tracks and what the actual ground pressure would be. The Westons have found that large tracked vehicles can leave behind a damaging washboard effect on a gravel road, so what would happen to bare wet soft ground?

By reading the Project Description's Table 2.6-7 (Estimated Crew Members and Equipment Use by Construction Activity), we can anticipate what other vehicles and equipment could also be travelling to and fro from other access routes in order to carry on the various construction activities around the pole locations on the ranch:

Pickup trucks of unspecified sizes, weights and total numbers for surveying, vegetation clearing, site improvement and reestablishment, drainage crossing establishment, LDSP hole excavation, reconductoring,

P-3.33

C5

cleanup and restoration. Apparently, workers for PG&E and its workers cannot walk anywhere or use a less obtrusive means of transport like an ATV. In addition, 2 large pickups (F550 and crew-cab) are mentioned separately.

Other vehicles: Bucket trucks, chipper trucks with chipper, semi-truck with trailer, water-truck, line truck with auger, line truck with trailer, line truck with worker lift attachment, dump truck, shiflet truck, boom truck, and UTV's mounted excavator, with worker-lift attachment, with hydraulic jack, but not with auger. Equipment: Rubber-tracked mower, D4 dozer, D6 dozer, crawler backhoe, crawler mounted with auger, backhoe, jackhammer, compressor, light tower, 100-ton cranes, and motor grader.

Access Route #4 is apparently meant to be a shortcut between the lower PG&E road and Pole 75 that will save construction workers a minute in travel time in accessing that pole. While only light tree trimming is needed to maintain the existing branch route to Pole 75, constructing the new shortcut will necessitate chainsawing and bulldozing a wide swath through oak woodland and riparian woodland, descending into and ascending out of a small valley with steep slopes, and crossing two creeks unprotected by culverts. Since the IS/MND's Prlject Description states that when trees are cut down in vegetation clearance, their stumps have to be treated with herbicides, it appears that this new access route will become permanent and not temporary.

P-3.33

Access Route #5 is PG&E's new approach to Pole 74 that for the most part ignores using the old PG&E road leading from the main creek crossing to the gated entry into Windsor Oaks Winery. As described earlier the modification of the old route would cross a grassy field in a straight line and not require any tree cutting, except for trimming back a coast live oak and Oregon oak clustered around the pole site. PG&E's new approach from the east, however, would first ignore PG&E's recently installed gate replacement, by breaking through the boundary deer fence 100 feet away to the west. In the process, 3 small oaks and a large Oregon oak tree would have to be cut down and removed. As the new road proceeds into this property, it sweeps to the left (removing another large Oregon oak) and descends into a scenic dale with a brook lined with more oak trees. After the crossing of this creek has been accomplished with more tree cutting,

C6

the new road follows the old one around a bend for a short distance and then takes off cross-country to the right to reach Pole 74. Along the way a beautiful mature Oregon oak with the perfect cavity for sheltering wildlife will probably be destroyed. The oak trees clustered around the pole site will certainly be cut down.

P-3.33

PHOTOGRAPHIC EXHIBITS C-7.2 to C-7.5

C-7.2 Pictures of Access Route #2
C-7.3 " " " " #3
C-7.4 " " " " #4
C-7.5 " " " " #5

Photos of Access Route #1 (Perinoli Road) are labeled C-8.9 & C-8.13

AERIAL (HELICOPER) ACCESS ROUTES

The flight paths of PG&E vendor's helicopter will be another example of floating easements not contemplated by the 1947 right-of-way easement agreement.

PHOTOGRAPHIC EXHIBITS C-8.1 to C-8.13

Pictures of areas shown on Exhibit C-2a to C-2c Project Detail Maps) that may be suitable for helicopter touch down zones.

P-3.34

* C-8.1 Series of on-the-ground pictures of Weston Ranch area marked with a number 1 on the aerial photo: Slight slope in grassy swell, bound by deer fence on south and an electric fence on west, so access to Poles 73 & 74 hampered on ground

* C-8.2 Narrow grassy area sloping southward with deer fence on the south, electric fence on the east, oak woodland on the west, and a stump-dynamited pit in the middle.

* C-8.3 Level but high grassy area around Pole 75, 12 kV distribution line and AT&T cable near the east side of pole, hill slope to the north has landslide hummocky terrain

* C-8.4 High rounded peninsula with steep slopes between creeks, located south of Pole 76

C7

* C-8.5 Very steep southwest-facing slope of Weston Home hill, marked by large rotational landslide

* C-8.6 Continuation of very steep southwest-facing hill slope with much erosion and slope-instability from past land use

*C-8.7 Small grassy glen in valley sloping southward & with steeply sloping sides and trees on the east and west

* C8.8 Small sloping grassy clearing with oaks around the west and north and a high cut bank for the entrance road on the east

* C-8.9 Designated turnaround area at upper bend in road, provides only small and uneven space for only small trucks turning around, U.S. Geodetic Service marker on south side or road, Sonoma County survey monument on other side

* C-8.10 Small shallow swale between Poles 78 & 79 on ridgetop, steep wooded fall on north side (seismic faceted ridge)

* C-8.11 Moderate to steep grassy slope below the above

* C-8.12 A high sheer rocky drop into the canyon below Pole 79

* C-8.13 Picture of gravel entrance road (Perinoli Road); broad swale first seen on entering ranch is a seasonal wetland, not fit for helicopter landings from late fall to late spring

* C-8.14 On Windsor Oaks property, broad level to gently-sloping empty field around Poles 72 & 73, provides ample room with no obstacles for helicopter use so that Weston areas marked 1 & 2 not needed

* C-8.15 Shows PG&E's new entrance to Weston property from Windsor Oaks, an unnecessary change from PG&E's old road, which involved less destruction of woodlands

P-3.34

Note: Exhibits C-8.13, C-8.14, and C-8.14 were not included with the comment letter

C8

D. SOILS, GEOLOGY (LITHOLOGY), LANDSLIDES, AND SEISMOLOGY

I. INTRODUCTION

This section is the Westons' response to the IS/MND's Section 3.6. We find that with reference to the area of the Weston Ranch that will be most adversely impacted by PG&E's project this section by Panorama Enivironmental commits so many basic errors as to undermine the validity of Table 3.6-3 (Summary of Project Impacts on Geology, Soils, and Mineral Resources) and the Required Applicant Proposed Measures and Mitigation Measures (3.6.3). Examples in the text are given below and in the Westons' own description of their homesite's pedology, geology and seismology. P-3.35

* Page 3.6-1 (Local Physiography and Topography): Almost all of the project alignment is in the hills and not on the floor of the Santa Rosa Valley. The elevations are not confined to a range of 130 feet amsl to 500 feet amsl but can be significantly higher in the Northern Segment (e.g., Weston Ranch).

* Page 3.6-2 (Regional Geologic Setting): The Great Valley Sequence is evident on the surface not only in northeastern Healdsburg but also on the Weston Ranch. P-3.36

* Local Geologic Setting: The project alignment in the Northern Segment (e.g., Weston Ranch) would not be primarily underlain by alluvium or by volcanic rocks. Great Valley Sequence is the dominant rock type with only two minor areas of Sonoma Volcanics. Figure 3.6-1 (Geologic Units in the Project Study Area) is grossly in error. P-3.37

* Soil Types: The project alignment soils include much more than soils found in basins, flood plains, and alluvial fans. Figure 3.6-3(2) (Soils in the Project Study Area) and Table 3.6-1 (Major Soil Units in the Project Area) are grossly oversimplified and inaccurate for the Northern Segment, including the Weston Ranch. P-3.38

* Geologic Hazards (Fault Rupture): The discussion of the CGS' publication "Fault Rupture Hazards in California" (2007) concerning the Alquist-Priolo Act implementation makes major misstatements. P-3.39

* Page 3.6-8 (Figure 3.6-4 Faults Near the Proposed Project) depicts the Healdsburg Fault as Late Quaternary (under 130,000 years ago) though it has been seismologically proven to be Holocene-and even Historic-active. Also, P-3.40

D1

it is shown separate from the Rodgers Creek Fault Zone, though it is generally included now within the RCFZ, with the two faults having been found in 2017 by USGS seismologists to be connected beneath Santa Rosa.

* Page 3.6-9 (Table 3.6-2 Active Faults Near Proposed Project): This table's information on San Francisco Bay Area Fault probabilities should be updated by referring to 2 UGS publications: UCERF3: A New Earthquake Forecast for California's Complex Fault System (2015) and Earthquake Outlook for the San Francisco Bay Region 2014-2043 (2016). (UCERF3 is the acronym for Uniform California Earthquake Rupture Forecast, Version 3).

* Alexander-Redwood Hill Fault should now be included in the Healdsburg Fault Zone in the same range of hills on the east side of the Santa Rosa Valley.

* Pages 3.6-18 to 3.6-19: APM GS-1: Soft or Loose Soils: Performance Standards and Timing, During Constructions: Since the soils on the Weston Ranch are so hazardous, they should be avoided in project work areas and access routes since the existing PG&E practicable routes are still available.

* MM Geology-1: Geotechnical Investigation Report: PG&E shall have a professional geotechnical engineer conduct a geotechnical investigation in areas suspected to have unstable soils or landslide susceptibility (as on the Weston Ranch). Landowners shall have the right to commission reports from their own geotechnical engineers, as well as from other experts such as soil scientists, engineering geologists, civil engineers and environmental damage restorationists before such suspected areas can be used or developed as project work areas or access routes.

The following lengthy section provides a detailed description of the physical science characteristics of at least one place on the Weston Ranch (Weston Home Hill) that prove that it should be considered one such suspected area. The access road down that hill pushed by PG&E has been decribed in Sections B and C. Supporting exhibits (Maps and references) are being mailed under separate cover.

P-3.40

P-3.41

P-3.42

P-3.43

P-3.44

D2

I. SOILS

The Weston Home Hill has as part of the Dibble clay loam series, one of the steepest phases (DcE, 15 to 30 percent slopes). The Dibble clay loam soils are subject to land slippage. They are some of the most unstable soils in Sonoma County. If gullies erode through the surface layer to the subsoil, erosion is accelerated and water courses deepen rapidly.

On these steep slopes, slickensides are more in evidence, indicating where there has been a history of landslide occurrences. The even steeper head wall and the hummocky terrain below present more obvious evidence of landslides. The prominent scarp located near the top of the hill and just below our home more properly belongs to the DcF phase with 30 to 50 percent slopes, where permeablility is slow in the subsoil; runoff is rapid, and the hazard erosion is high; land slippage is a hazard on this soil, as indicated by slickenslides being very prominent in the subsoil. Light grazing and no grazing at all are the only acceptable uses.

The Sonoma County Grading Ordinance groups the Dibble soils among the seven series in the county that require construction projects involving them to be specially engineered before a grading permit can be obtained. In the American Asssociation of State Highway Officials' engineering classification system for soil materials, Dibble soils are placed in the A-6 and A-7 categories, consisting of clayey soils having low strength when wet. Shrink-swell potential is moderate for the thin surface layer and high for the thick subsoil. Dibble's suitability as a source of road fill is poor. According to the California Soil Resource Lab, Dibble clay loam's usefulness for local roads and streets as well as for off-road motorcycle trails is very limited and has severe restraints for paths and trails.

As part of the hydrologic soil group C, these soils have a slow infiltration rate when thoroughly wetted. They have a slow rate of water transmission and high runoff potential. They have a layer that impedes downward movement of water, or they are moderately fine textured or fine textured, and have a slow infiltration rate.

D3

P-3.45

III. GEOLOGY (LITHOLOGY)

Published and privately-commissioned geologic maps show that the Weston Ranch is predominantly underlain by rocks of the Great Valley Sequence (specifically, the Healdsburag Terrane), Jurassic to Cretaceous in age. This geologic unit consists of a range of Mesozoic marine sediments that include sandstone, siltstone, mudstone, shale and conglomerate. It has been divided into Great Valley Sequence Undifferentiated (map symbol Kjgv), G.V.S. Sandstone (Kjgvs), and G.V.S. conglomerate (Kjvc).

During the early Pliocene or perhaps late Miocene of the Cenozoic, andesitic to basaltic lava flows of the Sonoma Volcanics (specifically, the Mark West Andesite) were extruded upon an eroded surface formed on rocks of the Great Valley Sequence. The thin beds of tuff and agglomerate are locally interbedded with these lava flows. Obsidian outcrops are also present. In late Pliocene time, at the end of the period of the Sonoma Volcanic extrusion, strong deformation (tilting, warping and faulting) occurred, accompanied by erosion of the lava beds and deposition of a sequence of terrestrial sediments and possibly minor amounts of marine sediments. These Pliocene deposits, which are part of the Glen Ellen Formation, were accummulated as stream, fan, flood-plain and lake deposits. Deposition of sediments of this formation continued into early Pleistocene time.

P-3.46

The Weston Home Hill, where PG&E is planning an access road down to its transmission line, is labeled on the geologic maps as being a part of the Great Valley Sequence Undifferentiated. On the southwest side, near the creek at the bottom of the hill, there is a depositional contact and fault delineation between the Kjgv and the Tsa (Mark West Andesite). South of the hill lies evidence of the Glen Ellen Formation (QTge).

The G.V.S. Undifferentiated consists of the following lithological components: turbidites; shale with silty and sandy laminations and interbeds; fine mica flakes, carbonaceous material (such as petroleum) and lithic fragments throughout; bedrock weathers readily, forming thick clay-rich soil and colluvium. Turbidites are sedimentary rocks formed from the deposits of a turbidity current, which is a mixture of sediment and water that flows down the continental slope to the deep ocean floor.

This rock formation can be particularly weak, unstable and prone to landslides if on a steep slope it includes a stratum of impermeable blue clay

D 4

serving as a slip plane.

The following are other geologic characteristics:

* Bedding: thin, rhythmic, and graded bedding
* Induration: well consolidated but friable, parting between beds
* Thickness: up to 5000 feet?
* Topographic expression: broad ridges, moderate to gentle slopes; numerous, massive, active landslides.

The following are some of the engineering characteristics:

* Ease of excavation: rippable with light equipment
* Slope stability: very poor
* Permeability: low
* Erodibility: low on bedrock; high on colluvium
* Seismic response: low- to moderate-intensity ground shaking; massive landsliding depending on moisture.

Expansive soils (such as Dibble) occur in areas underlain by the Kjgv and landslide deposits. A seasonal shrinking and swelling of these soils is due to the absence or presence (respectively) of water in clay minerals (especially, montmorillonite) within the soils. Montmorllonites are a clay group which has O, Si and Al as the prominent elements and has high relative swelling when wetted and high relative stickiness. The Montmorillonites (one of a group of similar clays called smectites) are the swelling, sticky clays. They are often referred to as 2:1 type or expanding lattice clays. The 2:1 refers to the number of silica sheets per alumina sheet per clay layer. In montmorillonites, water easily penetrates between layers, causing the individual particles of clay to swell. They are most common in soils that have little or no leaching.

Such clay soils are considered geologic hazards because they are critically expansive and prone to significant volume changes (shrinkage and swelling) with seasonal fluctuations in soil moisture. A further consideration of the shrink/swell behavior of the expansive clay soils is that when these materials are located on moderate slopes, they have a tendency to creep down hill. Thus, any structures or roads constructed on clay soils on sloping terrain should be designed to resist a significant lateral creep force. Remedial engineering measures are necessary for development where these soils are encountered. Such soils occur most frequently in areas underlain by rocks of the Great Valley Sequence or Sonoma Volcanics.

DS

P-3.46

There are also problems with expansive bedrock. Moderately- to highly-expansive ~~expansive~~ materials are most commonly layers of mudstone or volcanic tuff. Mudstone within the Great Valley Sequence and Glen Ellen sediments may locally be moderately expansive. Tuff beds occur commonly in the Sonoma Volcanics and can be highly expansive.

Of the sedimentary rocks found on the Weston Ranch, the Great Valley Undifferentiated is the least stable, the Great Valley Sandstone is more stable and the Great Valley Conglomerate is the most stable.

P-3.46

III. LANDSLIDES

According to the published and privately commissioned maps, most of this very hilly ranch, with the exception of ridge top areas, is depicted as mantled by widespread zones of landslide debris. The west- to south-facing slopes of the Weston Home Hill are no exception. The slope that would have to take the runoff from the beginning of the new access road is already too steep, eroded and destabilized from its natural erodibility and instability and from former cattle overgrazing and trail-rutting; every winter newly caused or retriggered earth flows and slumps add to the disturbance. The only reason the slope stretching down below our dwelling has not suffered much new disturbance is that we keep the slope from being overgrazed or driven on by motor vehicles of excavated for a road in order that the thick protective vegetative covering can remain intact.

The geologic and hydrologic map of Eugene Boudreau's study of the southwest corner of the ranch (where the transmission line is located) shows two landslides already situated where the access road would greatly aggravate damage to the hill slopes.

The Geologic Hazards Map (Plate 2) by Charles Armstrong in the Environmental Geologic Analysis of the Chalk Hill Road Study depicts two contiguous landslide areas, one involving the creek watershed below the beginning of the road and the other being roundish in shape and much larger in

P-3.47

size as it envelops not only the hill slope where the access road would descend but also the small hilltop where the managing owners' house is located, the residences where the other family owners stay, the barns and other outbuildings, the grounds around the structures in the building envelope, and the grasslands and woodlands descending all the way therefrom as far as the transmission line (with three poles) and the bottom of the creek watershed. Sweeping arrows show the downward movement of this massive landslide. Above the northeast side of this Quaternary landslide area, a landslide belt lies below a steep scarplike hill slope of a 858-foot high hill, which is likely the source of the landslide debris zone below.

The combination of steep slopes, ample seasonal rainfall and poor inherent geologic stability is common to much of the hill range where the ranch is located. In Plate 2 this California Divsion of Mines and Geology report developed a range of slope instability zones, A through F and Landslides, by correlating the abundance of landslides within the study area to (1) bedrock geology, (2) slope angle and (3) local rock variation (the presence of shearing, fracturing and bedding or cleavage parallel to the slope surface). This State report recommended that a site geologic study should be required prior to issuance of permits in Zones D, E and F, plus all landslide areas.

The Landslides and Relative Slope Stability Map (Plate 2A) by Michael Huffman in the Geology for Planning in Sonoma County, Special Report 120, depicts the Weston Home Hill as being enveloped in an elongate landslide debris zone about 12,000 feet long and roughly having the shape of a giant dumbbell. This landslide zone, which incorporates the transmission line inside the ranch and on neighboring properties, follows the prominent northwest-trending hill range overlooking the ranch headquarters. The ridge's steep southwest-facing slope has a scarplike appearance and below there spreads out a large thick layer of landslide materials.

This map has a range of relative slope stability zones: Landslides, C, B, B_f and A, in the order of increasing natural slope stability. Of course, landslides are areas of lowest relative slope stability where failure and downslope movement of rock and soil has occurred. Zone C, which is shown here and there around the periphery of this particular landslide zone, includes areas of relatively unstable rock and soil units, or slopes greater than 15%, containing abundant landslides.

This particular landslide zone also follows the northwest- to southeast-

P-3.47

D7

trending course of the main trace of the Healdsburg Fault Zone, which is located at the base of the prominent steep-facing hill range overlooking the ranch headquarters.

According to the Geology for Planning in Sonoma County, what undoubtedly has contributed to extensive natural landsliding in the Healdsburg Fault Zone east of Healdsburg has been the fault's working on weak rocks that are crushed and broken by repeated fault movement.

The two engineering geologic evaluations prepared by the engineering geologist, David Peterson, after seven field trips to the ranch found that with the passage of time since the two CA DMG publications, landslide erosion in the ranch's southwest corner had increased noticeably (the Site Geologic Map, Plate 2 in his 2006 report).

In particular, Peterson examined the 3 grassy hill slopes between wooded creeks that are located just east of the hill slope being planned for development. The southwest-facing slopes of the hill range in this part of the ranch are very similar in terms of soil, geologic formation, slope angle and aspect, vegetative covering, microclimate and anthropogenic effects.

One site he examined is situated on a south-west descending ridge area downslope of an existing residence, occupied by another Weston family owner. This site lies within an extensive landslide debris zone. Just below the house sitting atop a knoll, the slope falls away sharply with a high arcuate headscarp before forming a ~~head~~hillside bench with a sag pond. Further downslope, the hummocky topography appears typical of an older rotational or translational landslide.

Another site to the east is located within an open, grass-covered sloping field and lies within a rotational landslide zone, characterized by a prominent arcuate scarp at the head and a lobate debris runout area downslope that extends to the property line. The landslide mass appears to be topographically subdued because of the thick grass cover planted and maintained to keep it that way. The high steep scarp, however, with thin soil and little plant cover, shows repeated active slide/slippage features.

Both sides described above lie very close to the mapped main trace and other strands of the Healdsburg Fault Zone. Peterson noted that large landslide zones on this ranch coincide with the fault locations, suggesting that the landslides may either have failed along zones of weak, sheared fault gouge, or were triggered by past seismic events.

D8

P-3.47

According to the California Geological Survey's Special Publication 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California (2008), " Slope stability analysis will generally be required by the [CEQA] lead agency for cut, fill, and natural slopes whose slope gradient is steeper than two horizontal to one vertical (2:1), and on other slopes that possess unusual geologic conditions such as unsupported discontinuities or evidence of prior landslide activity. Analysis generally includes deep-seated and surficial stability evaluation under both static and dynamic (earthquake) loading conditions."

P-3.47

IV. SEISMOLOGY

The geology maps all show that the Healdsburg Fault Zone, either under that name or as an extension of the Rodgers Creek Fault Zone, passes through the southwestern corner of the Weston Ranch, with the PG&E's Fulton-Fitch Mountain transmission line appearing to follow its course.

(1) Gealey's Geologic Map of the Healdsburg Quadrangle (1951): The main trace or strand follows the base of the steep, southwest-facing slope of the hill slope overlooking the ranch headquarters; in doing so, this strand runs through the barnyard. Another strand splays off near the southeast corner of the ranch and passes to the south through the ranch's front pasture, where a high headscarp and landslide debris runout indicate its presence (rocks occasionally fall off the clifflike hill). Both fault strands appear to be placed where the transmission line passes over them. They are not inferred with dashed lines but are solid black lines showing that their presence is definitely indicated by several telltale topographic features.

(2) Boudreau's Figure 1 map of the surface geology and well and spring sites of the ranch's southwest corner (1983): The depositional contact between the geologic units Tsv (Sonoma Volcanics) and Kgvsh (Great Valley Formation shale, or undifferentiated) is interpreted as a fault trace, which is readily discernible because of the contrast between the reddish-orange Guenoc soil derived from the volcanic rock and the light grayish-brown Dibble soil derived from the sedimentary rock. This fault strand is located just below the Weston Home Hill and also appears in CA DMG Special Report 120's mapping.

(3) Armstrong et al.'s Geology Map of the Chalk Hill Road Study Area (Plate 1, 1978): The fault zone is depicted as spreading apart and dividing into five strands, two being still located inside the southwestern corner of the ranch

P-3.48

D 9

and three to the southwest in the piedmont of this hill range. The main strand within this property has the same location as the Gealey map's, but short dashes are used to indicate reliable inferences outside of the areas of slope instability and dots are used in the trajectory of the fault where it is concealed by the numerous large landslides.

On properties to the southeast of the ranch, the fault zone is shown as being narrower and more delimited and constrained, with the traces on the north depicted as 2-3 solid lines (where well located) or long-dashed lines (where approximately located). According to the 1983 version of the Alquist-Priolo Earthquake Fault Zones Map, the nearest Holocene-active portion of the fault (with ground surface rupture or seismic activity during the Holocene epoch, the past 11,000 years) lies about ½ mile southeast of the ranch. This revision of the 1976 map was made before new paleoseismic trenching studies were made in the Healdsburg area and before seismologists had available lidar aerial photos for better analysis of fault zones. Another reason for the oversight about the seismic activity that actually occurs on this ranch is all the concealment of surface evidence that is caused by the widespread massive landslides produced in part by the predominant geologic unit here. Great Valley Undifferentiated's slope stability characteristic is very poor, whereas the rock formations prevalent on properties to the southeast have moderate slope stability (Glen Ellen Formation) and very good slope stability (Mark West Andesite), so that far fewer landslides occur there.

On Armstrong's Geologic Hazards Map of the Chalk Hill Road Study Area (Plate 2, 1978), the letter "S" is placed right by the Weston Home Hill to denote a Fault Rupture Hazard Zone, which is defined as a portion of the Healdsburg Fault Zone where an active fault break is likely to be encountered.

(4) Knox and Huffman's Geologic Map Exclusive of Landslides, Northern Sonoma County (Plate 3A, Geology for Planning, 1980): The depiction of the Healdsburg Fault Zone strands within and near the Weston Ranch is similar to the Gealey map's. The main strand is drawn as a solid black line with X's along its full course. Such a marking signifies that it is potentially active fault that exhibits features indicative of geologically young (Quaternary) surface rupture. Therefore, it is considered to be capable of renewed surface movement. As stated above, this trace of the fault zone runs through the ranch barnyard close to the Weston home hill.

D 10

P-3.48

The strand that splays off the to the south of the main strand is shown as a solid line, which signifies that it is well located. A new seismic feature on this map is a short potentially active trace that starts near the ranch's southeast corner, runs straight across the main trace and then wraps around the base of the Weston home hill. At this point the downward inclination (dip) of the rock strata is shown as 40% (some other dip recordings on the ranch are even steeper). Also, the main strand just to the north divides into two closely spaced parallel strands for a short distance. This part of the hill range is one of the major topographic features of the ranch where Holocene and Pleistocene landsliding has produced dramatic effects.

(5) Peterson's Site Geologic Map, Plate 2 (2006): This simplified depiction of seismic activity on the ranch shows only the main trace of the fault zone, which is located in the same places (running through the ranch building envelope, etc.) as on the earlier geologic maps. It is drawn with a dashed line outside of the landslides and with a dotted line where concealed thereby.

(6) A refined and sophisticated method of mapping acive faults was explained to the Westons in 2014 by a USGS seismologist, Suzanne Hecker, who is an experienced researcher of the San Andreas Fault System, particularly in the northern San Francisco Bay Area. She came to the ranch to corroborate in the field the findings of a detailed topographic aerial derived from airborne lidar (light detection and ranging) surveys of the Healdsburg Fault, the northern extension of the Rodgers Creek Fault Zone.

Filtering of lidar point clouds to isolate ground returns has made possible high-resolution "bare-earth" digital elevation models (DEM'S) and associated topographic imagery. Lidar remote sensing is particularly useful in areas where traditional methods of mapping geomorphic features using aerial photography are hampered by ground cover (such as vegetation, buildings and other structures) concealing fault traces. In the past, geologists were not able to use aerial photography to precisely locate the tell-tale topographic features identifying where a fault reaches the surface; a single dotted line had to be used to infer the location of a fault within a concealment area. By means of refined research technology,

D11

P-3.48

new USGS geologic maps show a network of fault strands and intersecting fragments.

Now lasers mounted on an airplane are able to measure the exposed topography with enough precision to allow researchers to observe slight changes in elevation. The locations of surface faults are identified in part by taking note of subtle inclines that are evidence of past fault motion. These scarps or scarplets are like vertical scars on the landscape. Scarps observed in digital elevation data are used to target the underlying faults for paleoseismic trenching studies and, in some cases, for deep imaging using seismic reflection, gravity, and magnetic data.

V. MORE INFORMATION ON THE RANCH'S ACTIVE FAULT

As part of the San Andreas Fault System, the Healdsburg and Rodgers Creek (sensu stricto) sections of the Rodgers Creek fault Zone (RCFZ) are characterized as northwest-trending, right-lateral and strike-slip. In its northern section, the fault zone is described by the 1980 Geology for Planning in the Sonoma County report as complex, with numerous, often disconnected, parallel and divergent breaks. Since it developed recently compared to the older San Andreas Fault, its surface appearance is only locally well-defined, though characterized by geomorphic features indicative of right-lateral displacement along its course. According to Wagner and Bortugno's 1982 CA DMG Geologic Map of the Santa Rosa Quadrangle, the Healdsburg section north of Santa Rosa primarily consists of two, sometimes three, parallel traces. Although seismicity appears to cluster along all traces, cross-sectional views show a single well-defined active planar zone dipping steeply (approximately 75%) to the east.

The 2011 Preliminary Geological Map of the Healdsburg 7.5' Quadrangle, California (by Marc P. Delattre, California Geologic Survey) depicts three fault strands within the southern portion of the Weston property: two strands subparallel and one divergent to the south, solid lines where accurately located and dashed where approximately located.

According to the Geology for Planning, the southern, Rodgers Creek section has likewise Holocene fault-related topographic features, including sag ponds, scarps, benches, linear ridges and troughs, and numerous stream channels that are offset right laterally.

D12

P-3.48

Although the Rodgers Creek (per se), Healdsburg, Maacama and Bennett Valley faults are probably all part of the same broad zone of seismic deformation, this fault segment exhibits geologically the greatest degree of late Holocene activity as manifested by geomorphic displacement features.

Nevertheless, there is uncertainty regarding the location and character of large portions of the fault due to burial by landslides. But it has been found that along most of its length, the fault zone is an array of several (sometimes as many as ten) distinct strands. It appears to consist of at least four geometric segments showing evidence of recent and systematic right-lateral slip. The segments are well defined by major right stepovers with the longest segment extending about 12 km.

The two sections of the RCFZ join together underneath the City of Santa Rosa through a 1-km-wide, 4-km-long right-releasing (extensional) bend, which was mapped in detail by lidar and other technologies described in a 2016 scientific article written by Hecker and her USGS team. The combined sections of the RCFZ reach from hills north of Healdsburg south to its underwater extension in San Pablo Bay (where in 2016 USGS researchers reported definite evidence of a missing link with the Hayward Fault).

The seismicities of the two sections of the RCFZ have differences between the two and also along each of them. Of the south end of the Healdsburg section, two damaging earthquakes (M 5.6 and 5.7) occurred to the north of Santa Rosa on October 1, 1969. (Though living on a hill range some miles north of the epicenters, Weston family members were much shaken by these events.) These were among the largest events in the northern Bay Area since the 1906 San Francisco earthquake and its after shocks second only to the 2014 M 6.0 South Napa earthquake. Epicenters were located near identified surface fault traces of the Healdsburg fault section. Substantial ground cracking but no surface faulting was observed as a result of these earthquakes, however.

Nevertheless, both 1969 events were felt over an area of about 27,000 sq. km, extending from approximately Clear Lake south to San Jose and eastward to Sacramento. The maximum felt intensity for these earthquakes was VII (Very Strong) and VIII (Severe) respectively on the Modified Mercalli scale. Nearly all of Santa Rosa's population of 50,000 rushed into

D13

The remaining 34 pages of this section are being mailed separately.

P-3.48

Note: Part 2 of the letter included additional exhibits, but did not include a continuation of this section

SECTION E: BIOLOGICAL RESOURCES

The Westons have many objections to what appears in Section 3.4 of the IS/MND but have too little time during the draconian 30-day public response period to adequately formulate the many suggestions needed for the section's biological reporting and mitigation measures. Undoubtedly, Panorama Environmental and the CPUC believe that they have done enough to satisfy CEQA's bare bones requirements for reporting the project's possible adverse biological impacts and their reduction to less than significant levels by fine-sounding mitigation measures. CEQA has always been more formulaic and legalistic than scientific.

We are mostly interested in continuing the preparation of a thorough, biological and ecological baseline before construction begins in order to better access how much the property has been left afterwards in an environmentally damaged condition despite BMP, APM and MM permit provisions.

Nevertheless, we feel that we should voice at least some of our criticisms now.

The "Biodiversity Action Plan for Sonoma County," published by Community Foundation, Sonoma County. "This document summarizes the input of a group of local science experts regarding priority actions related to the conservation of Sonoma County biodiversity." This document states: "Many species and habitats that are neither threatened/endangered nor exclusive to Sonoma County nevertheless warrant priority conservation attention... Several experts stressed that even 'common' species and habitats like deer and oak woodland, are integral contributors to local ecological integrity. (page 5) ...

"Changes to the health of Sonoma County's biological diversity are directly related to the ways humans develop and use local land and water...The severity of human-caused threats to Sonoma County biodiversity was ranked by botanists, biologists, policy experts, and conservation practitioners familiar with the situation in Sonoma County. (page 17 and 18)...

"The extension of residential, commercial, and agricultural development into previously undeveloped forests, the single greatest threat to Sonoma County habitats... The County's more than 180,000 housing units and

E1

P-3.49

P-3.50

approximately 60,000 acres of vineyard take their toll on local water, land and native wildlife." (page 18) See Exhibit E1.

By providing more electricity for increasing development, this project is increasing the loss of biodiversity in Sonoma County. In addition by ignoring the impacts of this project on the "common" flora and fauna of this area, this project will contribute to their loss and decline.

On page 3.4-17 of the IS/MND there is a discussion of Wildlife Corridors but this discussion does not relate this subject to this PG&E project. So readers are left wondering why the subject of wildlife corridors is presented. Perhaps Panorama is implying that this PG&E project will somehow enhance wildlife corridors.

Perhaps Panorama should read "Corridor Ecology, the Science and Practice of Linking Landscapes for Biodiversity Conservation" (Hilty, Lidicker and Merenlender; Island Press, 2006). The authors found songbirds that occur more frequently in natural areas than they do in exurbia or suburbia such as Hutton's vireos, orange-crowned warblers and northern flickers. See Exhibit E2.

The Fulton-Fitch Mountain Raptor Survey by GANDA dated September 8, 2015 states:

"Nesting bird hotspots.

The northern 8.5 miles of power line is located mainly in woodland, grassland, or agricultural (vineyard) habitats and intersects with very little residential development and few roads. Much of this part of the survey area sees little human activity, supports vibrant and diverse bird populations, and could be described as a 'nesting bird hotspot'." (page 4) See Exhibit E3.

Why did Panorama drop the description of diverse rural to natural land uses in the PEA (page 2.0-4) for the Shiloh-Fitch Mountain Segment, the 8.5 mile section just described?

Then on pages 8 to 11 of this same report there is a list of the "Bird species observed or likely to occur within Fulton-Fitch Mountain project area and nesting phenology."

It appears that GANDA and the Corridor Ecology authors agree that natural areas are bird hotspots. But PG&E is not offering to find out how many of these birds will survive the year long PG&E helicopter construction

E2

P-3.50

P-3.51

P-3.52

project in the 8.5 mile "natural area". How many vireos, flickers and warblers will be able to tolerate helicopter noise? Usually parks and nature preserves are considered to be "sensitive receptors" when it comes to noise. And GANDA has more or less described the whole 8.5 miles as a "nature preserve". However the IS/MND doesn't include this description of the 8.5 mile transmission line alignment as a "bird hotspot" or a "nature preserve" nor is the bird list included, perhaps because these songbirds are considered by Panorama to be "common" with the exception of the oak titmouse which is actually mentioned in the IS/MND. However the oak titmouse can thrive in suburbia.

P-3.52

The Westons are really curious as to how Panorama intends to restore mature full grown oak trees. Shouldn't they acknowldege that such a feat is almost impossible, at least in an ordinary lifetime? Wouldn't it be better to be more realistic about restoration in general. Restoration is not a scentific discipline. And it is controversial in this county.

Perhaps Panorama should consult the California Oak Foundation concerning the problem of restoring old oak trees for a recommendation of oak ecologists whom they can consult on this matter.

A review of restoration projects in Sonoma and in Mendocino Counties by UC ecologists (Christian-Smith and Merenlender) led them to this conclusion:

"Although a total of over $47 million has been spent on restoration in the [Russian River] basin, dominant forms of restoration are limited in scope to small-scale projects that focus on technical solutions to site-specific problems." See Exhibit E4.

P-3.53

The IS/MND offers no proof that PG&E knows how to practice restoration or has accomplished successful restoration projects that have been reviewed in restoration literature or periodicals. To the Westons who have experience in managing a large property to prevent erosion in a high rainfall area, PG&E's promises of restoration appear empty, especially since PG&E has scheduled their restoration projects almost one year after the damage will take place.

Panorama believes that if they just promise to do restoration, their promise will remove the negative impacts of this project. It would be better if they were more honest about the impacts, because obviously the

E3

CPUC is not very concerned about them but still wants to pretend that "restoration" will make them disappear.

The ecologists who reviewed the Sonoma County restoration projects concluded that restoration should concentrate on entire watersheds instead of small projects. How will PG&E treat the watersheds in their project?

The Westons have followed this watershed restoration practice by allowing adequate vegetation to cover the ground to prevent erosional forces from the often heavy winter storms in this part of the county. How will PG&E protect the existing vegetation protecting steep slopes from avoidable erosional forces caused for example by PG&E heavy vehicles? See Exhibit E5.

P-3.53

PG&E should recognize that this part of Sonoma County is infested with wild pigs and that throwing hay on bare soil creates wild pig habitat especially after rainstorms, and if the bare soil is on a slope the pig diggings can cause gullies to form. It is best not to use hay on bare soil unless a wild pig exclusion fence surrounds the hay treated ground.

P-3.54

We hope that PG&E realizes that washing their vehicles before entering a property will not protect against all invasive weed seeds. After the truck washing routine upon leaving every property, the trucks will probably pick up more bad weed seeds plentifully waiting along roads and import them into the next property.

Certainly one of these bad invasives will be -- stinkwort -- which will be especially difficult not to disperse because it matures in summer through fall and is growing along Los Amigos Road and the Weston private entrance road through the St. Francis property. This widespread weed even grows along Highway 101. See Exhibit E6

P-3.55

In the end, PG&E right-of-way easement legally requires them to repair damages they cause. So damage impacts are really PG&E's legal obligation to mitigate and repair whether or not that company has negotiated MM's to its liking with the CPUC.

P-3.56

E4

SECTION F: LAND USE

This is the Westons' response to the IS/MND's Section 3.10.

The only references by Panorama Environmental to the Sotoyome [Highland] Conservation Easement and The Windsor Oaks Conservation Easement appear in Figure 3.10-2 (Sonoma County Land Use Designations, Map 2). The apparent reason is given in the discussion of proposed project impact (b) on page 3.10-10: "Pursuant to CPMC GO 131-D, the CPUC has sole and exclusive jurisdiction over the siting and design of the proposed project; therefore, no local land use plans, policies, or regulations would apply to the project."

If that is the case, why did Panorama include any reference to Sonoma County land use designations maps and land use descriptions, and Sonoma County zoning designations maps and zoning descriptions? Why did Panorama consult with the Sonoma County Regional Park District and the Town of Windsor concerning Shiloh and Foothill Parks? Why did you not consult with the Sonoma County Agricultural Preservation & Open Space District concerning the 2 large conservation easement properties that have perpetual conservation easement provisions protecting the large natural areas on these properties? In making decisions about a public utility's construction permit application, CPUC Commissioners do not have to abide by the wishes of county supervisors but they usually act courteously and learn about them. This courtesy is especially appropriate for project-affected conservation properties when a CEQA document is being prepared.

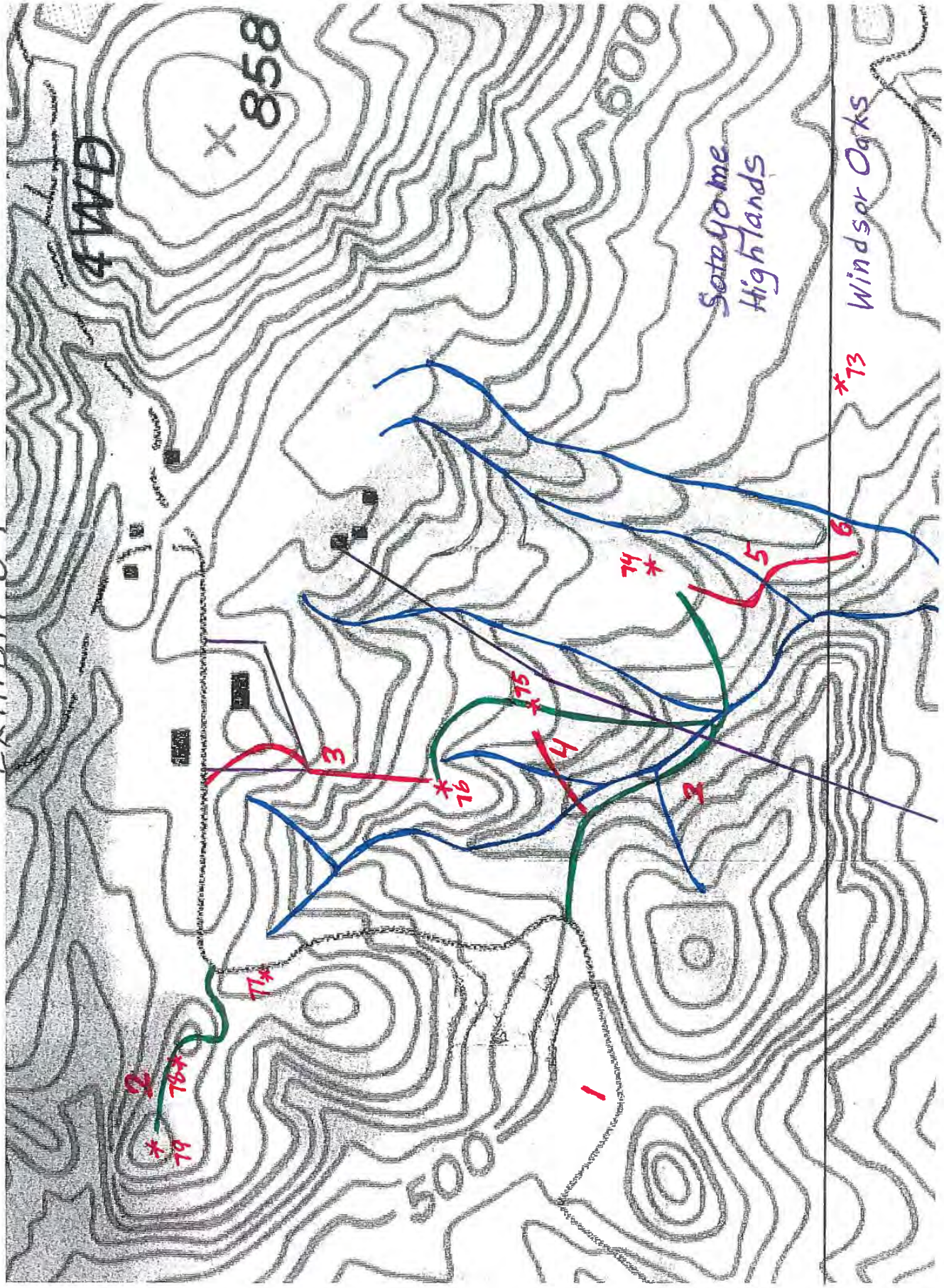
The conservation easement agreement contract between Sonoma County and the Westons is a public document accessible through the County's Recorder's Office (O.R. 96-109842 S.C.R.).

In addition we believe that the provisions of a state law, California Civil Code Sections 815-816, should apply to PG&E and CPUC.

P-3.57

F1

Exhibit C-1



Exhibits: Comment Letter Part 1

EXHIBIT C-2a

Exhibit C-2

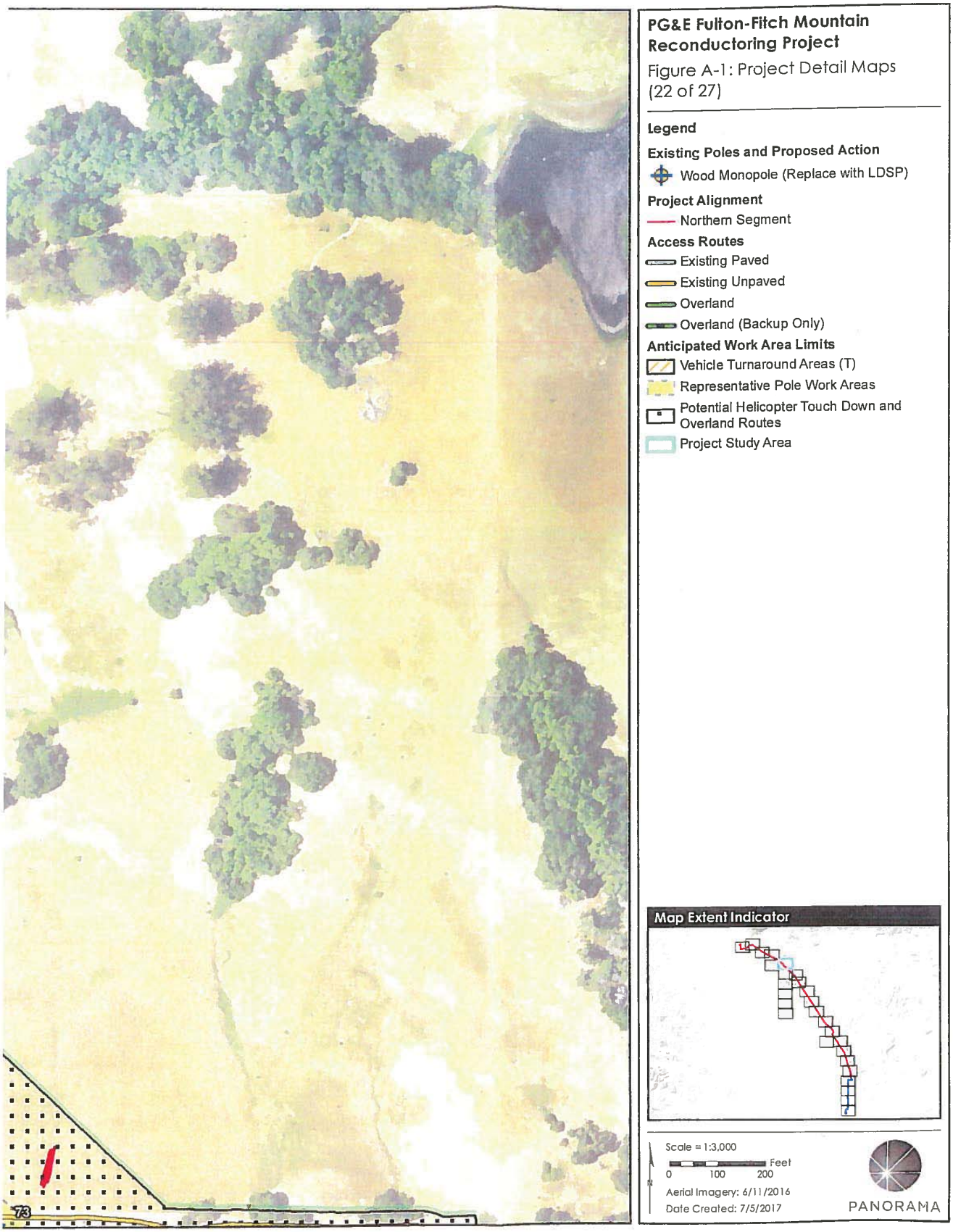


EXHIBIT C-2b

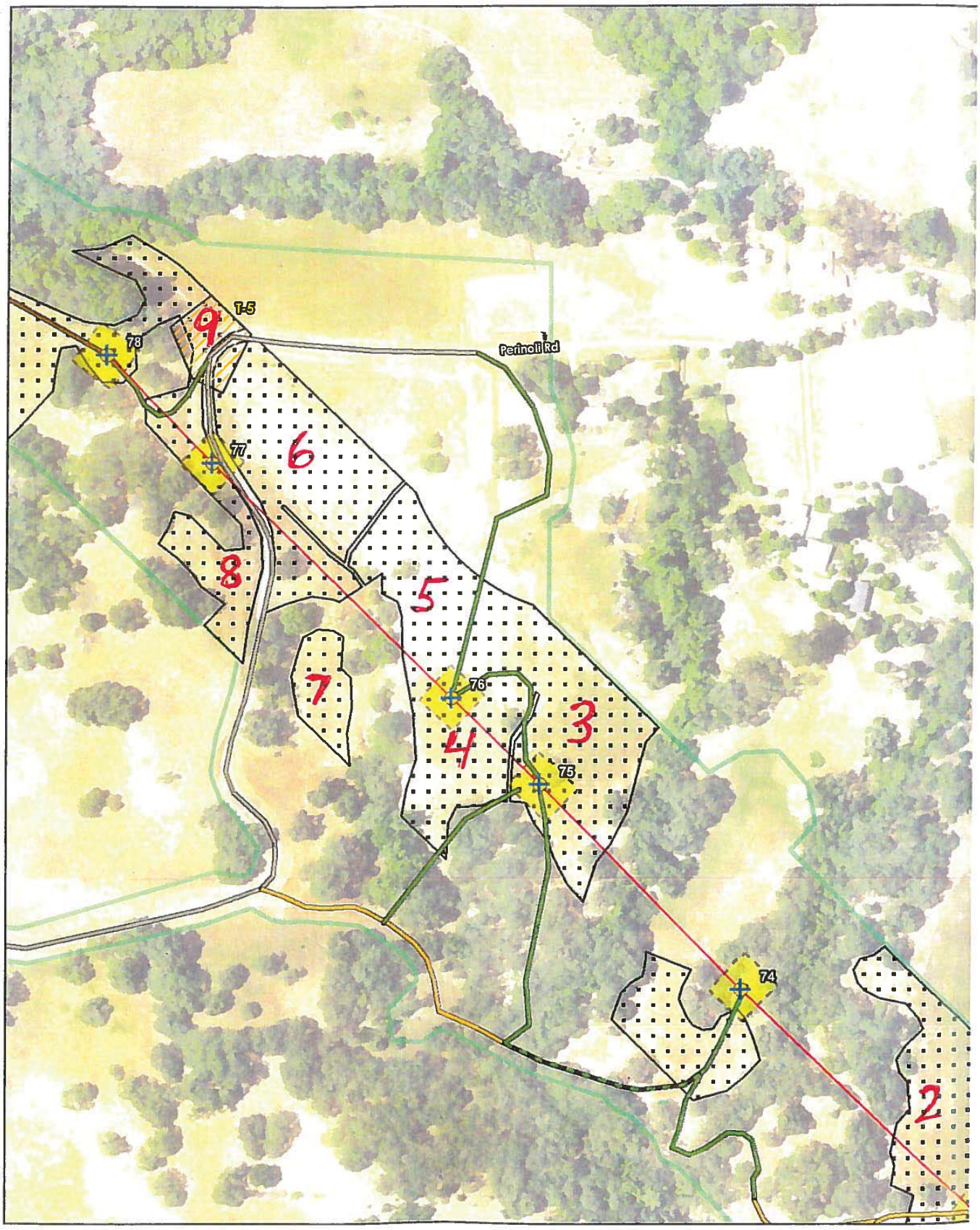
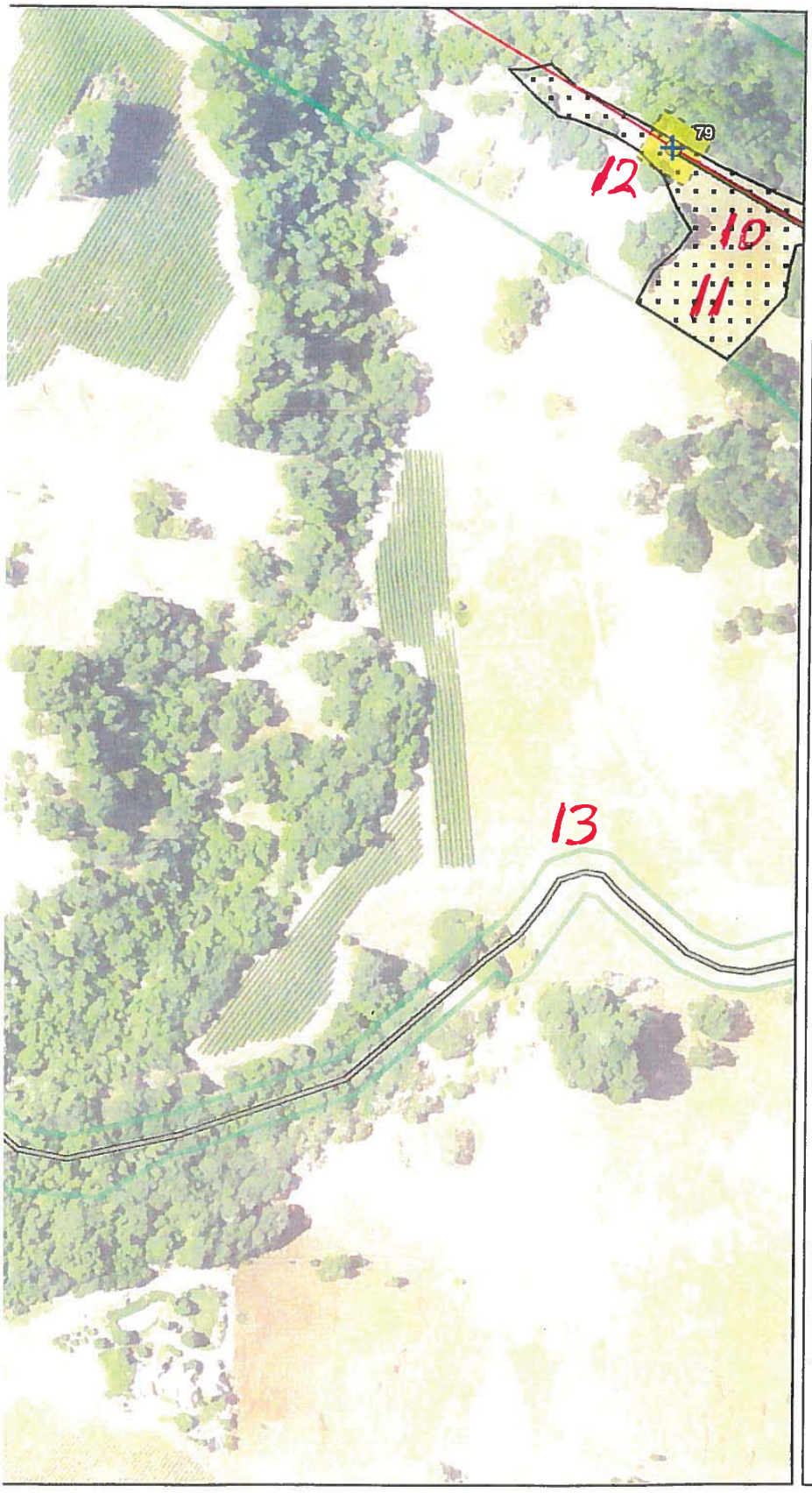


EXHIBIT C-2c



PG&E Fulton-Fitch Mountain Reconductoring Project

Figure A-1: Project Detail Maps (23 of 27)

Legend

Existing Poles and Proposed Action

Wood Monopole (Replace with LDSP)

Project Alignment

Northern Segment

Access Routes

Existing Paved

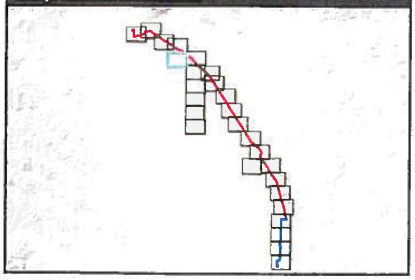
Overland

Representative Pole Work Areas

Potential Helicopter Touch Down and Overland Routes

Project Study Area

Map Extent Indicator



Scale = 1:3,000

0 100 200 Feet

Aerial Imagery: 6/11/2016

Date Created: 7/5/2017

PANORAMA

EXHIBIT C-2d

EXHIBIT C-2e

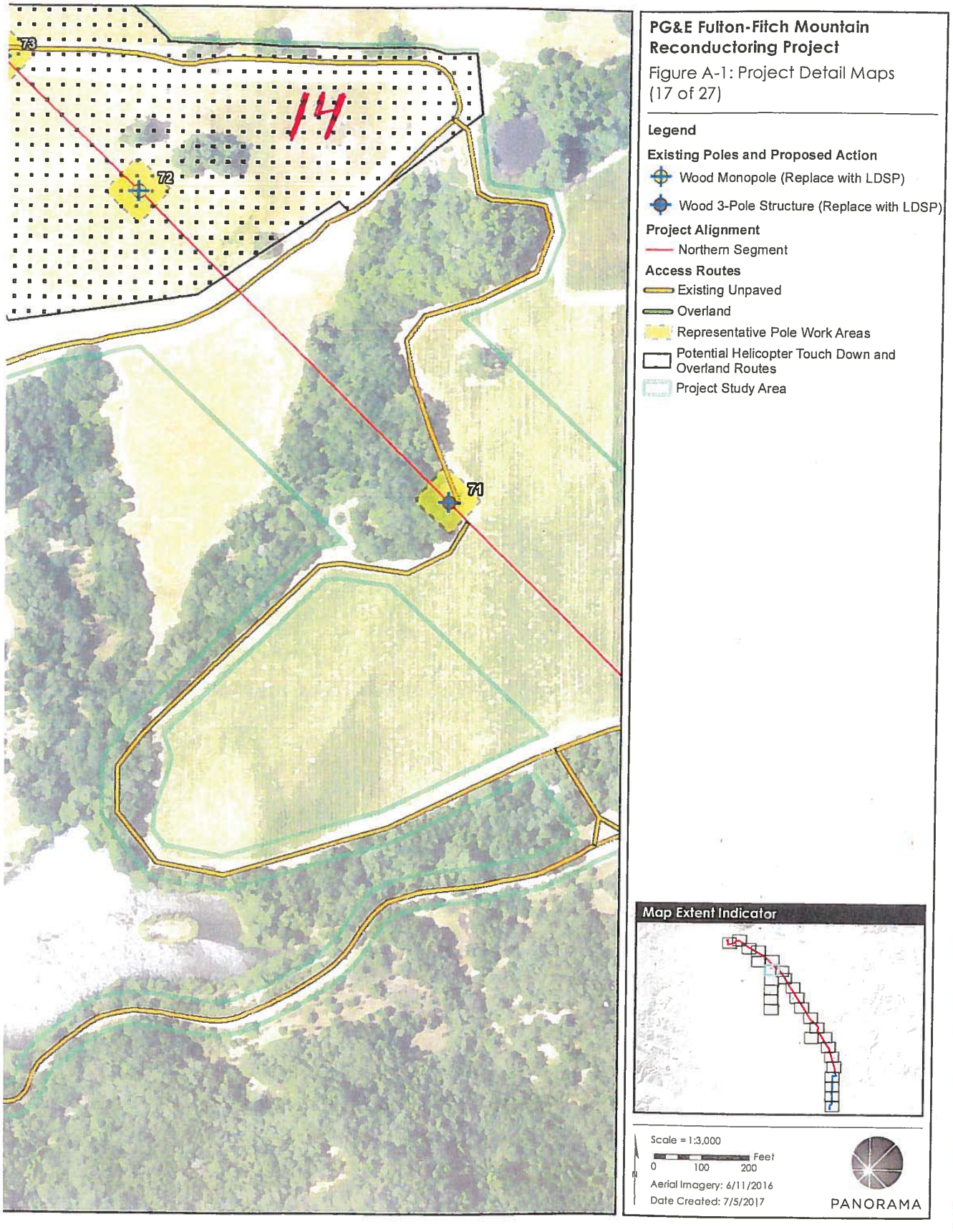

73
72
71
14
PG&E Fulton-Fitch Mountain Reconductoring Project
Figure A-1: Project Detail Maps (17 of 27)
Legend
Existing Poles and Proposed Action
Wood Monopole (Replace with LDSP)
Wood 3-Pole Structure (Replace with LDSP)
Project Alignment
Northern Segment
Access Routes
Existing Unpaved
Overland
Representative Pole Work Areas
Potential Helicopter Touch Down and Overland Routes
Project Study Area
Map Extent Indicator
Scale = 1:3,000
0 100 200 Feet
Aerial Imagery: 6/11/2016
Date Created: 7/5/2017
PANORAMA

EXHIBIT C-2f

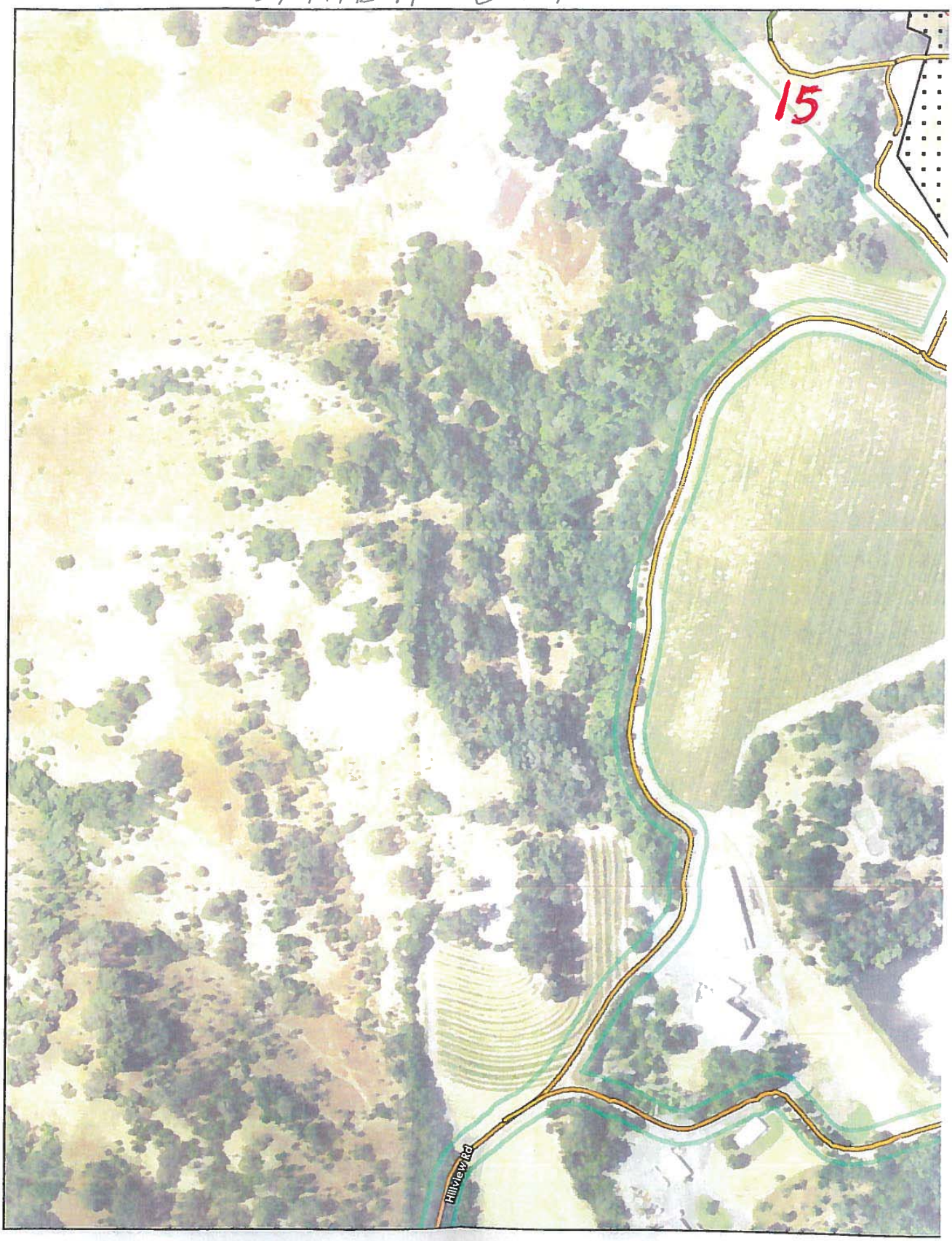


EXHIBIT C-3

Exhibit C-3

Delineation of Waters of the United States

for

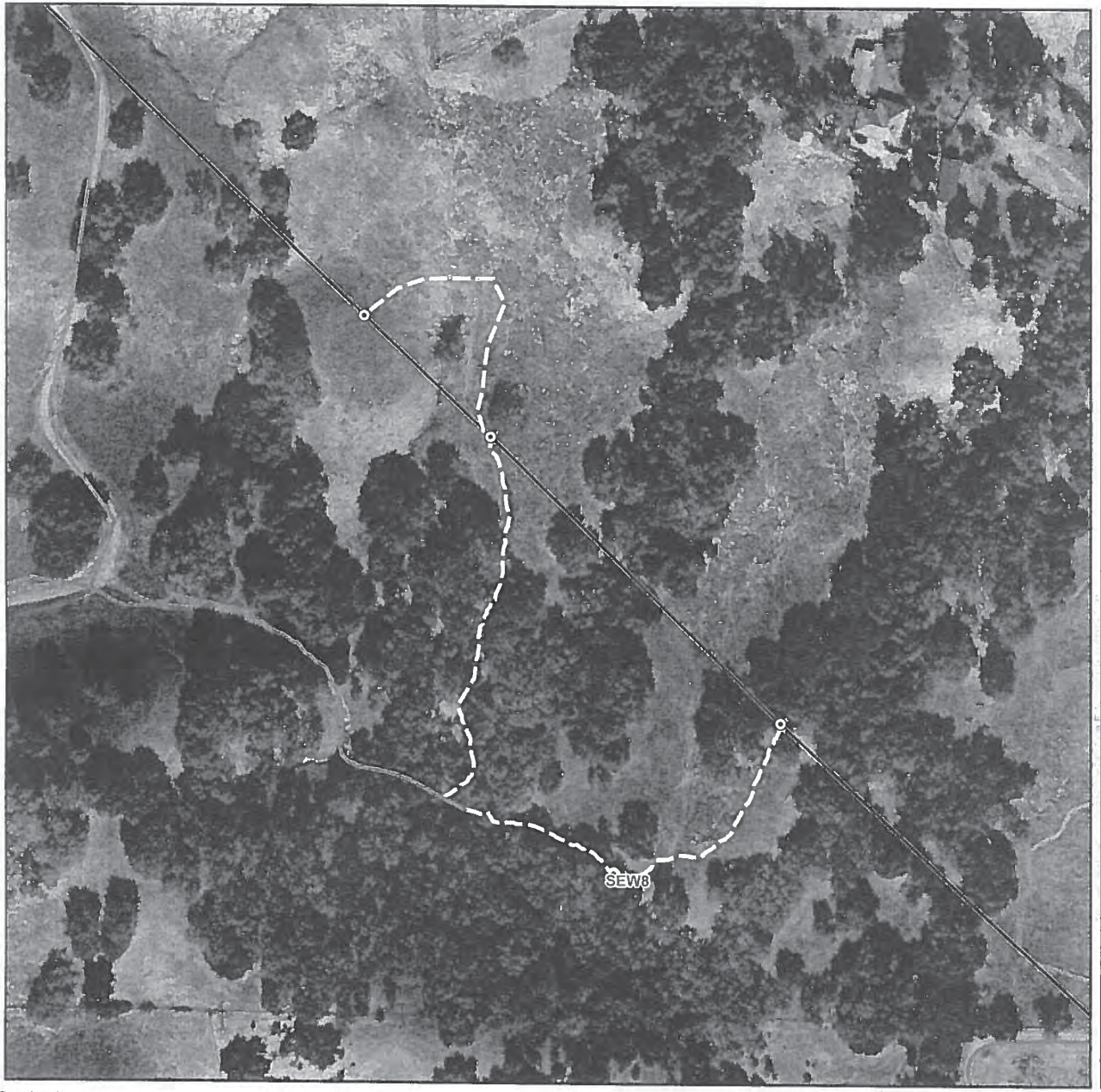
Pacific Gas and Electric Company's Fulton-Fitch Mountain Reconductoring Project, Sonoma County, California

May 2015

Prepared for
Pacific Gas and Electric Company
245 Market Street, N10A
San Francisco, CA 94105

Prepared by
TRC
101 2nd Street, Suite 300
San Francisco, CA 94105

EXHIBIT C-3



Attachment C - Wetland Delineation
Fulton - Fitch Mountain Reconductoring Project

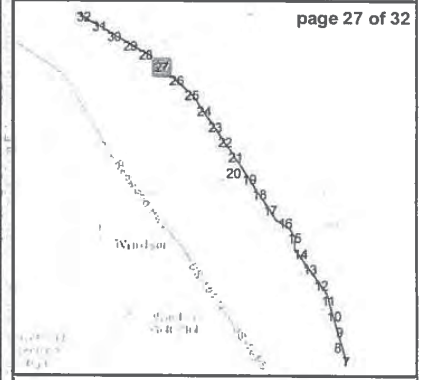
11/19/2012

- Existing Poles
- Upland Data Point
- Wetland Data Point
- Fulton Fitch Mountain Project
- Features with Proposed Impacts

Wetland and Water Features

Total acreage for all features - 1.38

- SEW-Seasonal Watercourse (1.18 ac)
- SW-Seasonal Wetland (0.20 ac)
- Existing access route (may require improvements)
- Overland access route



N

TRC Results you can rely on

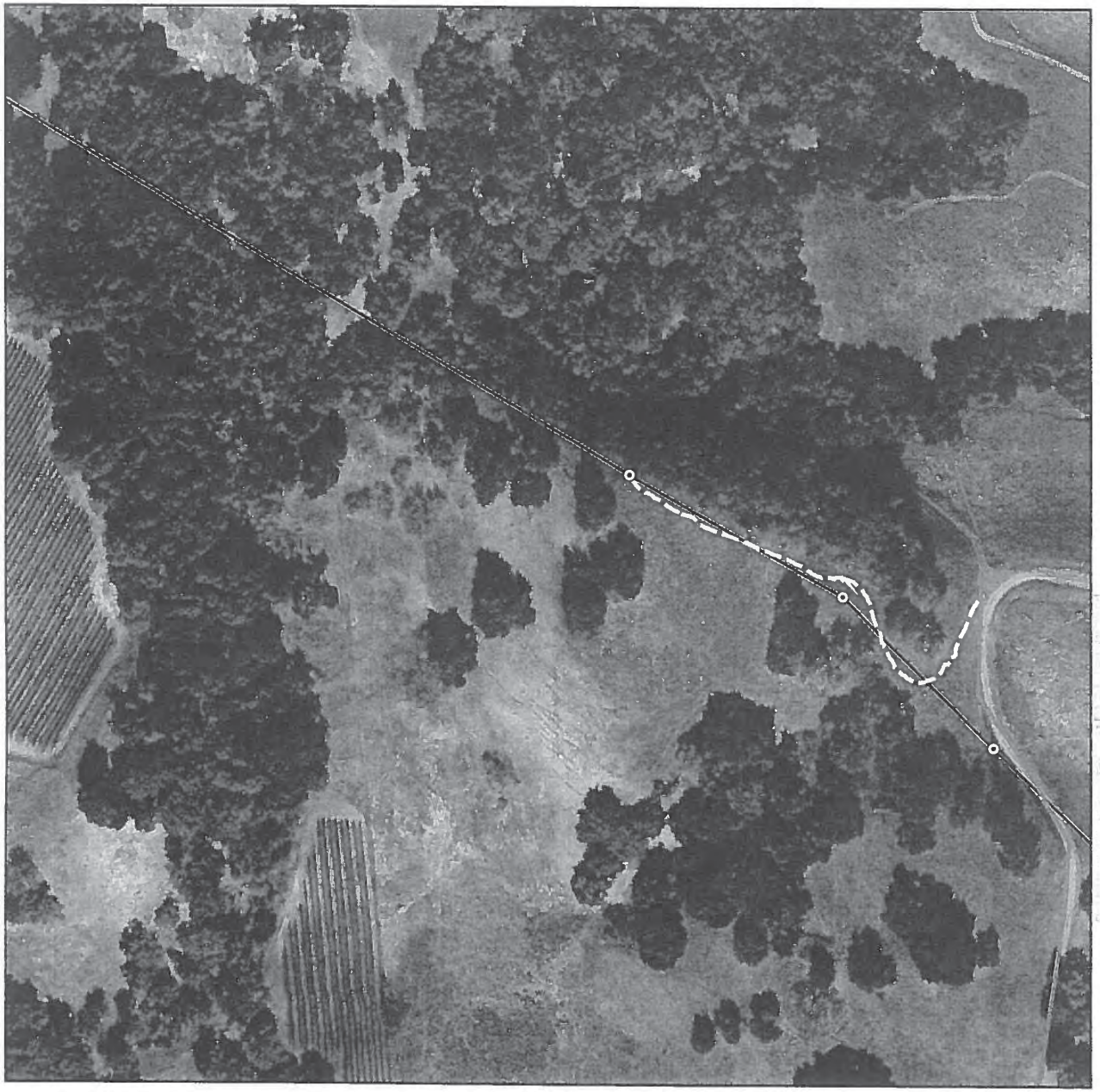
Project particulars are preliminary and subject to change.

1:2,400

0 100 200 400 ft

Overland access routes are provided to establish a centerline for the survey corridor and are subject to change

EXHIBIT C-3



Attachment C - Wetland Delineation
Fulton - Fitch Mountain Reconductoring Project

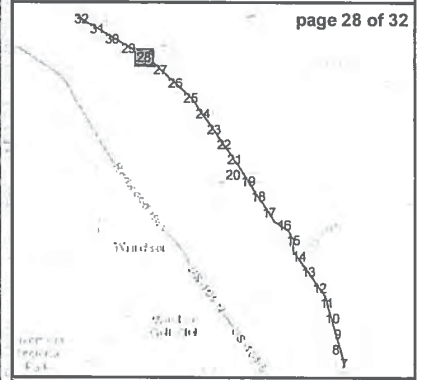
11/19/2012

- Existing Poles
- Upland Data Point
- Wetland Data Point
- Fulton Fitch Mountain Project
- Features with Proposed Impacts

Wetland and Water Features

Total acreage for all features - 1.38

- SEW-Seasonal Watercourse (1.18 ac)
- SW-Seasonal Wetland (0.20 ac)
- Existing access route (may require improvements)
- Overland access route



N

TRC Results you can rely on

Project particulars are preliminary and subject to change.

1:2,400

0 100 200 400 ft

Overland access routes are provided to establish a centerline for the survey corridor and are subject to change

Exhibit C-4

Exhibit C-4

CURTIS & ASSOCIATES
LAND SURVEYING SERVICES
805 HEALDSBURG AVENUE
HEALDSBURG, CALIFORNIA 95448
707-433-4808 FAX 707-433-9918

July 12, 2012
95-061

Richard Weston
Caroline Weston
P.O. Box 515
Windsor, CA. 95492

Re: Use of farm roads for accessing PG&E poles.

Richard, Caroline:

With regard to our walk along the old road leading to the PG&E poles located in the southwesterly quadrant of your property, the road overall, with a little bit of work, seems driveable with a heavy duty vehicle. An area of concern, however, with regard to erosion as well as drivability is where this road crosses a major seasonal creek. The road leaving the creek in an easterly direction is quite steep and has cut banks on both sides. Also, you expressed a desire for a year round road.

My recommendations, then, for a year round road are as follows:

1. A thickness of 12" of class 2 Aggregate Base Rock, or equivalent, placed on a native soil sub grade compacted to a minimum of 90% of the Modified Procter Compaction.

2. This base rock, at its surface, to be a minimum of 12' wide.

3. Maximum grade to be 20%.

4. In general, the road wants to be "outboarded" as shown on the attached Proposed X-section 1.

5. At the above mentioned creek crossing, or anyplace the road has cut banks on both sides, the road cross section should be similar to that shown on the attached Proposed X-section 2. Stone rip/rap should be placed where the roadside ditch "daylights".

6. At the above mentioned creek crossing, in order to prevent the 10 year storm from running over the road, two (2) 36" culverts, side by side, will be required, with 2' of cover over them at the low point in the road. Building up the road at this point will also help to alleviate the steep grade going off to the east.

Another concern which I had regards temporary, individual pole access roads leading off the main year round road. My understanding is that these temporary access roads, until used, will be little more than mowed pathways. Walking along some of these mowed pathways, the cross slope in some areas appeared excessive. Should you or those accessing the poles also find the cross slope to be excessive, I would recommend grading the road in these areas to conform to the enclosed Proposed X-section 3 drawing.

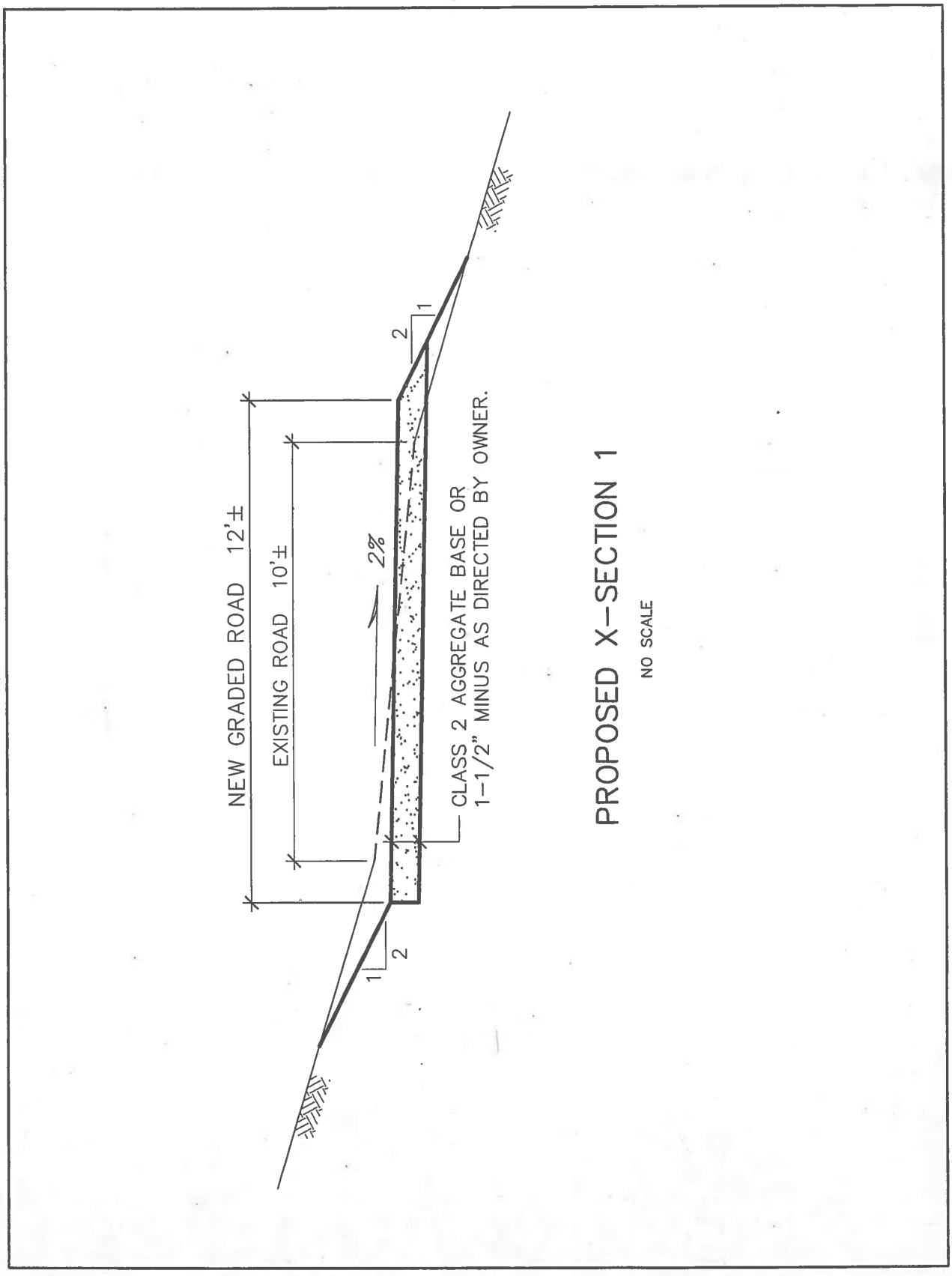
After the pole accessing work is done, any bare earth from grading or destructive use of the road, should be scarified, seeded and mulched. Any ruts should be filled with soil prior to seeding and mulching. I have enclosed some seeding and mulching specifications which you may want to utilize. Let me know if I may be of further assistance.

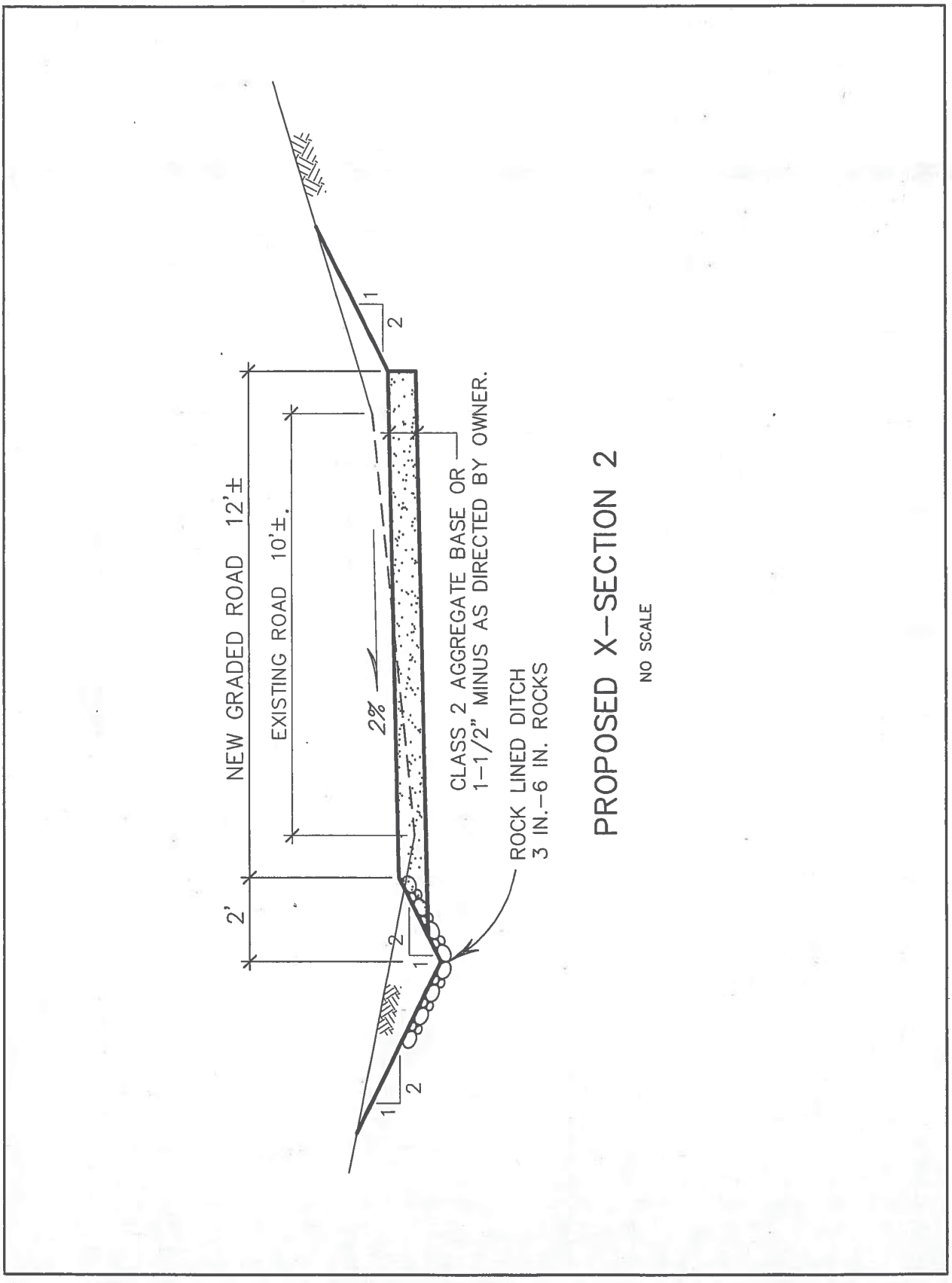
Yours truly,

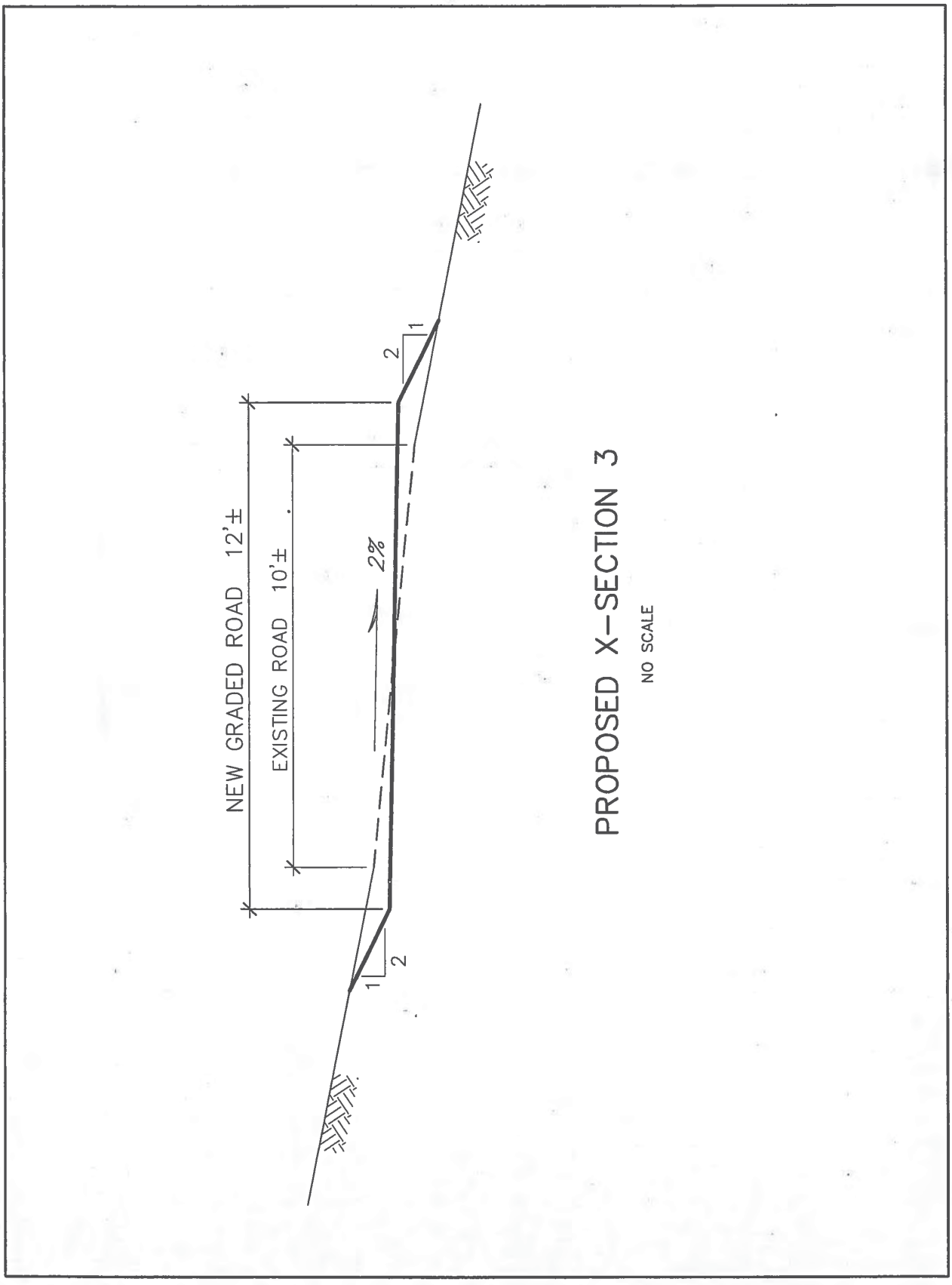
CURTIS & ASSOCIATES

Gordon Meininger, P.E.

GM:cc
Encl.


NEW GRADED ROAD 12'±
EXISTING ROAD 10'±
2%
CLASS 2 AGGREGATE BASE OR
1-1/2" MINUS AS DIRECTED BY OWNER.
2
1
2
1
PROPOSED X-SECTION 1
NO SCALE
P:\Job Storage\12-011\12011G&C.dwg, 7/17/2012 4:19:47 PM


NEW GRADED ROAD 12'±
EXISTING ROAD 10'±.
2'
2%
CLASS 2 AGGREGATE BASE OR
1-1/2" MINUS AS DIRECTED BY OWNER.
ROCK LINED DITCH
3 IN.-6 IN. ROCKS
2
1
2
1
2
1
PROPOSED X-SECTION 2
NO SCALE
P:\Job Storage\12-011\12011G&D.dwg, 7/17/2012 4:20:09 PM


NEW GRADED ROAD 12'±
EXISTING ROAD 10'±
2%
2
1
2
1
PROPOSED X-SECTION 3
NO SCALE
P:\Job Storage\12-011\12011G&C.dwg, 7/17/2012 4:10:01 PM

1. All disturbed areas shall be protected by using erosion prevention measures to the maximum extent practicable: straw mulch, geotextiles, plastic covers, blankets or mats. Temporary or permanent revegetation shall be installed as soon as practical after vegetation removal but in all cases prior to October 15. Prior to final inspection, all disturbed areas shall be revegetated or landscaping shall be installed.

2. Seeding shall be conducted in a three step process, first, evenly apply seed mix and fertilizer to the exposed slope. Second, evenly apply mulch over the seed and fertilizer. Third, stabilize the mulch in place. An equivalent single step process, with seed, fertilizer water, and bonded fibers is acceptable.

Applications shall be broadcasted mechanically or manually at the rates specified below. Seed mix and fertilizer shall be worked into the soil by rollling or tamping. If straw is used as mulch, straw shall be derived from wheat, rice, or barley and be approximately 6 to 8 inches in length. Stabilization of mulch shall be done hydraulically by applying an emulsion, or mechanically by crimping or punching the mulch into the soil. Equivalent methods and materials may be used only if they adequately protect vegetation growth and protect exposed slopes.

MATERIALS	APPLICATION RATE (Pounds per Acre)
Seed Mix	
Bromus mollis (Blando Brome)	40
Trifolium hirtum (Hykon Rose Clover)	20
Fertilizer	
16–20–0 & 15% Sulphur	500
Mulch	
Straw	4000
Hydraulic Stabilizing*	
M–Binder or Sentinel	75–100
Equivalent Material	Per Manufacturer

*Non–Asphaltic, derived from plants.

P:\Job Storage\12-011\12011G&D.dwg, 6/27/2012 3:25:32 PM

Grading, drainage improvement, and vineyard and orchard site development shall be designed and conducted in compliance with the following requirements.

A. The limits of grading, drainage improvement, and vineyard or orchard site development shall be defined and marked on the site to prevent damage to surrounding vegetation.

B. Any existing vegetation within the limits of grading, drainage improvement, or vineyard or orchard site development that is to remain undisturbed by the work shall be identified and protected from damage by marking, fencing, or other measures.

Sec. 11.16.090. Revegetation.

Grading, drainage improvement, and vineyard and orchard site development shall replant disturbed surfaces in compliance with the approved plans and specifications and the following requirements.

A. **Preparation for revegetation.** Topsoil removed from the surface in preparation for grading, drainage improvement, and vineyard and orchard site development shall be stored on or near the site and protected from soil loss while the work is underway, provided that such storage shall not cause damage to root systems of trees intended to be preserved.

B. **Methods of revegetation.** Mulching, seeding, planting of groundcover, shrubs or trees, or other suitable stabilization measures shall be used to protect exposed soil to minimize soil loss, and to maximize slope stability. Use of drought-tolerant, fire resistant native plant species is encouraged; use of invasive plant species identified in the permit authority's best management practices guide is prohibited.

C. **Timing of revegetation measures.** Temporary or permanent revegetation shall be installed as soon as practical after vegetation removal, but in all cases prior to:

1. October 15 for all grading and drainage improvement;

2. October 15 for all initial land preparation work for vineyard and orchard planting, and all final land preparation and planting work; and

sonoma-county.org/prmd/docs/grdord/bmpguide.htm

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

Skip to Content | Accessibility Assistance

Best Management Practice Guide

1. Erosion and Sediment Control Field Manual, Fourth Edition, California Regional Water Quality Control Board, San Francisco Bay Region, 2002

2. Stormwater Best Management Practice Handbook -- Construction, California Stormwater Quality Association, 2003 Control Board, San Francisco Bay Region, 2002

3. Construction Site Best Management Practices (BMP) Manual, State of California, Department of Transportation, 2003

4. Guidelines for the Standard Urban Storm Water Mitigation Plan, First Edition, EOA, Inc. and BKF Engineers, 2005

5. Best Management Practices for Agriculture Erosion and Sedimentation Control, Sonoma County Grape Growers Association, Sonoma County Agricultural Commissioner's Office and Enterra Associates, 2004

6. California Salmonid Stream Habitat Restoration Manual

7. Stormwater Quality Manual for Development Projects in Marin County -- A Low Impact Development Approach, Marin County, 2008

8. Hydromodification Management Plan -- Final Report, Santa Clara Valley Urban Runoff Pollution Prevention Program, 2005

9. National Management Measures to Control Non-Point Source Pollution from Urban Areas, United States Environmental Protection Agency, 2005

10. California Bank and Shore Rock Slope Protection Design, Third Edition, State of California, Department of Transportation, 2000

11. Flood Control Design Criteria Manual, Sonoma County Water Agency, 1983

12. Trails Handbook, State of California, The Resources Agency, Department of Parks and Recreation, 1991

13. Best Management Practices, State of California, The Resources Agency, Department of Parks and Recreation, Trails and Resource Management Section, North Coast Redwoods District, 2001

14. Trail Management Handbook, US Department of the Interior, National Park Service, Denver Service Center, 1983

15. National Trail Drawings and Standard Specifications for Construction and Maintenance of Trails, EM-7720-103, US Forest Service, 1996

16. BLM Manual Handbook, GV191.67.T7 T724, US Bureau of Land Management, 1984

17. A Water Quality and Stream Habitat Protection Manual for County Road Maintenance in Northwestern California Watersheds

18. The CalEPPC List: Exotic Pest Plants of Greatest Ecological Concern in California, The California Exotic Pest Plant Council, 1999

19. Stormwater C.3 Guidebook, Stormwater Quality Requirements for Development Applications, Fourth Edition, Contra Costa Clean Water Program, 2008

20. TR-55 Users Manual, Natural Resources Conservation Service

21. Storm Water Low Impact Development Technical Design Manual

Appendix A. Landscaping and Vegetation for Storm Water Best Management Practices in New Development and Redevelopment in the Santa Rosa Area

This section should be used as guidance for design and installation of plantings as part of landscape-based treatment controls in Santa Rosa and Sonoma County. Site-specific climate and soil conditions must be determined prior to final plant selection and control installation.

A. Plant Species for Landscape-Based Treatment Controls

Landscaping plans and/or hydroseeding specification shall be provided for water quality systems using landscaped-based treatment controls such as swales or buffer strips. Landscaping plans shall be provided for water quality systems and shall include species lists, plant sizes (*e.g.,* seed, plug, 1-gallon container, etc.), planting layout, planting techniques, plant spacing, soil amendments, and hydroseed specifications. After establishment, summertime irrigation is rarely required when using plants adapted to Sonoma County's climate. Establishment may take 1-3 years, depending on timing of planting, plant size, planting location, etc. Revegetation with native species and adaptable species that can tolerate varying zones of inundation and soil moisture is encouraged.

Planting with native aquatic and wetland species will also provide a medium for biological uptake of pollutants. Bulrush and cattail are emergent species that have been noted for absorbing nitrogen and phosphorus. Bacteria present in the anaerobic conditions of saturated soils convert nitrates into a gaseous form that is then released into the atmosphere. Phosphorus can combine with various metal ions, including iron, manganese, copper, aluminum, and zinc in removing these pollutants from the water. Aquatic plants that are adapted for growth in permanently inundated conditions where the roots are continuously underwater provide significant water quality improvement capabilities. Herbaceous species and grasses are also useful for water quality improvement.

The use of shrubs and trees along the borders and banks of a basin is beneficial. A diverse association of plant species that provide stratified growth forms should be used to recreate a more natural system, as well as provide aesthetic and wildlife habitat value.

B. Invasive Species

To protect natural wetlands and agricultural areas, the use of the following invasive species is specifically prohibited.

Scientific Name	Common Name
Acacia spp.	acacia
Aegilops triuncialis	barbed goatgrass
Arundo donax	giant reed
Brassica spp.	mustard
Carduus pycnocephalus	Italian thistle
Carpobrotus edulis	ice plant
Carthamus lanatus	distaff thistle
Centaurea calcitrapa	purple starthistle
Centaurea solstitialis	yellow starthistle
Conium maculatum	poison hemlock
Cortaderia selloana	pampas grass
C. jubata	Jubata grass

Cotoneaster pannosus	cotoneaster
Cytisus scoparius	Scotch broom
Delairea odorata	cape ivy
Dipsacus fullonum	fullers teasel
Eucalyptus spp.	eucalyptus
Euphorbia oblongata	oblong spurge
Festuca elatior	tall fescue
Foeniculum vulgare	fennel
Genista monspessulana	French broom
Hedera helix	English ivy
Holcus lanatus	velvet grass
Lepidium latifolium	perennial pepperweed
Ligustrum spp.	privet
Lolium multiflorum	Italian ryegrass
Lolium perenne	perennial ryegrass
Lythrum salicaria	purple loosestrife
Mentha pulegium	pennyroyal
Phalaris aquatica	Harding grass
Rubus discolor	Himalayan blackberry
Taeniatherum capùt-medusae	medusahead grass
Tribulus terrestris	puncture vine
Ulex europaeus	gorse
Vinca major	periwinkle
Xanthium spinosum	spiny cocklebur

Or any plant listed by the California Invasive Plant Council as invasive (http://www.cal-ipc.org/index.cfm), or any species that exhibits invasive characteristics.

C. PLANTING PLAN GUIDELINES FOR SPECIFIC TREATMENT CONTROLS

Recommended plant species are shown for each vegetated treatment control. Information about water use, dormancy, height, propagation, and drainage needs is included in Table A1.

1. Vegetated swales

Vegetated swales slowly convey runoff flow to downstream discharge points. Vegetated swales will be planted with species adapted to seasonal inundation and extended periods of dry conditions.

Emergent Species. The optimum planting conditions for these species would be within the center of the swale where the soil would be saturated for a greater duration (such as at the water elevation for a 24-hour storm with an annual return interval). Recommended species are:

Scientific Name	**Common Name**
Carex barbarae	Santa Barbara sedge
Carex densa	dense sedge
Carex obnupta	slough sedge
Juncus balticus	Baltic rush
Juncus bufonius	toad rush
Juncus effusus	Pacific rush
Juncus patens	blue rush
Juncus xiphioides	iris-leaved rush

Exhibit C-5

Exhibit C-5

March 21, 2016

Richard Weston
P.O. Box 515
Windsor, CA 95492

Re: *Recommendations for New Road and Stream Crossing Installations*

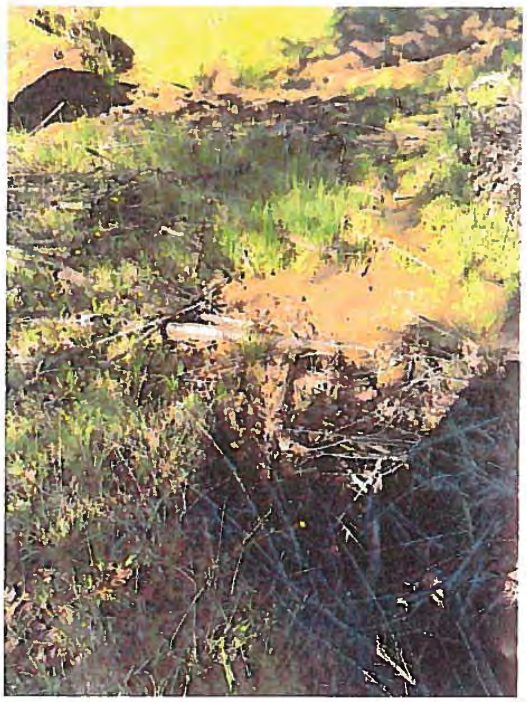
Dear Mr. Weston:

The following are some basic recommendations for the new road and stream crossings that you are planning on installing in order to get to the old orchard on the property. A map and typical drawings for stream crossing and road shaping design are enclosed. Refer to the map for site number references.

Site 1:

Depending on frequency of road use, I would recommend an armored fill crossing here for low traffic use conditions, and an 18" culvert for high traffic use conditions. If you choose to put a culvert here, it will need regular maintenance and I would suggest installing a trash rack at the inlet to reduce plug potential of the culvert.

Site 1 also has a headcut below the crossing that needs to be armored, or it will keep migrating upstream and will destabilize the crossing.



Site 2:

Again, depending on frequency of use, I would recommend trying to convert this site to a wet ford crossing for low traffic use conditions. For higher traffic use conditions, a large culvert (48" or bigger) may be needed and I would recommend having an engineer design the crossing in that scenario. I could not find any typical design drawings for a wet ford crossing, but I have included some text from the Pacific Watershed Associates Roads Handbook. You will want to rock/armor the approaches very well or you may have erosion and sediment delivery into the stream crossing.

Sites 3 and 4:

I would recommend installing a 24" culvert at both sites 3 and 4. I performed a quick drainage area calculation and a 24" diameter culvert should be sufficient to handle up to the 100 year storm event at both sites. Make sure the culvert is set at stream grade, and make sure the pipe is long enough so that you can have a 2:1 slope at the outboard fill. See the typical drawings for more information on culvert installation. Install trash racks at each culvert inlet to reduce plugging.

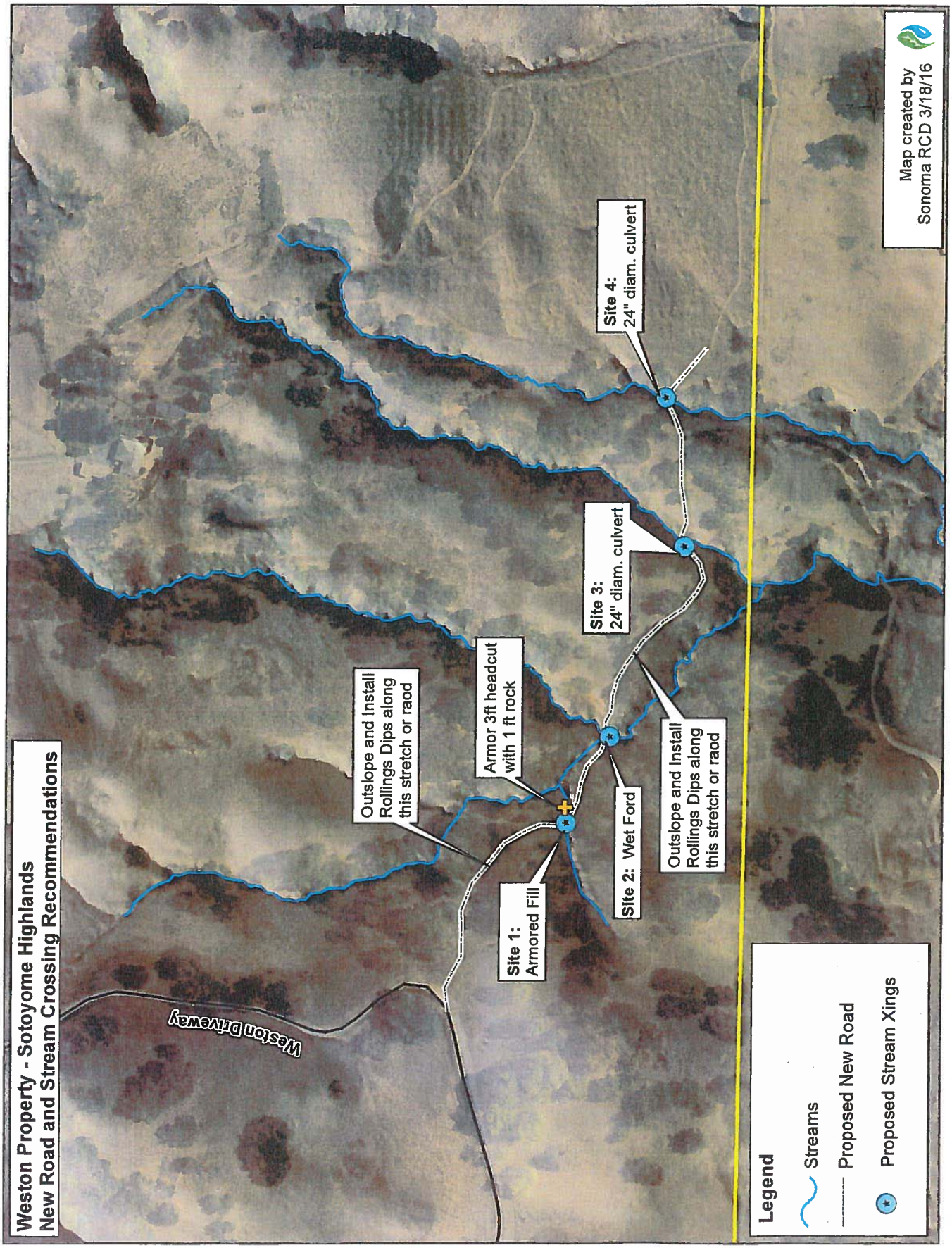
Road Shaping: Wherever you can, outslope the road and install rollings dips to improve road drainage. Typical designs for outsloping and rolling dips are enclosed.

Sincerely,

Kevin Cullinen
Project Manager
Sonoma Resource Conservation District

FIGURE 122. *Wet ford on a Class II (non-fish) perennial stream. Coarse rock armor that has been grouted in place provides energy dissipation and protects the outer edge of the hardened roadbed. Fords should not be used if high wet season flows would cut off access to inspect and maintain drainage structures further out the road. Unvented, hardened fords may also obstruct fish passage.*

FIGURE 125. *In addition to the actual ford crossing, the road approaches also contribute to sediment pollution unless they are paved or heavily rock surfaced. Fords are always low points in the road, so runoff from the connected approaches is delivered directly to the stream channel.*


Weston Property - Sotoyome Highlands
New Road and Stream Crossing Recommendations
Weston Driveway
Site 1:
Armored Fill
Outslope and Install
Rollings Dips along
this stretch or raod
Armor 3ft headcut
with 1 ft rock
Site 2: Wet Ford
Site 3:
24" diam. culvert
Outslope and Install
Rollings Dips along
this stretch or raod
Site 4:
24" diam. culvert
Map created by
Sonoma RCD 3/18/16
Legend
Streams
Proposed New Road
Proposed Stream Xings

From: **Handbook for Forest, Ranch & Rural Roads by Pacific Watershed Associates**

FORDS

Fords are stream crossings where vehicles drive on the bed of the stream channel (i.e., no man-placed fill in or on the streambed). Fords work well on small to medium sized streams where there is a stable stream bottom and traffic is light. However, "construction" of fords and other unimproved stream crossings on well-traveled roads should be avoided where water regularly flows because of their potential to impact water quality. In certain situations, where flash floods, high seasonal flood peaks or floating debris are problems, fords may be a practical answer for low volume roads.

Fords of live streams, called "wet fords," are typically composed of streambed gravels or concrete structures built in contact with the streambed so that vehicles can cross the channel (Figure 122). If possible, a stable, rocky (or bedrock) portion of the channel should be selected for the ford location. **The simplest of fords are those on low volume roads where occasional traffic drives over a naturally hardened streambed composed of bedrock or cobbles.**

Where the streambed at the crossing site is not sufficiently hard, fords can also be fortified or constructed of permeable trench drains of coarse, imported cobbles and boulders. Low summer flows seep through the fill, and higher water discharges flow over the top without scouring or removing the armor layer. Some post-winter or post-wet season maintenance may be needed. During extreme events, however, the ford may be completely washed-out and need reconstruction. Permeable or concrete fords are likely to be a barrier to migrating juvenile or resident adult fish and should not be used in fish-bearing channels.
Paved (hardened) fords across live streams may be necessary to maintain water quality if there is to be regular traffic. These are sometimes called "Arizona Crossings" for their prevalent use as ford crossings of dry streambeds in the USA's desert southwest. Paving, if used, usually consists of a concrete, slightly dish-shaped slab built across the stream channel that extends sufficiently up each streambank to contain design flood flows (i.e., the wetted perimeter for the design (100-yr) flood flow).13 These may sometimes contain enough fill material beneath the concrete to maintain a level driving surface. A discharge apron orenergy dissipater is constructed on the downstream side of the ford to prevent scour and undermining during high flows and this must also extend the entire width of the 100-yr flood flow wetted perimeter (Figure 123).

Fords are designed to pass both sediment and debris during high flows. Unfortunately, concrete fords are often plagued by scour around their edges because of a lack of capacity (depth and width) or because armor was not placed to the full width of the flood flow channel, sometimes leaving the ford elevated and impassable. Hardened ford structures are sometimes even moved downstream by large flood flows after the outfall has been eroded and the structure undermined.

Vented fords can also be constructed with a culvert embedded in the concrete or hardened structure to handle low seasonal flows. Fords, particularly vented fords, can be constructed to pass large flows and large amounts of debris while still accommodating fish passage. On streams that contain fish during some part of the year, fish passage is frequently obstructed at low flows unless venting culverts have been embedded into the basal concrete. Unless the vent/area ratio is large (Figure 75), vented fords typically require regular maintenance to clear debris from the culvert inlets. The larger the venting culvert, as compared to the stream width, the less likely they will become plugged with debris.

Unless it has a bedrock foundation and hardened approaches, most ford crossings are vulnerable to erosion and can create pollution from several sources. High traffic levels and/or high water flows can cause erosion of both natural and artificial streambed materials (Figure 124). Material placed in the stream or moved about by vehicle traffic can create a barrier to fish migration. Vehicle passage through fords with fine sediment channel bottoms creates plumes of turbidity with every passage. Deep water ford crossings can cause oil products to be released from vehicles as they pass through a wet ford.

Fords are always the low point in a road alignment, where each road approach drops into the channel and then climbs back out. Unless the approaches are heavily rocked or paved, and hydrologically disconnected, rainfall and runoff will erode the roadbed and deliver fine sediment directly to the stream at the crossing site (Figure 125). Incised stream channels with high streambanks require the excavation of substantial ramps to get vehicles down to the streambed. Unless they are similarly protected, these through cut ramps are often sites of substantial surface and rill erosion that causes eroded sediment and turbid runoff to enter the stream during periods of heavy rainfall.

On small, poorly incised, ephemeral or intermittent streams a ford may be needed if there is insufficient channel depth to install a culvert. In fact, a rock lined rolling dip with a rock apron face may be preferable to a permanent culvert on some swales and small watercourses. **Fords and armored fills have the advantage, over culverted fills, of never plugging.** Fords on small streams should be rock armored to prevent erosion of the road surface during runoff events. **What are sometimes referred to as "unimproved" fords, where a stream channel has been filled with a substantial quantity of soil and left unprotected by armor or rock surfacing, is a high maintenance crossing that is a hazard to water quality and should not be constructed.**

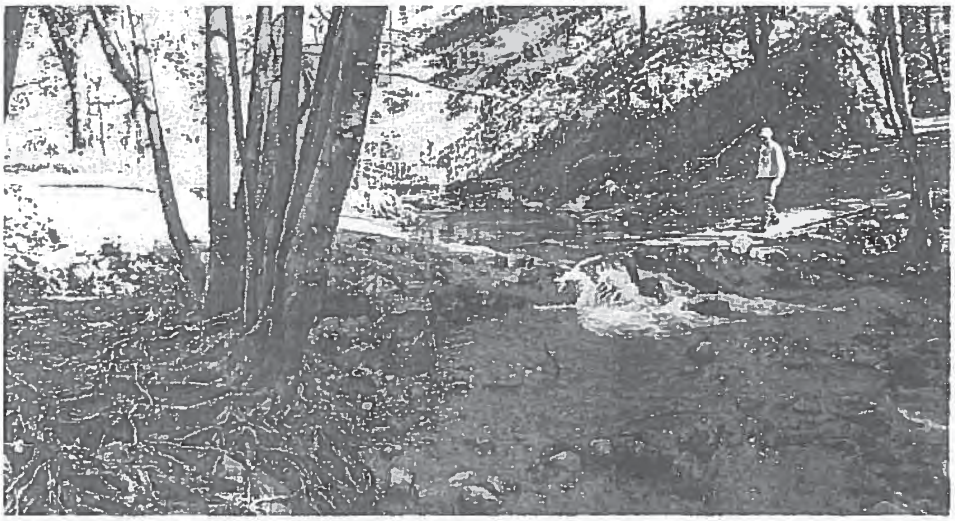
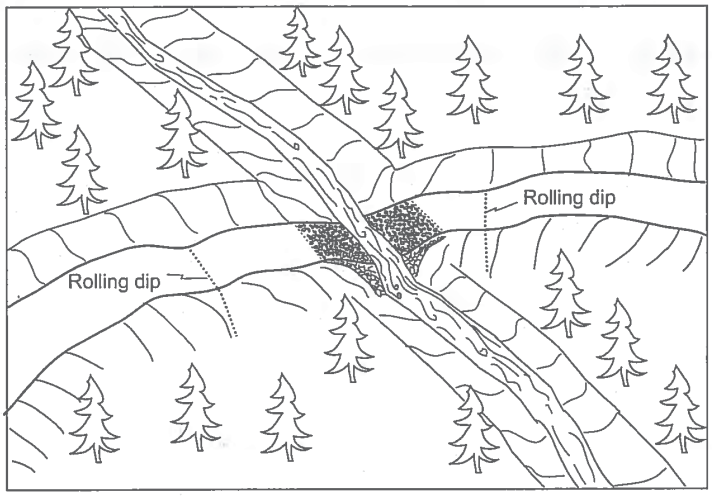


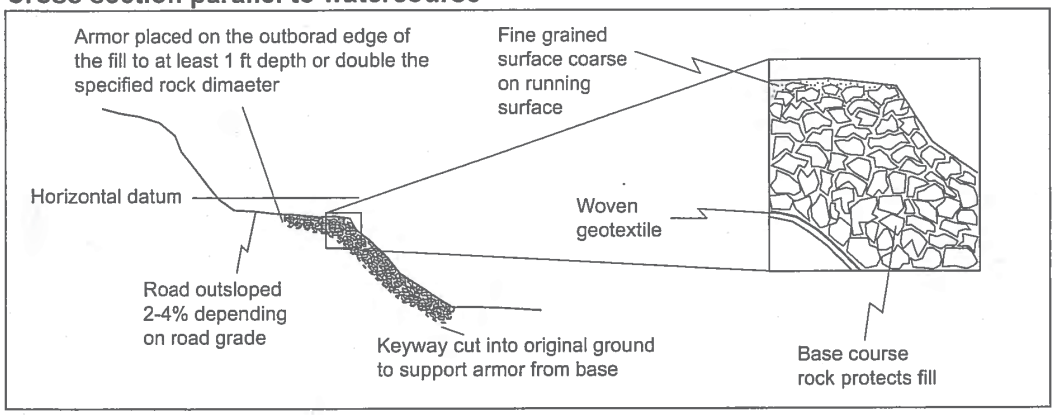
FIGURE 122. *Wet ford on a Class II (non-fish) perennial stream. Coarse rock armor that has been grouted in place provides energy dissipation and protects the outer edge of the hardened roadbed. Fords should not be used if high wet season flows would cut off access to inspect and maintain drainage structures further out the road. Unvented, hardened fords may also obstruct fish passage*

FIGURE 125. *In addition to the actual ford crossing, the road approaches also contribute to sediment pollution unless they are paved or heavily rock surfaced. Fords are always low points in the road, so runoff from the connected approaches is delivered directly to the stream channel.*

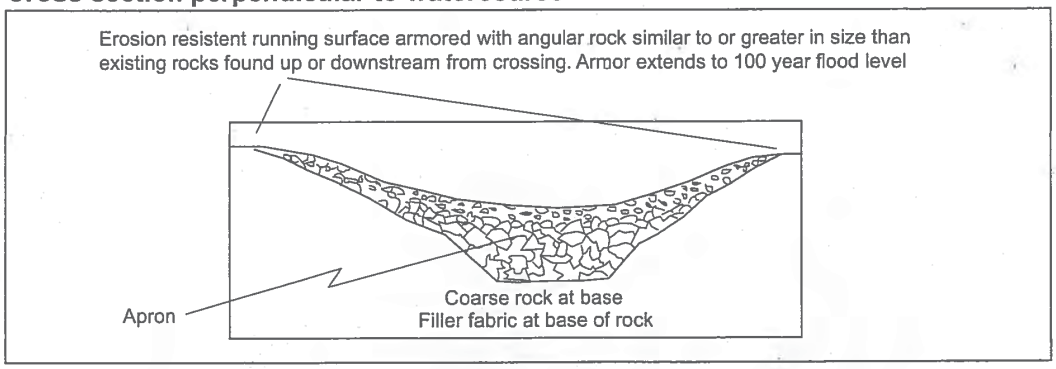
Typical Armored Fill Crossing Installation



Cross section parallel to watercourse



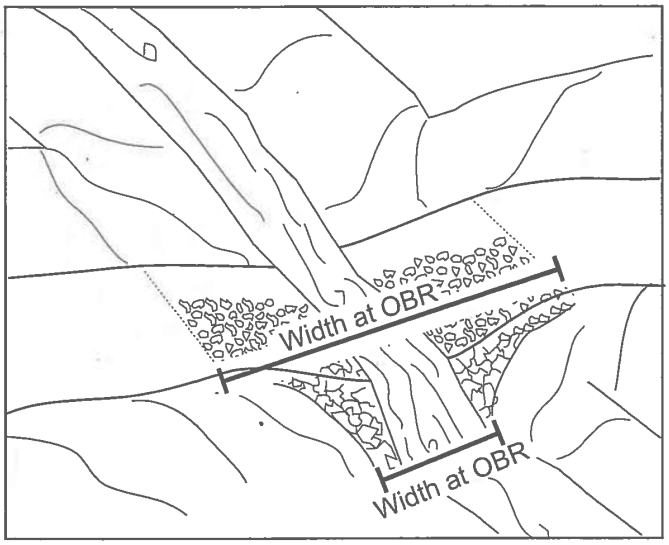
Cross section perpendicular to watercourse



Pacific Watershed Associates Inc.
Geologic and Geomorphic Studies • Watershed Restoration • Wildland Hydrology • Erosion Control • Environmental Services
PO Box 4433, Arcata, CA 95518 / Ph: 707-839-5130 / FAX: 707-839-8168 / www.pacificwatershed.com

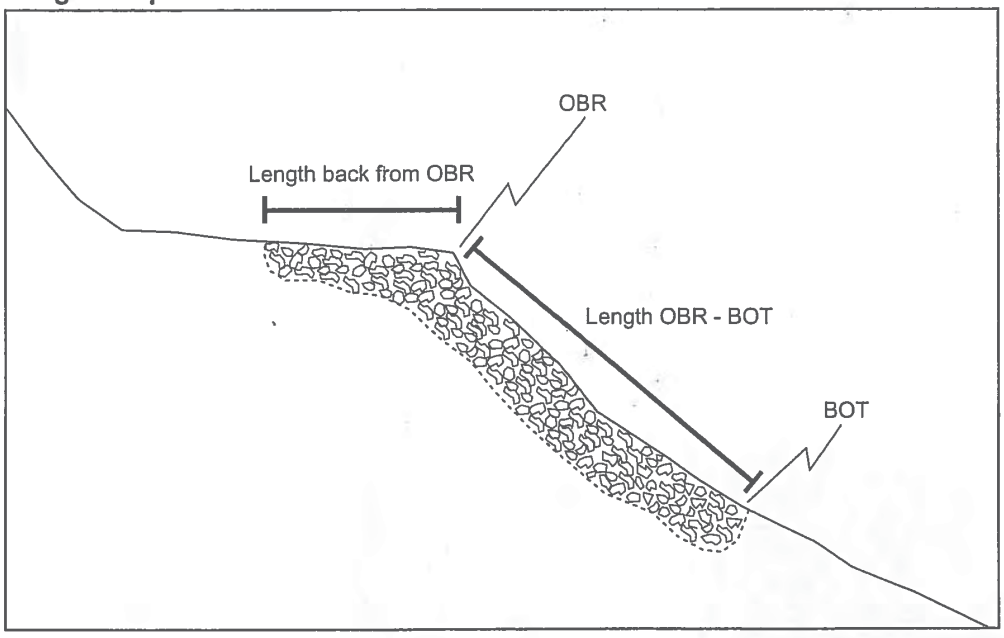
Typical Dimensions Refered to for Armored Fill Crossings

Widths in oblique view



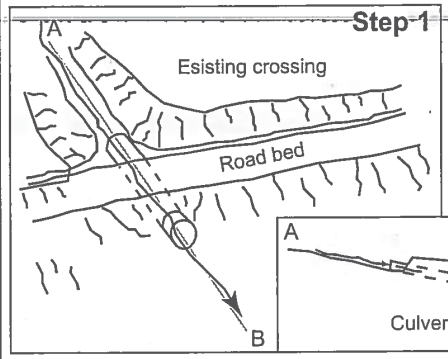
OBR - Outboard edge of road

Lengths in profile view



Pacific Watershed Associates Inc.
Geologic and Geomorphic Studies • Watershed Restoration • Wildland Hydrology • Erosion Control • Environmental Services
PO Box 4433, Arcata, CA 95518 / Ph: 707-839-5130 / FAX: 707-839-8168 / www.pacificwatershed.com

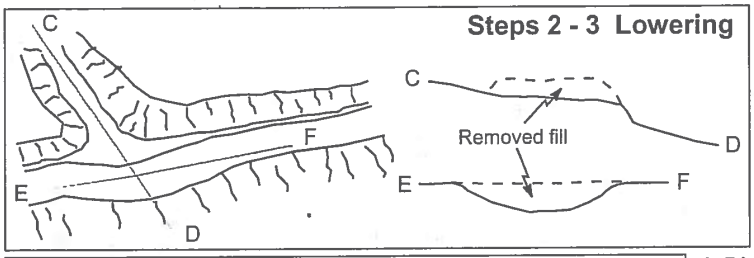
Ten Steps for Constructing a Typical Armored Fill Stream Crossing



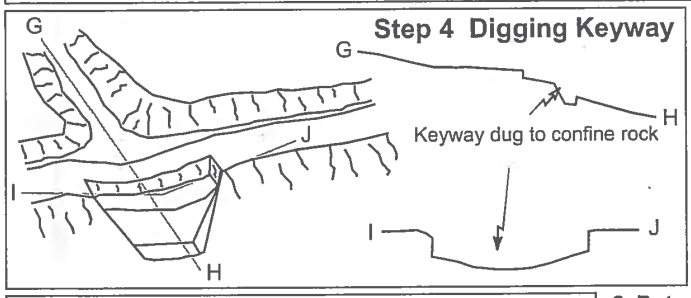
1. The two most important points are:

A) **The rock must be placed in a "U" shape across the channel to confine flow within the armored area.** (Flow around the rock armor will gully the remaining fill. Proper shape of surrounding road fill and good rock placement will reduce the likelihood of crossing failure).

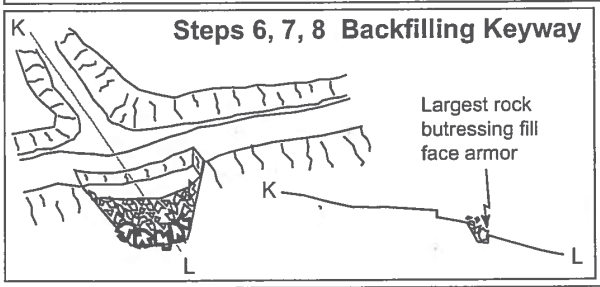
B) **The largest rocks must be used to butress the rest of the armor in two locations:** i) The base of the armored fill where the fill meets natural channel. (This will butress the armor placed on the outboard fill face and reduce the likelihood of it washing downslope). ii) The break in slope from the road tread to the outer fill face. (This will butress the fill placed on the outer road tread and will determine the "base level" of the creek as it crosses the road surface).



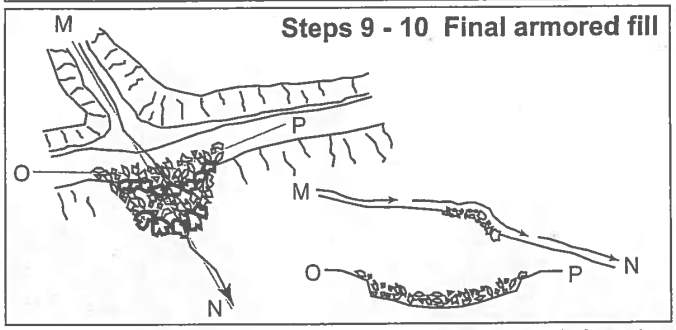
2. **Remove any existing drainage structures** including culverts and Humboldt logs .
3. **Construct a dip** centered at the crossing that is large enough to accomodate the 100-year flow event and prevent diversion (C-D, E-F).



4. **Dig a keyway** (to place rock in) that extends from the outer 1/3 of the road tread down the outboard road fill to the point where outbaord fill meets natural channel (up to 3 feet into the channel bed depending on site specifics) (G-H, I-J).
5. **Install geofabric (optional)** within keyway to support rock in wet ares and to prevent winnowing of the crossing at low flows.



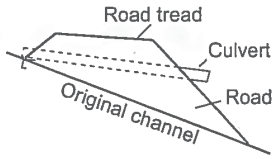
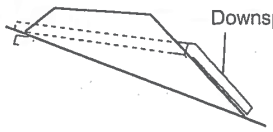
6. **Put aside the largest rock** armoring to create 2 butresses in the next step.
7. **Create a butress using the largest rock** (as described in the site treatments specifications) at the base of fill. (This should have a "U" shape to it and will define the outlet of the armored fill.)
8. **Backfill the fill face** with remaining rock armor making sure the final armored area has "U" shape that will accomodate the largest expected flow (K-L).



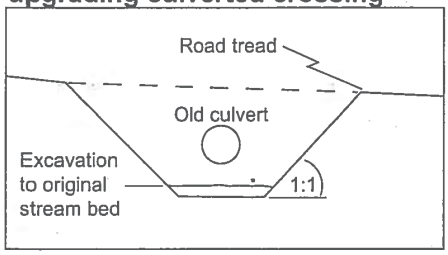
9. **Install a second butress** at the break in slope between the outboard road and the outboard fill face. (This should define the base level of the stream and determine how deep the stream will backfill after construction). (M-N)
10. **Back fill the rest of the keyway** with the unsorted rock armor making sure the final armored area has a "U" shape that will accomodate the largest expected flow (O-P).

Pacific Watershed Associates Inc.
Geologic and Geomorphic Studies • Watershed Restoration • Wildland Hydrology • Erosion Control • Environmental Services
PO Box 4433 Arcata, CA 95518 / Ph: 707-839-5130 / FAX: 707-839-8168 / www.pacificwatershed.com

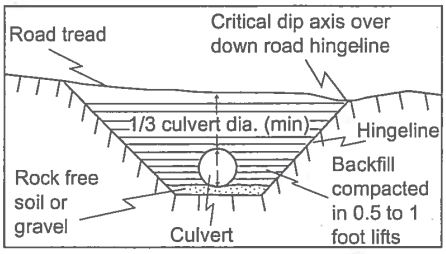
Typical Design of a Non-fish Bearing Culverted Stream Crossing

Existing	Upgraded	Upgraded (preferred)
		
1. Culvert not placed at channel grade. 2. culvert does not extend past base of fill.	1. Culvert not placed at channel grade. 2. Downspout added to extend outlet past road fill.	1. Culvert placed at channel grade. 2. Culvert inlet and outlet rest on, or partially in, the originial stream bed.

Excavation in preparation for upgrading culverted crossing



Upgraded stream crossing culvert installation



Note:
Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100-year flood flow should be determined by both field observation and calulations using a procedure such as the Rational Formula.

Stream crossing culvert Installation

1. Culverts shall be aligned with natural stream channels to ensure proper function, prevent bank erosion and debris plugging problems.
2. Culverts shall be placed at the base of the filland the grade of the original stream bed or downspouted past the base of the fill.
3. Culverts shall be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
5. To allow for saggin after burial, a camber shall be between 1.5 to 3 incher per 10 feet culvert pipe length.
6. Backfill material shall be free of rocks, limbs or other debris that could dent or puncture the pipe or allow water to seep around pipe.
7. One end of the culvert pipe shall be covered then the other end. Once the ends have been secured, the center will be covered.
8. Backfill material shall be tamped and compacted throughout the entire process:
   - Base and side wall material will be compacted before the pipe is placed in its bed.
   - backfill compacting will be done in 0.5 - 1 foot lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
9. Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
10. Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
11. Layers of fill will be pushed over the crossing until the final designed road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Erosion control measures for culvert replacement

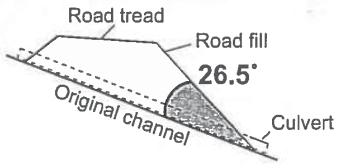
Both mechanical and vegetative measures will be employed to minimize accelerated erosion from stream crossing and ditch relief culvert upgrading. Erosion control measures implemented will be evaluated on a site by site basis. erosion control measures include but are not limited to:

1. Minimizing soil exposure by limiting excavation areas and heavy equipment distrubance.
2. Installing filter windrows of slash at the base of the road fill to minimize the movement of eroded soil to downslope areas and stream channels.
3. Retaining rooted trees and shrubs at the base of the fill as "anchor" for the fill and filter windrows.
4. Bare slopes created by construction operations will be protected until vegetation can stabilize the surface. Surface erosion on exposed cuts and fills will be minimized by mulching, seeding, planting, compacting, armoring, and/or benching prior to the first rains.
5. Extra or unuasable soil will be stored in long term spoils disposal locations that are not limited by factors such as excessive moisture, steep slopes greater than 10%, archeology potential, or proximity to a watercourse.
6. On running streams, water will be pumped or diverted past the crossing and iniot the downstream channel during the construction process.
7. Straw bales and/or silt fencing will be employed where necessary to control runoff within the construction zone.

Pacific Watershed Associates Inc.
Geologic and Geomorphic Studies • Watershed Restoration • Wildland Hydrology • Erosion Control • Environmental Services
PO Box 4433, Arcata, CA 95518 / Ph: 707-839-5130 / FAX: 707-839-8168 / www.pacificwatershed.com

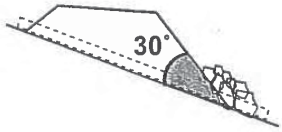
Typical Design of Stream Crossing Fill Armor

Fill angles ≤26.5˚ (2:1)



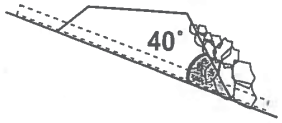
No rock armor needed

Fill angles 26.5˚ - 35˚ (1.5:1)



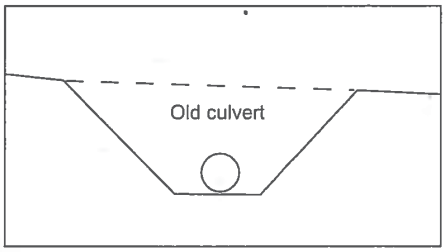
Armor 1/4 up fill face

Fill angles 35˚ - 45˚ (1:1)

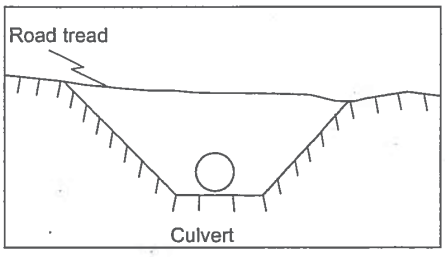


Armor 3/4 way up fill face

Fill angles 26.5˚ - 35˚ (1.5:1)



Fill angles 35˚ - 45˚ (1:1)



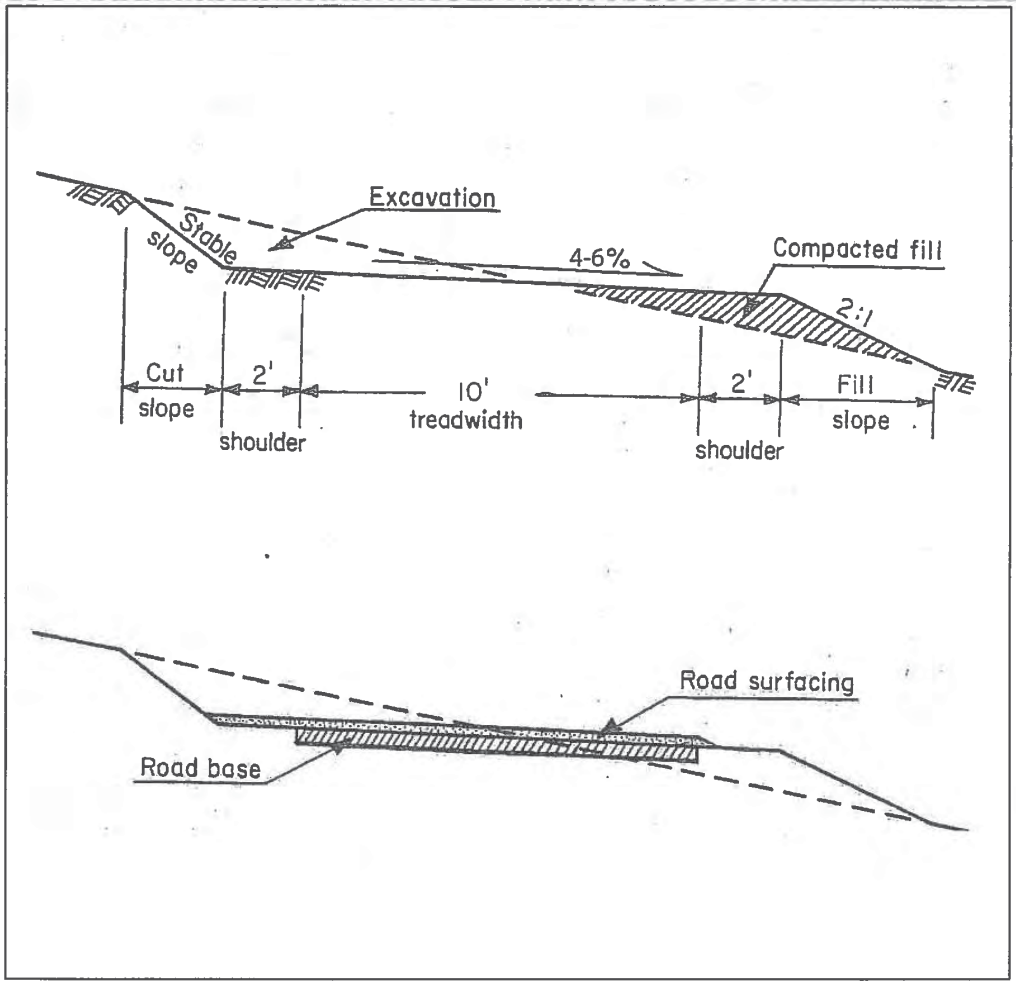
Note:
Road upgrading tasks typically include upgrading stream crossings by installing larger culverts and inlet protection (trash barriers) to prevent plugging. Culvert sizing for the 100-year flood flow should be determined by both field observation and calulations using a procedure such as the Rational Formula.

Stream crossing culvert Installation

1. Culverts shall be aligned with natural stream channels to ensure proper function, prevent bank erosion and debris plugging problems.
2. Culverts shall be placed at the base of the filland the grade of the original stream bed or downspouted past the base of the fill.
3. Culverts shall be set slightly below the original stream grade so that the water drops several inches as it enters the pipe.
5. To allow for saggin after burial, a camber shall be between 1.5 to 3 incher per 10 feet culvert pipe length.
6. Backfill material shall be free of rocks, limbs or other debris that could dent or puncture the pipe or allow water to seep around pipe.
7. One end of the culvert pipe shall be covered then the other end. Once the ends have been secured, the center will be covered.
8. Backfill material shall be tamped and compacted throughout the entire process:
   - Base and side wall material will be compacted before the pipe is placed in its bed.
   - backfill compacting will be done in 0.5 - 1 foot lifts until 1/3 of the diameter of the culvert has been covered. A gas powered tamper can be used for this work.
9. Inlets and outlets shall be armored with rock or mulched and seeded with grass as needed.
10. Trash protectors shall be installed just upstream from the culvert where there is a hazard of floating debris plugging the culvert.
11. Layers of fill will be pushed over the crossing until the final designed road grade is achieved, at a minimum of 1/3 to 1/2 the culvert diameter.

Pacific Watershed Associates Inc.
Geologic and Geomorphic Studies • Watershed Restoration • Wildland Hydrology • Erosion Control • Environmental Services
PO Box 4433, Arcata, CA 95518 / Ph: 707-839-5130 / FAX: 707-839-8168 / www.pacificwatershed.com

Typical Design for Outsloped Road



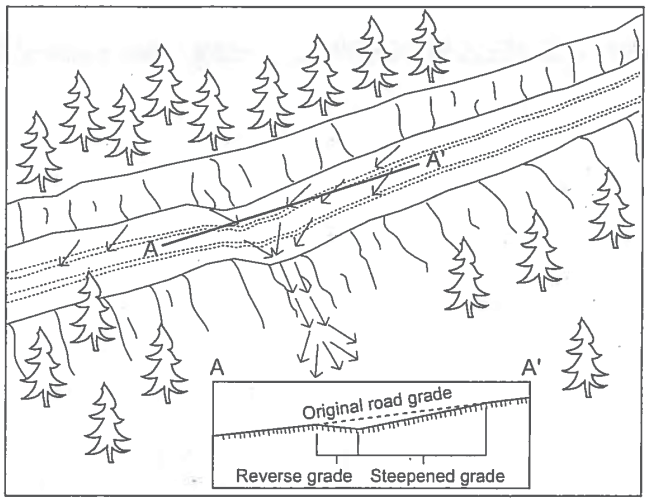
Outsloped Road Notes:

1. Road tread will have at least a 4% outslope, steepening to 6% outlsope along outside shoulder to promote drainage.
2. Edge berms from grading will be completely removed – OR – install compacted edge berm with drainage outlets every 150'.
3. All road surface and fills will be compacted to 95% of ASTM D-698 before final grading.
4. Road base and surface to be designed for road use and site conditions.
5. Cut and fill slopes will be vegetated.
6. For two-lane road, add 6'of treadwidth.
7. For turnout, add 10' to treadwidth.

Napa County Resource Conservation District
www.naparcd.org / 1303 Jefferson St, Suite 500B, Napa Ca, 94559 / (707)252-4188

Typical Drawing # 9b

Typical Road Surface Drainage by Rolling Dips



Rolling dip installation:

1. Rolling dips will be installed in the road bed as needed to drain the road surface.
2. Rolling dips will be sloped either into the ditch or to the outside of the road edge as required to properly drain the road.
3. Rolling dips are usually built at 30 to 45 degree angles to the road alignment with cross road grade of at least 1% greater than the grade of the road.
4. Excavation for the dips will be done with a medium size buldozer or similar equipment.
5. Excavation of the dips will begin 50 to 100 feet up road from where the axis of the dip is planned as per guidelines established in the rolling dip dimensions table.
6. Material will be progressively excavated from the road bed, steepening the grade unitl the axis is reached.
7. The depth of the dip will be determined by the grade of the road (see table below).
8. On the down road side of the rolling dip axis, a grade change will be installed to prevent the runoff from continuing down the road (see figure above).
9. The rise in the reverse grade will be carried for about 10 to 20 feet then it will fall to the original slope.
10. The transition from axis to bottom, through rising grade to falling grade will be in a road distance of at least 15 to 30 feet.

Table of rolling dip dimensions by road grade

Road grade %	Upslope approach distance (from up road start to trough) ft	Reverse grade distance (from trough to crest) ft	Depth at trough outlet (below average road grade) ft	Depth at trough inlet (below average road grade) ft
<6	55	15 - 20	0.9	0.3
8	65	15 - 20	1.0	0.2
10	75	15 - 20	1.1	0.01
12	85	20 - 25	1.2	0.01
>12	100	20 - 25	1.3	0.01

Pacific Watershed Associates Inc.
Geologic and Geomorphic Studies • Watershed Restoration • Wildland Hydrology • Erosion Control • Environmental Services
PO Box 4433, Arcata, CA 95518 / Ph: 707-839-5130 / FAX: 707-839-8168 / www.pacificwatershed.com

Exhibit C-6

Exhibit C-6

Best Management Practices for Agricultural Erosion and Sediment Control

SONOMA COUNTY AGRICULTURAL COMMISSIONER'S OFFICE

INTRODUCTION

On December 9, 2008, the Sonoma County Board of Supervisors adopted Ordinance No. 5819, amending the Sonoma County Code and the previously adopted 2007 California Building Code with respect to the regulation of grading, drainage, and vineyard and orchard site development. One of the requirements of this ordinance is compliance with best management practice guidelines. The minimum requirements discussed in this handbook are specific to agricultural practices in Sonoma County for Sonoma County soul types and weather conditions.

The purpose of the Sonoma County Best Management Practices handbook is to provide the minimum requirements to control water quality impacts from accelerated erosion due to agricultural activities in Sonoma County. The intent of this handbook is to show what basic practices are effective in reducing erosion and sedimentation and to show how to install these practices.

It is not the intent of this handbook to provide design criteria for engineered structures. Steeper slopes and projects with grading and drainage components may need structures designed by a licensed engineer.

The process of soil erosion by water involves the detachment of particles from the soil mass, the transportation of the particles by runoff, and the eventual deposition of particles in the form of sediment. Most of the energy responsible for erosion is provided by the impact force of falling raindrops or by the force of surface storm water runoff. Disturbance of soil from farming practices can add to the problem by loosening and pulverizing soil particles, thereby making them more easily moved by rainfall and runoff and by removing the vegetative cover that protects and holds together soil and slows runoff velocity thereby decreasing its capability of transporting soil particles downslope.

Raindrops strike the ground with a velocity of approximately 20 mph. The force of the raindrops breaks apart soil particles, and surface runoff transports the particles downslope. If the soil is not protected from the force of raindrops it will be lost from the agricultural operation and eventually it will be deposited as silt in a creek or waterway where it can have water quality impacts and harm fish habitat.

Drainage features such as pipe with inlets, water bars, swales, and perforated pipe can discharge sufficient water to create a gully, sediment plume, or both, that can extend to a stream channel. These structures are very effective in some situations, provided they have a sediment collection component.

Technical support was provided by Munselle Civil Engineering and Enterra Associates.
Front cover photographs are (clockwise starting from upper left): Rock lined channel designed by Atterbury & Associates, Inc., olive orchard at Kunde Winery, sediment basin designed by Atterbury & Associates, Inc., and erosion control featuring cover crop, straw mulch, and straw wattles designed by Edwards Engineering.

CHAPTER TWO-Roads

Fine sediments eroding from roads are a major source of sediment to streams in Sonoma County and throughout Northern California. Whether it is surface runoff or concentrated storm runoff, sediment and other pollutants are reaching streams and harming our natural resources.

Good planning, proper location and the use of progressive construction practices result in low maintenance, low impact roads.

Removing existing access roads from within the riparian zone will reduce fine sediment inputs, greatly improving spawning and rearing habitats for salmonids and eliminate the influence of the road on the stream system.

Environmental Concerns

Fine sediment delivered from roads to streams reduces the flow of oxygenated water to embryos, limits invertebrate prey, fills in pools used for rearing, and cements spawning gravels, reducing the area available for adult salmonids to successfully spawn.

If roads are built too close to a stream, the result is often that streams are armored and straightened to protect the adjacent road. Simplified channels provide less cover and rearing habitat for salmonids. Furthermore, roads interrupt the functions of riparian zones in providing bank stability, filtering sediment and pollutants, and providing shade, large woody debris, and invertebrates to streams. Improperly sized or designed culverts are a common barrier to fish passage in Northern California stream systems.

Site Evaluation

Use a map or aerial photo to view the location of the road system, including abandoned and unused roads and identify all potential sources of sediment to the stream. Identify stream crossings and the type and size of culverts. Examine the downstream side of stream crossings to see if there is erosion from concentrating flows or by directing flows into the streambank.

Best Management Practices for Agricultural Roads

2.1. Decommission or relocate existing roads away from the riparian zone whenever possible.

2.2. Weatherproof or harden daily traffic roads. Pave or chip seal before the rainy season to allow toxic compounds in the oils to solidify, degrade or volatilize from the road surface and not be delivered to waterways.

2.3. Establish a thick cover crop on temporary or seasonal ranch roads by October 15. Depending on traffic, this may require active seeding annually.

2.4. Use straw mulch during the rainy season in places where cover crops are sparse. Monitor and augment straw treatments as necessary.

2.5. Blade existing roads in dry weather when possible, but while moisture is still present in soil and aggregate to minimize dust and maximize compaction to prevent road fines from being discharged from the road surface.

2.6. Do not sidecast the bladed material to areas where the material can enter the stream directly or indirectly as sediment. Sidecast material can indirectly enter the stream when placed in a position where rain or road runoff can later deliver it to a channel that connects with the stream.

2.7. Out-slope roads wherever possible to prevent the concentration of flow within the ditch, to promote even draining of the road surface and to minimize disruption of the natural sheet flow pattern off the hill slope to the stream.

2.8. If unable to eliminate in-board ditches, crowning the road can remove half the road surface drainage from the ditch.

2.9. Use water bars and rolling dips to break-up slope length, diverting water to well-vegetated areas.

2.10. Maintain in-board ditches and line them, if needed, with geotextile fabric or rock.

2.11. Remove stream crossings wherever possible.

2.12. Replace culverts, fords, or Humboldt crossings with single span bridges where possible

2.13. Ensure that all stream crossings meet National Marine Fisheries Service and California Department of Fish & Game guidelines for fish passage.

2.14. Design culverts to pass 100-year flow.

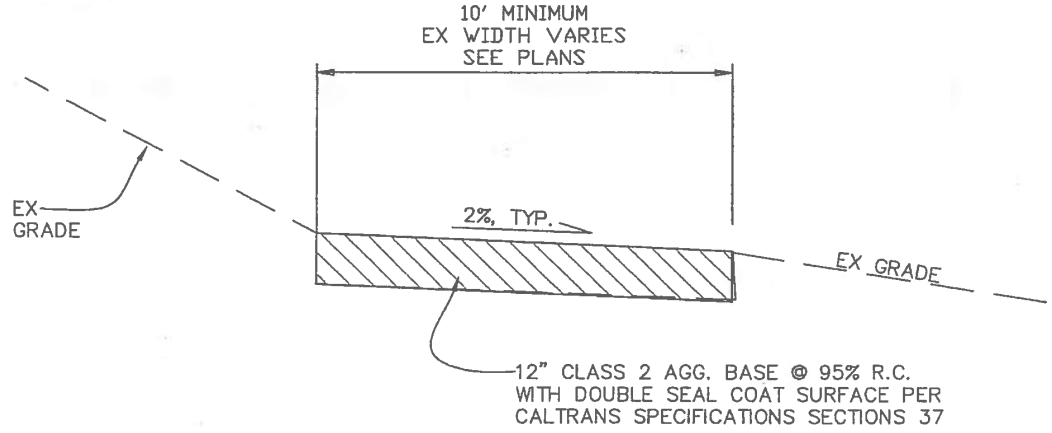
2.15. Check culverts periodically during the rainy season to ensure that they are not plugged with debris.

2.16. Minimize erosion downstream of culverts by using energy dissipaters.

2.17. Monitor energy dissipaters to make sure that they do not wash away or shift.

2.18. Maintain culverts at the level and gradient of the stream bed. In non-fish bearing streams, with "shotgun" culverts, use pipe extenders (e.g., elephant trunks) to bring the discharge down to the level and gradient of the stream.

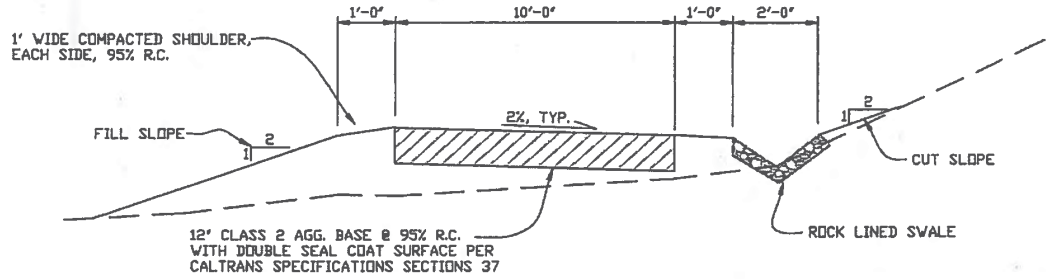
Figure 2.1 Example Outsloped Road



OUTSLOPED ROAD SECTION

N.T.S.

Figure 2.1 Example Insloped Road



NOTES:

1. REMOVE ALL WEAK SOILS AS DETERMINED BY THE GEOTECHNICAL ENGINEER IN THE FIELD DURING CONSTRUCTION.
2. THE SURFACE EXPOSED BY REMOVAL OF WEAK SOILS SHALL BE SCARIFIED TO A DEPTH OF 8", UNIFORMLY MOISTURE-CONDITIONED TO WITHIN 2% OPTIMUM MOISTURE CONTENT, AND COMPACTED TO AT LEAST 95% R.C.
3. FOR FILL SECTIONS APPROVED, SELECT FILL SHALL THEN BE SPREAD IN LOOSE, 8-INCH THICK LIFTS, UNIFORMLY MOISTURE CONDITIONED TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT, AND COMPACTED TO AT LEAST 90% R.C.
4. ALL EXPOSED SOIL SHALL BE PROTECTED FROM EROSION PER EROSION CONTROL NOTES

INSLOPED ROAD SECTION TYP.

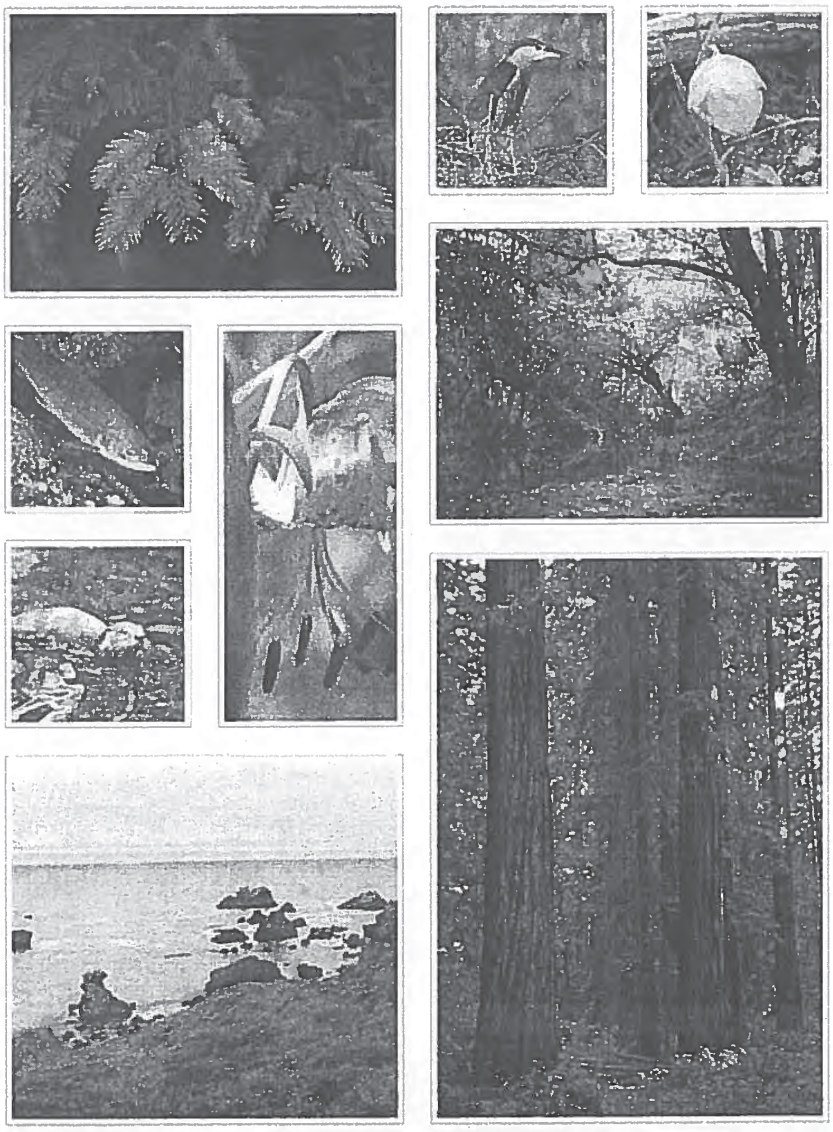
NO SCALE

6

EXHIBIT E1

Exhibit E-1

Biodiversity Action Plan for Sonoma County



This document summarizes the input of a group of local science experts regarding priority actions related to the conservation of Sonoma County biodiversity

ACKNOWLEDGEMENTS

Community Foundation Sonoma County:
Robert Judd, Vice President for Programs

Steering Committee Members:
Kathleen Brennan-Hunter, Conservation Program Manager, Sonoma County Agricultural Preservation and Open Space District
Caroline Christian, PhD, Ecologist, Sonoma State University
Caitlin Cornwall, Ecologist, Sonoma Ecology Center
Brock Dolman, Ecologist, Occidental Arts and Ecology Center
Robert Judd, Vice-President for Programs, Community Foundation Sonoma County
Karen Gaffney, Ecologist, West Coast Watershed
Daniel Gluesenkamp, PhD, Ecologist, Audubon Canyon Ranch
Liza Prunuske, Planner, Prunuske-Chatham Inc.
Christina Sloop, PhD, Ecologist, Laguna de Santa Rosa Foundation

West Coast Watershed:
Karen Gaffney, Ecologist
Katherine Gledhill, Conservation Planner
Kate Reza, Ecologist

Sonoma Ecology Center:
Caitlin Cornwall, Ecologist

Woods Biological:
Denise Woods, Biologist

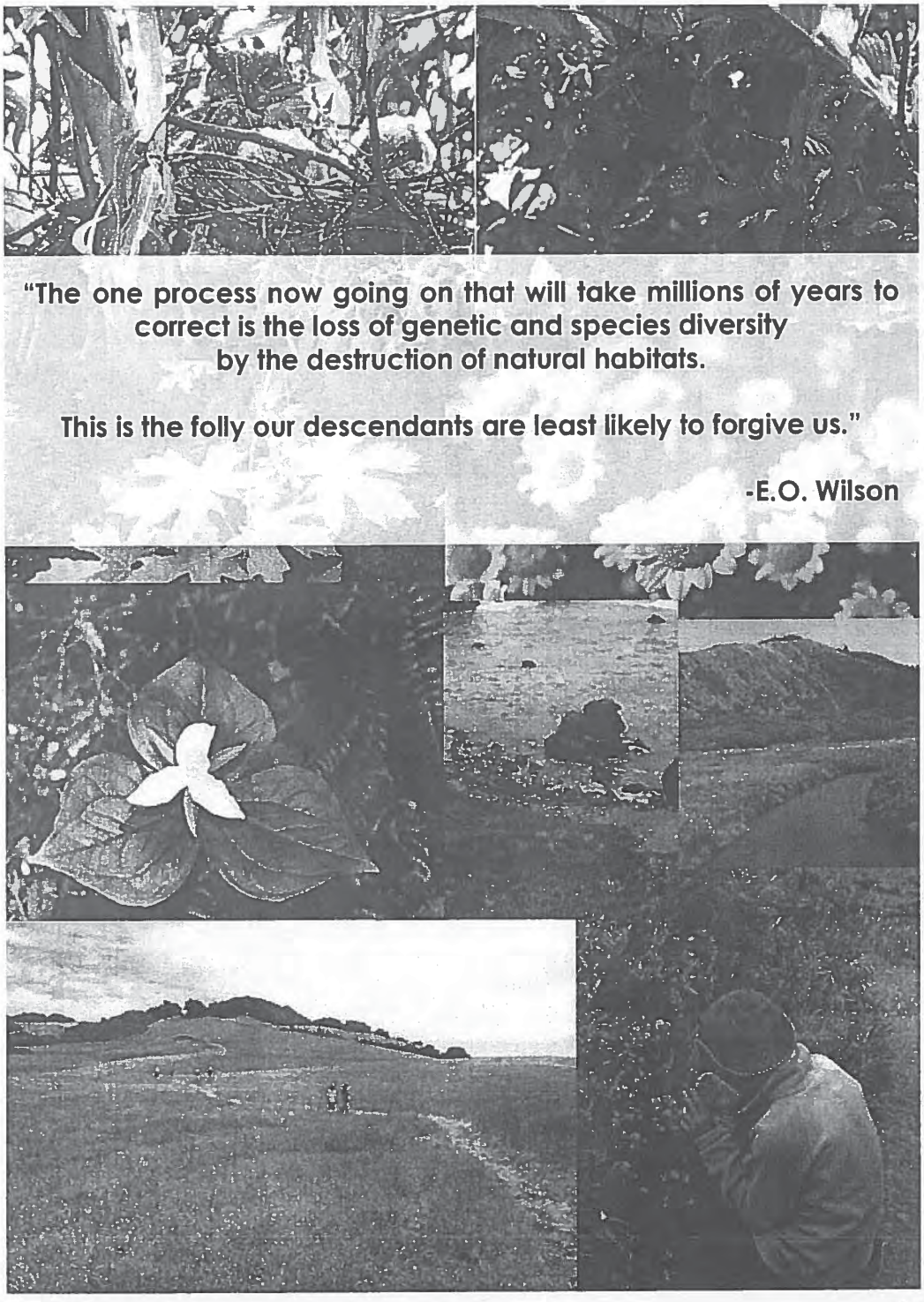
Participating Experts:

Steve Barnhart	Deanne DiPietro	Chris Kjeldsen, PhD
Peter Baye, PhD	Wendy Elliot	Adina Merenlender, PhD
Allistair Bleifuss	Sheri Emerson	Nathan Rank, PhD
Caroline Christian, PhD	Karen Gaffney	Christina Sloop
Dave Cook	Emily Heaton	David Stokes
Gene Cooley	Andrew Jensen	Kasey Wade
Catilin Cornwall	Curtis Kendall	Richard Walker, PhD

COMMUNITY FOUNDATION SONOMA COUNTY

Copies of this document are available by calling Robert Judd at (707) 579-4073 x15 or visiting www.sonomacf.org

CONTENTS


"The one process now going on that will take millions of years to correct is the loss of genetic and species diversity by the destruction of natural habitats.
This is the folly our descendants are least likely to forgive us."
-E.O. Wilson

iv

I: INTRODUCTION

1.1. Significance of Sonoma County Biodiversity

Sonoma County is one of the most biologically diverse places in the United States, home to numerous unspoiled habitats and a treasury of both familiar and rare plant and animal species. Matched in species richness in the U.S. only by the southern Appalachians[1], the region is host to a number of threatened or endangered species. Twenty Sonoma County species are found nowhere else on Earth.

"*Biodiversity*", an expression of the variety of living things in a given area, is often used as a measure of ecosystem health; greater numbers of species reflect higher levels of ecosystem and human well-being. Sonoma County's globally significant biodiversity is something to cherish and protect. Conservation, stewardship and restoration of the natural ecosystems that support biological diversity (and hence, the viability of human communities) are direct measures to safeguard this legacy for future generations.

The people in Sonoma County depend on intact, functioning ecosystems for many things. Chief among these resources is plentiful, clean drinking water (imagine life without this privilege.). We also expect protection from seasonal flooding, pollination of our gardens, the annual return of salmon, surrounding beauty, and almost unlimited access to local water sources for irrigation of vineyards and other agriculture. In addition to fundamentally sustaining people and wildlife, natural landscapes also satisfy our innate need to be immersed in the outdoors. An appealing variety of easily accessible natural areas and the remarkable living things these support are inextricably linked to what people value about living in Sonoma County.

> ***"People think that biodiversity lives in a tropical rainforest; they need to know deeply that biodiversity richness is very high here, possibly more so than a tropical rainforest if you look at whole county."***
>
> ***–Chris Kjeldsen***

1.2. Historic and Current Conditions

Sonoma County's biodiversity is decreasing every day, yet conservation practitioners are hindered by a lack of comprehensive understanding of historical ecology, including how ecosystem dynamics have been altered within the last century (C Sloop, pers. comm.). Certain changes from historic conditions are undeniable, if not always quantifiable.

Significant impacts on Sonoma County's natural systems include:

- The construction of Warm Springs Dam - the 1983 project which created Lake Sonoma and obliterated the town of Skaggs Springs[2] and important indigenous cultural sites
- The large-scale logging of redwood and other primary forests
- The radical modification of streams and wetlands

1 Center for Biological Diversity, www.biologicaldiversity.org
2 Best et al. 1996

- The introduction to pristine habitats of hundreds of non-native plant and animal species
- The reduction of salmonid populations (Although the historic population size of salmonid populations remains largely unknown[3], current numbers of these sensitive species represent a fraction of their former glory. The Russian River was once home to one of the largest steelhead trout populations in the world). Exhibit one: the Pacific Fisheries Management Council voted in April of 2008 to completely close salmon fisheries off the California coast, an unprecedented move in direct response to the populations' recent decline.

THE BIODIVERSITY CONTEXT

Total area of Sonoma County: 4,152 km² (1,603 mi²; 1,025,982 acres)
Percent area of California: 1.01%
Area of land: 4,082 km² (1,576 mi²; 1,008,684 acres)
Area of water: 498 km² (192 mi²; 123,058 acres)
Ecoregions: California North Coast (58 %), California Central Coast (42 %)
Mountain Ranges: Mayacamas Mountains, Mount Hood Range, Outer Coast Range, and Sonoma Mountains
Highest Elevation: 1,370 meters (4,495 ft) on Cobb Mountain, in the Mayacamas Mnts.
Length of rivers and stream: 5,354 km (3,327 miles)
Number of native plant species: 2,210
Number of threatened species: 6 (all animals)
Number of endangered species: 27 (22 plants, 5 animals)
Number of species unique to Sonoma County (endemic species): 20
Area of land in protected status: At least 384 km² (148 mi²; 95,000 acres in 301+ protected areas)

THE HUMAN FOOTPRINT

Estimated population size: 464,435 (2007)
Projected population size: 603,000 by 2020
Population growth rate: 14% increase from 1996-2005
Number of households: 183,518 (2005)
Area of vineyards in cultivated: 243 km² (94 mi²; 60,047 acres)
Number of recipients of drinking water drawn from the Russian River Watershed: 540,000 in tri-county area (Sonoma, Mendocino, and northern Marin)
Amount of water consumed: Unquantified at present
Number of invasive plant species: At least 195 (approximately 8 percent of County flora)

1.3. Need for a Biodiversity Action Plan for Sonoma County

The precious resource of Sonoma County's biodiversity and the importance of protecting its fragility is often overlooked by the poeple who live here. Many of us take our open spaces, wildlife and plant populations for granted. But recent human activities are rapidly altering the environment, placing its unique biodiversity at great risk. We have an opportunity, and a stewardship responsibility, to conserve and enhance local native habitats to ensure that the biological diversity of Sonoma County is sustained for future generations.

3 Chase et al. 2007

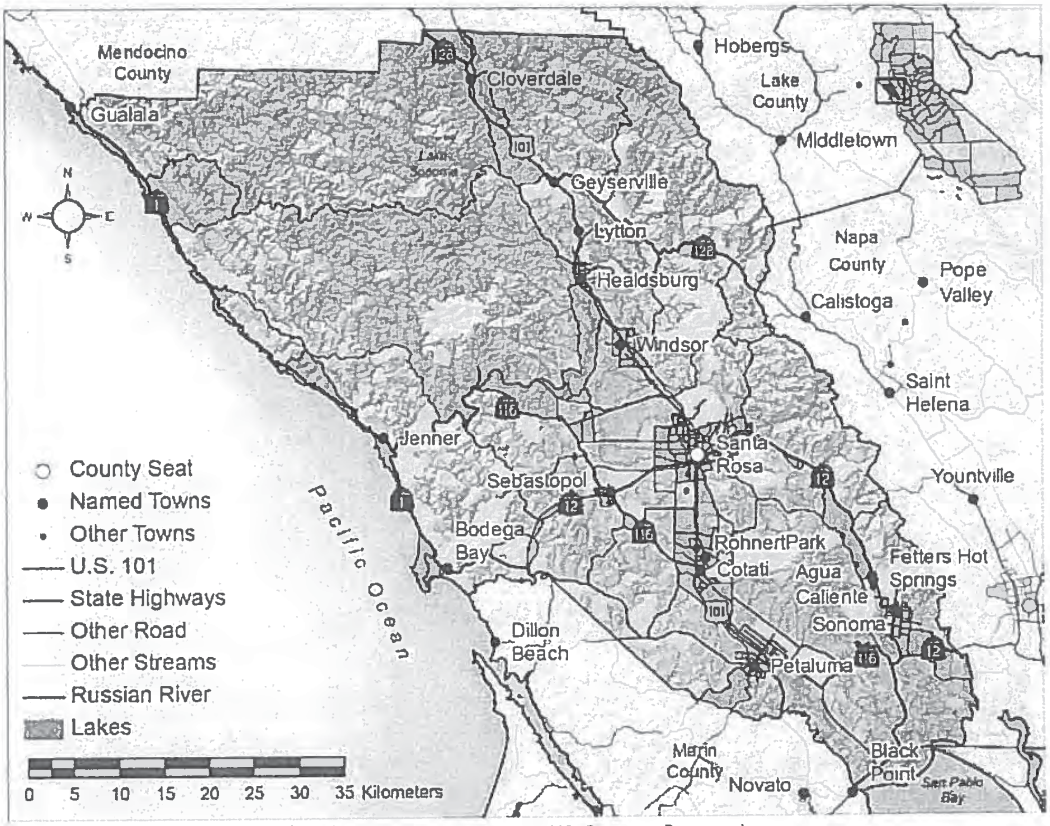


Figure 1: Sonoma County Map (Sources: USGS, US Census Bureau)

Numerous government agencies, academic institutions, community groups, community benefit organizations, and individuals are engaged in preserving the region's endangered habitats and protecting its treasured species. However, there is no comprehensive, widely-endorsed plan to guide these activities. Prioritization of human and financial resources is critical, as is countywide coordination; the absence of this has contributed to reductions in local biological diversity via missed opportunities for collaboration and consensus-building which has resulted in less-than effective conservation action.

1.4. Purpose of Current Planning Process

Experts involved in this planning process agree: Sonoma County is in need of an ongoing, steadily funded, data-rich, science-driven program that:

- Sets precise, measurable goals for species and habitat recovery,
- Tracks species viability, threat occurrences, and other real-world conditions, and
- Prioritize the substantial number of conservation actions needed to sustain local biodiversity and ecosystem function

Recognizing this need, Community Foundation Sonoma County (Foundation) has engaged in a long-term process to develop a widely-endorsed Biodiversity Action Plan

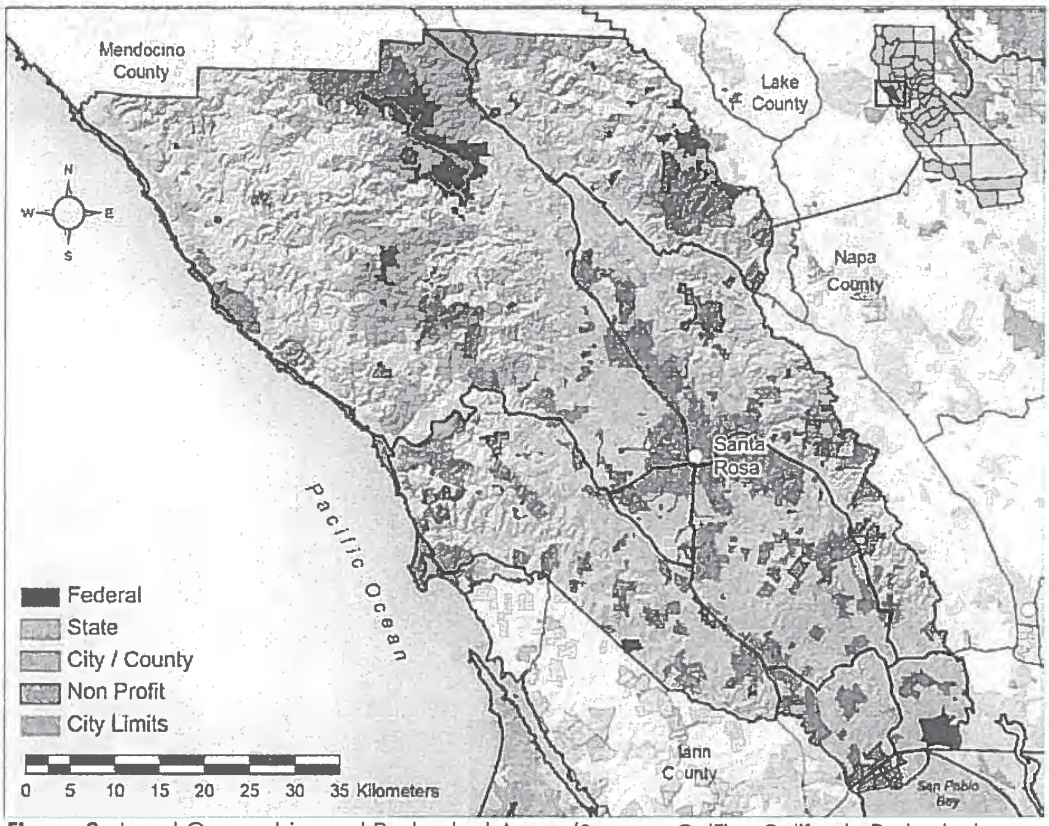


Figure 2: Land Ownership and Protected Areas (Sources: CalFire, California Protected Areas Database)

for Sonoma County that will ultimately incorporate regularly-updated scientific data and expert input to strategically identify, protect, and enhance the rich biological diversity of local natural communities.

This report represents the first phase of the multi-year planning and protection process and includes:

- Summary information about Sonoma County's biological diversity
- Top threats to local habitats
- Results from surveys and interviews conducted with local science experts
- A working draft of recommended priority management and restoration actions
- An Appendix with lists of animals and plants of conservation interest and common invasive species
- A list of participating experts
- A sample questionnaire

4

II: PLANNING METHODOLOGY

A diverse group of twenty regional science and policy experts were polled to provide information about which Sonoma County species and habitats are most in need of protection, enhancement or restoration, as well as what conservation actions would best preserve local ecological integrity. Experts' recommendations were compiled via on-line and in-person surveys (see Appendix). Their recommended highest priority conservation actions, those requiring immediate attention, are summarized in this document in Section VI and their direct quotes inform this document throughout.

Next, the Foundation will use this report as the basis for a full day workshop that will be held in 2009. The workshop will involve dozens of local and regional experts on Sonoma County's biological diversity and resource use policy and is expected to produce a well-vetted, clearly-ranked version of the draft list that appears herein (Section IV). Once this workshop is complete, the next phase of the planning process, the biodiversity assessment, will proceed (see Section 6.1.). The biodiversity assessment will embody the experts' recommended larger vision of a complete inventory and spatial database tracking the viability of Sonoma County biodiversity. (see Section 6.5)

III: SUMMARY OF UNIQUE AND RARE HABITATS AND POPULATIONS

Sonoma County is home to over a hundred plant and animal species, subspecies, and varieties that are classified as conservation priorities (Table 1). Although limited quantitative data are available, it is well known that conspicuous species that once occurred here are now extirpated (e.g. tulle elk, pronghorn antelope, badger, and porcupine) and that many other Sonoma County species (tiger salamander, salmon, and the Pitkin Marsh lily, among too many others) are now being pushed toward the same fate. Table 3 (Appendix) lists the county's endangered and threatened species and their essential habitat types; each requires special attention if it is to persist into the future. Sonoma County's varied and sometimes isolated habitats foster high levels of endemism: Twenty plant or animal species living here evolved in the county and are found nowhere else on Earth (Table 4, Appendix).

Many species and habitats that are neither threatened/endangered nor exclusive to Sonoma County nevertheless warrant priority conservation attention (see Table 5, Appendix). Several experts stressed that even "common" species and habitats, like deer and oak woodland, are integral contributors to local ecological integrity, largely because of their dominance in the landscape. Other unofficial candidates for conservation concern are Sonoma County's wide-ranging species like mountain lion, bobcat, Pacific flyway birds and habitat cohorts such as grassland and riparian-specialist birds. Planners should also be aware of the importance of ecosystem architects and process drivers like beavers, conifers, and willows (C Kjeldsen, pers. comm.), which may also merit special attention.

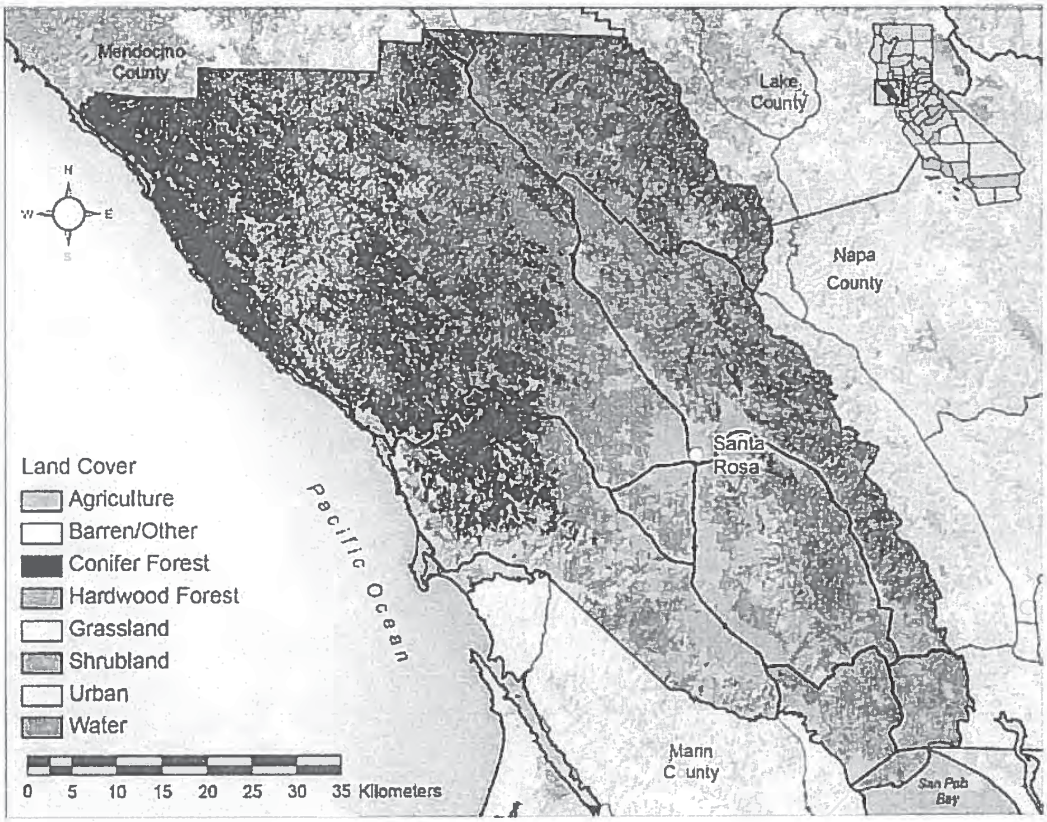


Figure 3: Landcover (Source: CalFire)

Table 1: Summary* of Sonoma County Species of Conservation Interest

	Number of Taxa (species, subspecies, varieties)			
Taxon	Endangered	Threatened	Endemic	Other**
Invertebrates	3			10
Fishes	2	2		
Amphibians		2		1
Reptiles	1	2		2
Birds	1	2		17
Mammals	1		2	1
Plants	22		18	151

* See Appendix for full listing.

** "Other" species are either US Fish & Wildlife (USFWS) Species of Special Concern (SSC); are recognized by the International Union for the Conservation of Nature (IUCN) as Globally Critically Imperiled (G1), Globally Imperiled (G2), or Globally Vulnerable to Extinction (G3); or belong to the California Native Plant Society's CNPS Inventory list 1B (rare, threatened, or endangered in CA or elsewhere).

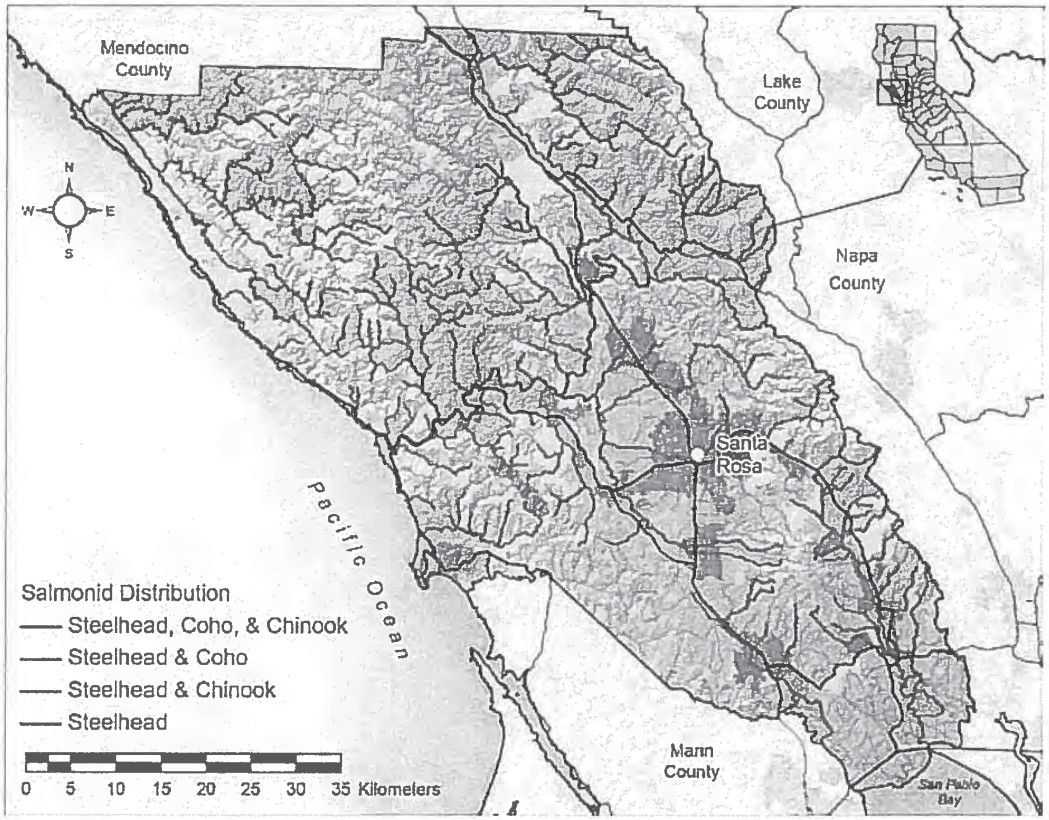


Figure 4: Rivers, Streams, and Salmonids (Source: USGS, CA Dept. Fish & Game, NOAA/ NMFS)

IV. CRITICAL HABITATS AND PROCESSES

It is difficult to overstate the uniqueness of Sonoma County's habitat diversity. It is practically unheard of for such a relatively small area to harbor so many microhabitats and distinct plant and animal communities. Due to its geographic location, varied topography, and adjacency to the coast, Sonoma County comprises a near-complete sampling of northern California natural habitat diversity, from chaparral, grassland, savannah, and forests to beach-dune and near-shore marine environments. Together, these habitats support not only ours but thousands of other species, including untold legions of insects, snails, worms, fungi, soil microbes, and other undervalued native microfauna. These and other nearly-invisible creatures ultimately are responsible for maintaining ecological integrity through recycling of nutrients, providing a base to food webs, and other keystone roles. Landscape-scale phenomena like wildfires, stream flooding, channel and meandering are also natural and essential components of overall ecosystem viability.

7

4.1. Plant Communities

Below are descriptions of a sampling of major plant communities/ associations that comprise Sonoma County. This is an informal classification borrowed, in part, from Manual of California Vegetation[4] and Wildlife Habitat Relationships Database[5]; it is based on the form of plant cover (physiognomy), not species composition. Future iterations of this document are expected to include a habitats listing that is more regionalized to, for example, recognize the important compositional changes taking place in plant communities of the county's floristic sub-regions. For the sake of brevity, some distinct habitats have been lumped (e.g. "salt marsh" compresses the variability inherent in saline and brackish, tidal and backwater systems).[6] A listing of characteristic dominant plants of each habitat is in the Appendix (Table 6).

4.1.1. Riparian Habitats

Terrestrial Riparian Habitats

Terrestrial riparian habitat is the assortment of plant life that occurs adjacent to and is influenced by streams, creeks, and rivers. Riparian habitat occurs throughout Sonoma County, especially in rivers and streams that sustain year-round water flow. Native riparian vegetation is well adapted to the dynamic streamside environment and also can be found along freshwater marshes if water is flowing. Most riparian vegetation is deciduous and, unlike in most other California habitat types, summer is the active growing season in the riparian belt. The Sonoma County General Plan[7] provides specific protective measures for riparian corridors along selected streams within the county. The General Plan 2020 update, unfortunately, will not extend protection to all 3200 miles of streams shown on county USGS topographic maps[8] .

In-Stream Habitats

In-stream habitats (i.e. the channel portion of freshwater streams) in the county may contain water year-round or may be intermittent if surface water in streams dries during the hot summer months. The in-stream environment is extremely variable: conditions change rapidly with precipitation events and when water is drawn down for a variety of human uses, including irrigation, wells and frost protection. In-stream habitat consists of relatively deep pools interspersed between riffle areas. Overhanging banks and treesalong the channel provide shade while root wads, large woody debris, and boulders add vital in-stream complexity.

The Russian River Watershed is the largest drainage in the county, flowing into the Pacific Ocean at Jenner.

4 Sawyer and Keeler-Wolf 1995.
5 CADept of Fish & Game. 1999. Version 7.
6 See CalFlora (www.calflora.org) for excellent, exhaustive information about the county's wild plants. Best et al. 1996 provides a comprehensive overview..
7 Sonoma County 1989
8 Sonoma County 2007a, 2007b

The Russian River watershed, like all watersheds, comprises instream, riparian and upland habitats within the drainage basin. A number of species, including steelhead trout (threatened), chinook salmon (threatened), and coho salmon (endangered) are in severe decline in Sonoma County, primarily from the loss or degradation of the coldwater perennial streams they require for spawning and rearing (D Cook, pers. comm.).

4.1.2. Wetlands

Wetland habitat has a very complex nutrient cycle which provides the base for a highly productive food web. Additionally, wetlands provide habitat for many resident species of aquatic and terrestrial wildlife and are an important refuge for migratory fish and bird species. For example, anadromous salmonids use saltwater estuarine wetlands as a staging area for the morphological changes necessary to successfully make the transition between salt and fresh water and to gather the energy reserves necessary for the next stage of their life cycle. Fresh and saltwater wetlands improve in-stream water quality by filtering pollutants and improve water quantity by providing groundwater recharge. Wetlands also buffer the effects of storms, reducing flood damage and shoreline erosion.

Wetlands of all types are increasingly scarce throughout California due to agricultural, urban and rural development and extractive land uses and have been identified by CDFG as one of many sensitive natural communities which are vulnerable to further loss. They are specifically protected in the Sonoma County General Plan (1989[9]) and also in the draft General Plan 2020[10] .

"Water is the key: If we do right by fish, we can do right by most other things."

–Rich Walker

Freshwater Wetlands

Freshwater wetlands include marshes, vernal pools, seeps springs and riparian corridors comprised of wetland vegetation. They serve as transitional areas between aquatic and terrestrial riparian habitats. Freshwater wetlands provide important habitat for migrating waterfowl, seasonal migrant birds and amphibians (including the California tiger salamander (*Ambystoma californiense*). Sonoma County contains many freshwater wetlands including several well-known freshwater marshes: Pitkin, Perry, and Cunningham Marshes, and the Laguna de Santa Rosa. Historically, Tolay Lake was a large and biologically diverse freshwater wetland complex. Sonoma County Regional Parks is evaluating various opportunities to restore Tolay Lake's historic functions and habitats.

Vernal pools are seasonal freshwater wetlands that occur

9 Sonoma County 1989
10 Sonoma County 2007

9

during the winter rainy season in shallow depressions underlain by hardpan. Water usually persists for a few months after winter rains cease, providing an aquatic resource for many species of wildlife, some of which are uniquely adapted to this ephemeral ecosystem. Waterfowl, frogs, salamanders, dragonflies and other widespread species use vernal pools for feeding, breeding and juvenile development. Other species (highly specialized plants and macroinvertebrates such as fairy shrimp) have evolved in association with these naturally isolated systems and are completely dependent upon them (vernal pool endemics).

Vernal pool obligates have developed life cycles that are adapted to months of extremely harsh dry conditions that are relieved for a few months by standing water. Vernal pools were formerly more widespread in Sonoma County, occurring in the Laguna de Santa Rosa plain, near the county airport, and in the Windsor area. Rapid industrial and residential development has eliminated most of these vernal pools, although several remain in the Todd Road Preserve. Whether the vernal pool systems are doomed to extinction due to climate change is still unclear, but they are an excellent system to measure subtle climate changes and its impact on water inundation (C Sloop, pers comm.).

Salt Marsh

Salt marshes are a transitional habitat between the open waters of bays or oceans and the freshwater or terrestrial habitats and include saline tidal marsh, intermittently tidal brackish marshes, and back-barrier stream mouth lagoons, all with different plant communities and distinct conservation priorities"(P Baye, pers comm.). Salt marshes are important habitat for juvenile fish, migratory waterfowl and are among the most productive of all local ecosystems, producing five-to-ten times as much oxygen, and sequestering five-to-ten times as much carbon, per acre as a wheat field[11]. Typically highly productive, these are nevertheless usually communities of very low species diversity.

In Sonoma County, the Sears Point region in the San Pablo Bay area contains large areas of salt marsh. The Petaluma River is tidal to Petaluma and both the Petaluma River and Sonoma Creek discharge into San Pablo Bay. The area between Petaluma and Lakeville has been severely impacted by industrial development. Smaller salt marshes occur in the Bodega Bay area, near Doran Beach.

4.1.3. Grasslands

Grasslands occur on the coast and in valleys and foothills where the soils are deep with high clay content. This widespread habitat was historically composed of perennial bunchgrasses, native annual grasses and herbs, but today typically contains mostly non-native annual species interspersed with native perennial grasses and herbs. Grasslands of different species compositions occur on different soil types, varying across the county. Many wildlife species utilize grasslands for forage and take shelter in nearby habitats which provide greater cover. Additionally, because of their widespread

11 California Coastal Commission 2007

distribution, grasslands serve as travel corridors for medium and large-bodied mammals. Historically, grasslands were managed by local Native Americans, including the Pomo and Miwok, to attract game animals such as deer and quail and to cultivate wild grass seed, which formed the basis for pinole, a regional food staple.

Land cultivation and the conversion to annual pasture grasses have resulted in the loss of most native grasslands in California. Native grasslands have been identified by CDFG as one of many sensitive natural communities that are rare and vulnerable to further loss. These communities have been identified for protection in the Sonoma County General Plan 1989[12] and in the draft Sonoma County General Plan 2020[13].

4.1.4. Oak Woodland

Oak woodland occurs throughout Sonoma County, occurring mainly on dry warm slopes and canyon floors, often amid mixed evergreen and Douglas-fir forests. Overstory trees may be sparsely spaced or densely packed and understory plants may also be sparse or dense. Throughout California, oak woodlands provide habitat for approximately 2,000 plant, 5,000 insect, 160 bird, and 80 mammal species[14]. Oak's acorns served as a staple food for many of California's original human inhabitants, including the Pomo and Miwok people, and are still relied upon by oak-dependent birds (e.g. acorn woodpeckers) and other wildlife.

The oak woodland in the upper Yulupa Creek and Spring Creek watersheds in Annadel State Park is a relatively undisturbed ecosystem with considerable biodiversity. These forests may have understories of relatively undisturbed prehistoric bunch grass.

4.1.5. Oak Savannah

Sonoma County is well known for its scenic, open oak savannah habitat, which occurs on valley bottoms and gentle slopes. The overstory canopy layer is open and the understory generally consists of grasses and other herbs with occasional sparsely distributed shrubs. Oak savannah provides habitat for many wildlife species. As in oak woodlands, acorns provide an important source of nutrition for wildlife and were extensively used by Native Americans. Fire was historically an important disturbance event that maintained the open aspect of this habitat type by preventing the establishment and growth of tree and shrub seedlings. Established oaks were protected from

12 Sonoma County 1989
13 Sonoma County 2007
14 Meadows 2007

the effects of fire by thick bark. Currently, much of this scenic habitat is maintained through ranching operations; cattle, horses, and other ungulates trample or graze seedlings.

4.1.6. Mixed Evergreen Forest

Mixed evergreen forest is a multi-layered habitat type that occurs throughout the county. It commonly occurs as transition forest between redwood forest and oak woodlands. Soil ranges from dry to moist, with the moist sites dominated by Douglas-fir and the dry sites dominated by evergreen hardwoods. The understory in mixed evergreen forest is usually densely shaded and poorly developed. This habitat type is widely distributed, with accessible sites occurring at Sugarloaf Ridge State Park, Hood Mountain Regional Park, Annadel State Park and Jack London State Park.

4.1.7. Coniferous forests

Redwood Forests

Coast redwood forests occur along a 450 mile coastal zone strip from Monterey County, California to just north of the Oregon-California border. Coast redwood is usually the dominant tree species but at higher elevations, Douglas-fir or other conifers occur as co-dominants. Redwood trees are adapted to fog, flood, and fire. The trees require the cool, moist air supplied by fog around the crown to prevent dehydration and to provide a year-round water source: Fog condenses onto leaves, drips down to the soil, and provides water for the shallow root system. Periodic floods cause siltation, which would suffocate most tree species; however, redwood trees have adventitious root systems that quickly sprout when buried and spread sideways, restoring oxygen to the root system and intertwining with nearby redwood trees, enhancing their stability.

Redwood trees possess very thick bark that can withstand the heat of most fires and they will readily resprout when the crown is killed by fire. Redwood seedlings require light gaps provided by fire, wind throw, or other disturbance events. In the absence of natural disturbance (e.g. fire and flood) preventing their establishment, it is likely that other native trees such as Douglas-fir, California bay, or tanoak will replace coast redwood where it has historically been the dominant species.

Redwood forest has been extensively logged in the county since the mid-1800s. Surviving redwood stands are almost exclusively second- and third-growth forests (i.e. exhibit a generation or two of regrowth following logging), with the exception of some historic trees in Armstrong Redwoods and a few on private property. In Sonoma County, coast redwood forest occurs in coastal canyons north of the Russian River and along Russian River tributaries. In the eastern part of the county, redwood occurs mainly on northern slopes and canyons.

Douglas-Fir and Other Coniferous Forests
Douglas-fir dominates higher elevation moist soils, grading into mixed evergreen forest as the soil becomes drier. It is often found as a mosaic within redwood forests. The understory is usually densely shaded and poorly developed, consisting mainly of woody debris and tree litter. Counter-intuitively, native Douglas-fir acts as an "invasive" in some areas – especially in the absence of natural fire regimes - mimicking many of the negative characteristics (e.g. out-competing local species) usually associated with non-native species.

In Sonoma County, Douglas-fir forest is widespread, with populations occurring in the Russian River drainage, on Rincon Ridge, along Mark West Creek, in Annadel Park, on Sonoma Mountain. Foothill pine is found in association with blue oak in foothills throughout the county and sugar pine can be found near the inner edge of redwood forest in the Gualala basin. Foothill pine is usually found on serpentine soil in Sonoma County. Other cone bearing species in Sonoma County include knobcone pine, Coulter pine, Monterey pine, western hemlock, and Pacific yew.

"People think carbon sequestration happens elsewhere, whereas our forests are excellent at this."

–Tom Robinson

4.1.8. Chaparral

Chaparral habitat contains a mix of evergreen, sclerophyllous (tough-leaved) shrubs that form a single layer canopy with little or no understory. This habitat type is common on the dry, rocky, nutrient poor soils of ridge tops and south facing slopes but is much rarer in coastal areas (e.g. maritime chaparral). As distinct from their fog-drenched cousins, plants that inhabit interior chaparral are adapted to harsh, dry conditions: Leaves are small, sometimes fuzzy, often and protected by layers of wax and fat that retard dehydration.

Interior chaparral represents a fire-climax community, adapted to a fire periodicity of about 10 to 12 years. Seeds often require fire and/ or smoke to germinate and many of the plant species are crown/ resprouters, able to regrow following even severe fires. Fires in the chaparral also kill soil pathogens and break down the waxes and oils in leaves that litter the soil surface, thus improving moisture penetration into the soil.

Chaparral occurs in interior portions of Sonoma County, including dry slopes of Hooker, Stuart, Nuns and Adobe Canyons, at Annadel State Park, Hood Mountain Regional Park, Sugarloaf Ridge State Park, and The Geysers.

4.1.9. Coastal Habitats

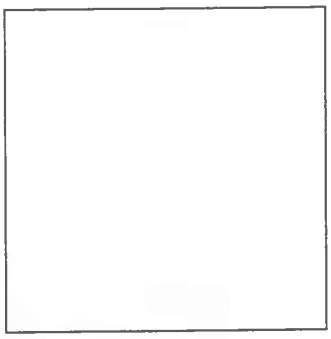
Coastal Scrub

Coastal scrub habitat occurs on coastal bluffs and mesas of interior hills and canyons. It contains a dense overstory of evergreen shrub vegetation no greater than two meters tall with an understory of smaller shrubs, herbs and grasses. Shrubs are not sclerophyllous, but are adapted to poor nutrients, high wind exposure, and dry soil. This habitat type intergrades with coastal dunes, grasslands, and forests. In Sonoma County, coastal scrub is common north and south of Jenner.

Coastal Strand

Coastal strand habitat consists of the beach and coastal dune and occurs exclusively along the coast in Sonoma County. This habitat contains an open to closed cover of herbaceous perennials and low growing shrubs above the maximum high tide line. Plants are often prostrate, succulent or possess other adaptations for harsh environments. Species composition varies depending on exposure to wind, salt spray, soil development, and degree of disturbance. Coastal strand often intergrades with coastal prairie and coastal scrub. In Sonoma County, coastal strand habitat occurs at Bodega Dunes State Park, Salmon Creek, Wrights Beach, Goat Rock and Russian Gulch. Coastal strand habitat has been severely impacted by the intentional planting and ongoing invasion of European Beach grass (*Ammophila arenaria*), with this invader transforming the dynamic physical and nutrient processes of this rare habitat.

Coastal Terrace/ Prairie



Coastal prairie occurs on coastal terraces with deep well-drained soils. This grassy habitat type extends inland where there is a maritime influence to merge with interior grassland. Much coastal prairie in Sonoma County has been converted to pasture, resulting in a loss of native perennial bunchgrasses. Non-native annual grasses and forbs proliferated during the conversion period and are now naturalized. In Sonoma County, coastal prairie occurs along terraces and hills of the coastline from Estero Americano north to Fort Ross.

4.1.10. Near-shore Marine Habitats

The near shore marine environment in Sonoma County provides habitat and forage for many species of marine mammals, seabirds, and invertebrates. Otters, seals, and sea lions utilize the county's near-shore marine environments for forage, shelter, and

reproduction. Tide pools support diverse marine life including mussels, crabs, starfish, sea anemones, and many species of fishes. Many of these organisms are avidly sought by sport fishers and commercial harvesters. For example, the indigenous red abalone (*Haliotis rufenscens*), which inhabits nearshore waters along the California coast, is worth approximately $50 per animal in commercial landing value. In Sonoma County, commercial harvest of this species is banned. Locally, this has led to a robust and profitable sport abalone harvest and, unfortunately, to a poaching problem.

4.1.11. Unique Habitats in Sonoma County

Serpentine Plant Communities

Approximately 42 percent of Sonoma County's endemic plants (i.e. those species found nowhere else) are dependent upon edaphic conditions, occurring in serpentine or on serpentine-related ("ultramafic") soils[15]. These completely unique plant communities are adapted to harsh conditions, growing where soils are particularly rich in heavy metals and lack calcium and other important nutrients. Variously-sized patches supporting serpentine plant communities exist as islands surrounded by more common vegetation. The habitat may be widely spaced shrub cover with little to no herbaceous understory or may occur as denser, chaparral-like cover. Some areas in Sonoma County which contain serpentine communities include: near Occidental; a large portion of the Austin Creek State Recreation Area; thousands of acres between Socrates Mine and The Geysers; Bradford Mountain; between Pythian Road and the summit of Mount Hood; and at the entrance of Pepperwood Preserve on Franz Valley Road[16].

The Cedars

The Cedars is a distinct nine-square mile area in western Sonoma County characterized by the presence of Sergeant Cypress and large expanses of serpentine and peridotite rock. Reminiscent of a moonscape, this habitat supports diverse serpentine plant communities (see above for more about these unique communities). This area forms the separation for the headwaters of the Russian River, the Gualala River, and Austin Creek. The Cedars is a mix of private and BLM land. It has no formal protected status.

15 Best et al. 1996
16 More serpentine locations can be found in Best et al. 1996.

15

Cunningham Marsh

Cunningham Marsh is a privately owned freshwater wetland surrounded by orchards and grasslands. It drains to Blucher Creek. Cunningham Marsh is home to three rare plants, the state and federally endangered Hickman's cinquefoil (*Potentilla hickmanii*), California beaked-rush (*Rhynchospora californica*) and Bolander's reedgrass (*Calamagrostis bolanderi*). This wetland is one of only three known locations of the Sonoma County endemic Pitkin Marsh lily (*Lilium pardalinum* ssp. *pitkinense*). The Marsh has no formal protected status.

Geysers Geothermal Area

This geothermally-active area represents the largest geothermal energy development in the world, and in the mid-90s, generated enough electricity to meet the power demands of San Francisco. Spread across northeast Sonoma County, the Geysers area contains significant deposits of serpentine soil and rare associated plants, as well as unique communities associated with the steam vents. The Geysers is on BLM land and the geothermal development is operated by CalPine. The area has no formal protected status.

Laguna de Santa Rosa

The Laguna de Santa Rosa is the largest tributary to the Russian River, draining a 254 square mile watershed. Its main channel extends fourteen miles from Cotati to Forestville. The Laguna covers more than 30,000 acres and consists of a mosaic of creeks, open water, perennial marshes, seasonal wetlands, riparian forests, oak woodlands and grasslands. It serves as important habitat for local wildlife and migratory birds and waterfowl. Additionally, the Laguna absorbs overflow during flood events, reducing the impact on downstream communities. Santa Rosa's Laguna Wastewater Treatment Plant treats sewage from several communities to tertiary standards and returns some of it to the river by way of the Laguna de Santa Rosa. The Laguna is a mix of private and public land, and is stewarded by the non-profit Laguna de Santa Rosa Foundation. It has no formal protection status.

Pitkin Marsh

Pitkin Marsh is located along Gravenstein Highway between Graton and Forestville. This freshwater marsh provides habitat for the endangered white sedge (*Carex albida*), a plant believed extinct until rediscovered there in the early 1980s. Pitkin Marsh is the only known place

in the western US where three species of beaked rush occur together. It is considered a botanical treasure. The Marsh is one of three locations in the world (all in Sonoma County) that support the endemic, eponymous Pitkin Marsh lily (*Lilium pardalinum* ssp. *pitkinense*). In 2007, Sonoma Land Trust negotiated the purchase of the lower Pitkin Marsh. Future efforts will focus on protecting middle and upper Pitkin Marsh.

Tolay Lake
Tolay Lake is a seasonal wetland in southern Sonoma County east of Petaluma. In April 2005, the lake and 1,737 acres of the surrounding ranch were purchased by Sonoma County as a regional park. The lake, which had been drained and used for agricultural operations, is expected to be restored. The park provides habitat for many species of conservation concern, including the California red-legged frog, northwestern pond turtle, golden eagle, white tailed kite, horned lark, burrowing owl, northern harrier, and tricolor blackbird. It has cultural and spiritual significance for the Southern Pomo people and contains important archeological objects and sites. The lake is protected as a County regional park.

4.2. Ecosystem Processes and Functions
Of course, acquiring and restoring habitat patches and preserving species occurrences is an integral part of local biodiversity conservation. However, the protection or enhancement of Sonoma County's natural physical and biotic *processes* is often overlooked. To be most effective, conservation practitioners in Sonoma County must seek to enhance not just "habitats" (however defined), but also overall ecosystem functionality, resilience, and sustainability. Viable habitats – and the landscapes they comprise - provide the essential ecosystem functions that all species (including ours) depend on: processing air and water-borne pollutants; supporting bees and other crop pollinators; storing climate-altering carbon; controlling floods and preventing soil erosion; restoring groundwater; and cycling essential nutrients. Without these and other fundamental processes in place, Sonoma County biodiversity will inevitably degrade.

We need to protect and enhance the natural *functioning* of the county's unaltered environments, including: the hydrologic integrity and variability of watersheds; connections among disparate habitat fragments to create functional wildlife corridors and allow gene flow; mimicking to the greatest extent possible the effects of a natural fire regime; allowing for groundwater recharge (particularly, reducing human summer and fall demand from sources such as wells near streams and direct, unregulated pumping from streams); and encouraging more natural flooding patterns along river systems.

V. THREATS TO SONOMA COUNTY BIODIVERSITY

Changes to the health of Sonoma County's biological diversity are directly related to the ways humans develop and use local land and water resources. The severity of human-caused threats to Sonoma County biodiversity was ranked by botanists,

biologists, policy experts, and conservation practitioners familiar with the situation in Sonoma County (see Appendix). According to these experts, the current top threats requiring conservation intervention are: habitat loss and fragmentation associated with housing and vineyard development; replacement of native species by invasive introduced species; reductions in water availability; pollution of air and water; and the unknown impacts of climate change.

5.1. Habitat Loss and Fragmentation
Threat Ranking: Highest Threat
The extension of residential, commercial, and agricultural development into previously undeveloped forests, hillsides, and pastures is, experts agree, the single greatest threat to Sonoma County habitats (see Figures 5 and 6). A burgeoning suburban and rural population on top of a thriving wine grape growing industry (in now globally recognized as Earth's largest wine-producing district[17]) is stretching local resources toward the breaking point. The County's more than 180,000 housing units and approximately 60,000 acres of vineyard take their toll on local water, land, and native

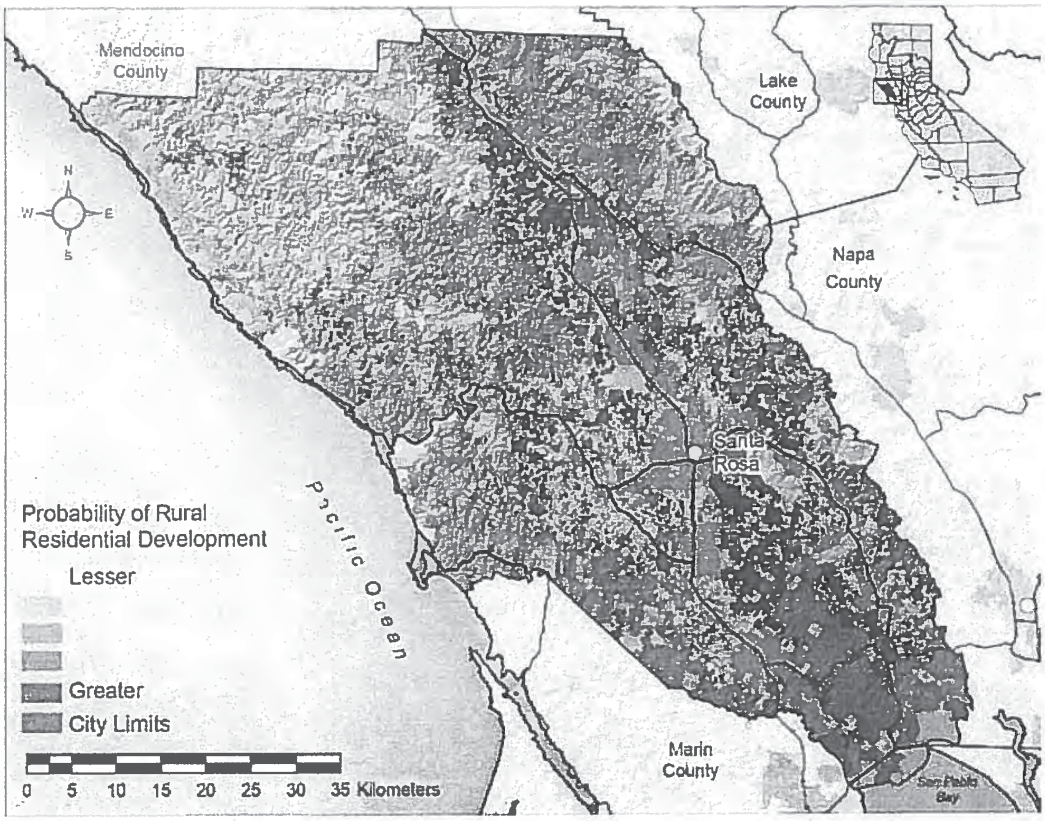


Figure 5: Residential and other Human Development (Source: Lohse et al. 2008)

17 "Sonoma County, California." Wikipedia. 2007. Wikimedia Foundation, Inc..20 November 2007. <http://en.wiki/Sonoma_County>

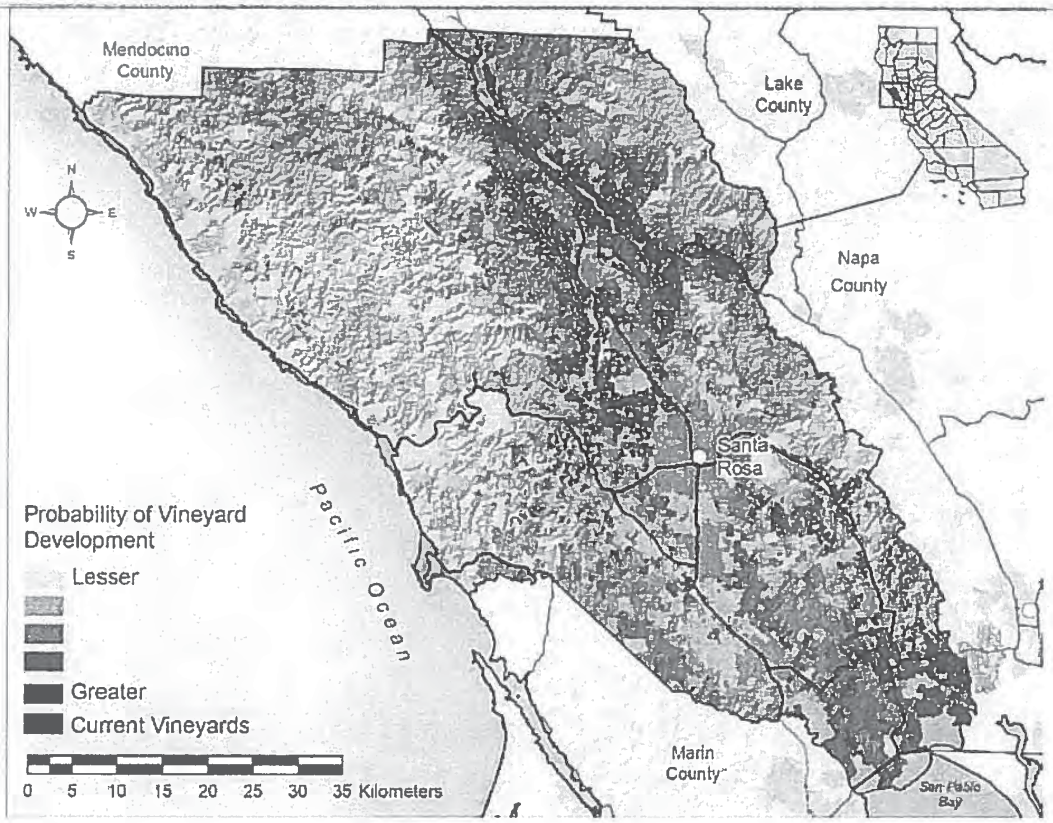


Figure 6: Vineyards Development (Source: Lohse et al. 2008)

wildlife. The often permanent conversion of natural areas into housing and agricultural development causes not only outright habitat loss[18] and insidious fragmentation, but also leads to excessive sedimentation of streams, de-watering of landscapes, and changes in runoff patterns that can exacerbate flooding.

Agricultural and residential development occurring amid undeveloped landscapes away from the county's urban centers often results from the division of formerly large parcels (e.g. single family farms) into clusters of smaller, more intensively-developed properties. This process is known as parcelization. It directly fragments the county's remaining natural areas; isolates species and blocks daily and seasonal migrations; and reduces local species diversity[19]. Divided and developed parcels also require an unsustainable input of water and fossil fuels; provide a vector for the introduction of invasive plants and animals; and pollute the region's watersheds.

Salmonid species, again, provide an illustrative example: in Sonoma County, the combination of agriculture, urban development, mining, logging, road construction,

18 One example: Tiger salamanders are down to as little as 10 percent of their former range (R Walker and D Cook, pers. comm.) due to urbanization and conversion of rangeland to vineyard.
19 E.g. there are fewer birds and butterflies in smaller parcels; Merenlender 1998

EXHIBIT E2

Exhibit E-2

Corridor Ecology

The Science and Practice of Linking Landscapes for Biodiversity Conservation

Jodi A. Hilty, William Z. Lidicker Jr.,
and Adina M. Merenlender

Foreword by Andrew P. Dobson

ISLAND PRESS
Washington • Covelo • London

Box 1.1.

Consequences of Exurban Development for Bird Species

Even at low densities, human development can impact native species. Disturbances associated with exurban development include roads, domestic pets, and great densities of urban-adapted predators such as raccoons and rats, as well as nest parasites such as brown-headed cowbirds. Since exurban expansion is a fairly recent phenomenon, there have been relatively few attempts to quantify its impacts on biodiversity. However, a few papers do include field studies of birds in exurbia (Maestas et al. 2003, Merenlender et al. 1998, Odell and Knight 2001, Odell et al. 2003). For example, a study in one Colorado watershed by Maestas et al. (2003) found six species at higher densities in exurban sites than on ranches and reserves: black-billed magpie (*Pica pica*), European starling (*Sturnus vulgaris*), Brewer's blackbird (*Euphagus cyanocephalus*), American goldfinch (*Carduelis tristis*), house wren (*Troglodytes aedon*), and broad-tailed hummingbird (*Selasphorus platycercus*); whereas green-tailed towhee (*Pipilo chlorurus*), vesper sparrow (*Pooecetes gramineus*), and rock wren (*Salpinctes obsoletus*) were less abundant in exurban sites. Also, many more domestic dogs and cats were present at exurban sites.

To explicitly address the influence of an exurban home on the surrounding bird community, Odell and Knight (2001) surveyed songbirds at three different distances from forty homes. They found significant increases in the density of six bird species 30 meters (98 feet) from the homes, compared to 180 meters (590 feet) and 330 meters (1,083 feet). The six species were American robin (*Turdus migratorius*), brown-headed cowbird (*Molothrus ater*), house wren, black-billed magpie, Brewer's blackbird, and mountain bluebird (*Sialia currucoides*). The same birds were also more common in high-density housing developments (1.04 ± 0.67 houses per hectare) compared to lower-density developments (0.095 ± 0.083 houses per hectare) and undeveloped sites (at least 700 meters, or 2,297 feet, from any development), with the exception of Brewer's blackbird and the European starling. In the natural habitat, farther from exurban home sites, the following species had significantly higher densities compared to surveys 30 meters from the homes: black-capped chickadee (*Parus atricapillus*), black-headed grosbeak (*Pheucticus melanocephalus*), orange-crowned warbler (*Vermivora celata*), blue-gray gnatcatcher (*Polioptila caerulea*), dusky flycatcher (*Empidonax oberholseri*), and spotted towhee (*Pipilo maculates*). The same species, with the exception of the spotted towhee and the addition of the green-tailed towhee and the plumbeous vireo (*Vireo plumbeous*), were also at higher densities in undeveloped sites than in higher-density housing areas. These studies demonstrate that some urban adapter species are found close to exurban homes but not necessarily in the surrounding habitat.

A similar study was conducted in California (Merenlender et al. 1998) comparing suburbs (one house per 0.1–1 hectare, or 0.2–2.47 acres), exurban areas (one house per 4–16 hectares, or 10–40 acres), and undeveloped landscapes (large undeveloped contiguous areas greater than 400 hectares, or 1,000 acres, in ownerships greater than 120 hectares, or 296 acres). More recent unpublished data from these sites revealed significant differences in the detection rates for Hutton's vireo (*Vireo huttoni*), orange-crowned warbler, and northern flicker (*Colaptes auratus*) (Figure 1.4) at undeveloped sites

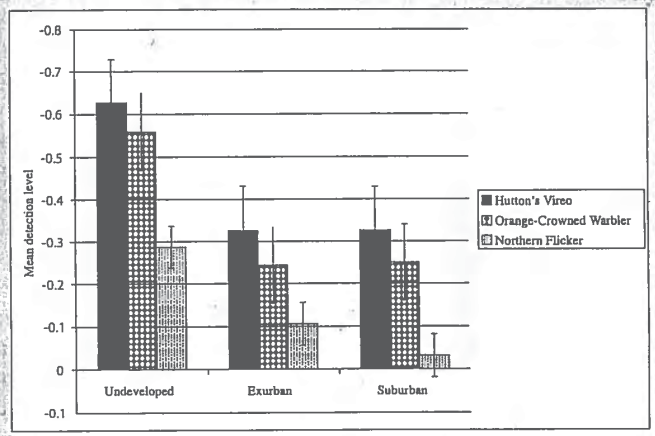


Figure 1.4. Detection levels of Hutton's vireo, orange-crowned warbler, and northern flicker in undeveloped, exurban, and suburban sites. All three were found significantly more often in undeveloped sites compared to exurban and suburban sites, where they were detected at similar levels. These data come from ninety-six point count locations in Sonoma County, California, that were evenly divided among the three levels of residential development.

EXHIBIT E3

Exhibit E-3

GANDA

Garcia and Associates
2601 Mission Street, Suite 600
San Francisco, CA 94110
Phone: (415) 642-8969
Fax: (415) 642-8967

To: Molly Sandomire

From: Eric Jepsen

Date: September 8, 2015

RE: Fulton-Fitch Mountain Raptor Survey

Garcia and Associates (GANDA) was contracted to conduct raptor surveys along the Fulton-Fitch Mountain power line in Sonoma County, California. This survey was conducted to establish a baseline understanding of raptor nesting and activity within the power line corridor to inform the project's planning process, for which work is expected to commence in 2017.

Methods

Surveys were conducted by GANDA biologists Eric Jepsen and Brittney Wendell over five days during the nesting season. Surveys focused on the 8.5-mile-long power line, 1.5-mile 230-kV transmission line, staging areas, and access roads to the line and poles. The survey area included the lines, access roads, staging areas, and, where possible, an area extending up to 500 feet from these features. Observations for golden eagles were noted up to 1 mile from these features, reflecting agency requirements for management of this species. During surveys, all active and inactive raptor nests were mapped. For each nest location, we recorded the species present, the stage of nesting (nest building, incubation, fledging etc.), the type of nest (e.g. stick nest, cavity nest) and the structure supporting the nest (e.g. tree, pole, cell tower, bridge). We also recorded all observations of raptors, as well as any territorial behaviors that might indicate nesting activity (e.g. copulation, undulating flight patterns). In most cases, these observations were recorded, with the location of the individual approximately indicating the area of activity within a territory. In addition to raptors, surveys were used to identify nesting bird hotspots (i.e. areas where nesting bird activity was observed or is likely to occur). For these areas, we noted the species observed and/or the species likely to be present during the nesting season. Surveys were conducted from March through May 2015.

Results

Several common raptor species were observed throughout the survey area; however, few active nests were observed. Most raptor observations were of individuals soaring overhead, displaying over a territory, or calling at a distance and from within forested areas. All observations are presented in Table 1 and in the attached map set.

Nesting bird hotspots

The northern 8.5 miles of power line is located mainly in woodland, grassland, or agricultural (vineyard) habitats and intersects with very little residential development and a few roads. Much of this part of the survey area sees little human activity, supports vibrant and diverse bird populations, and could be described as a "nesting bird hotspot." The southern 1.5 miles of transmission line runs through residential communities. However, between poles 25/111 and 25/112 the line crosses Mark West Creek which supports a mature riparian forest, which in turn supports a robust avian community. This area constitutes a "nesting bird hotspot" within the survey area. Nesting birds observed or expected to occur in these hotspot areas include common California riparian, deciduous woodland, and grassland species (Table 2).

Species	ID	Date	Latitude	Longitude	Nesting?	Observation
	WTKI-02	4/28/2015	38.592653	-122.818490	Unknown	Adult rose up out of trees to chase the golden eagle that was soaring over the area, approximately 825 feet southwest of power line.
	WTKI-03	4/28/2015	38.578543	-122.798354	Unknown	Adult flushed from perch in oak approximately 140 feet northeast of pole 6/3. Status unknown. No nest observed. Not observed in subsequent surveys.
Common raven (*Corvus corax*)	**CORA-01**	4/8/2015	38.581709	-122.800033	Yes	Pair observed carrying nesting material in an area east of pole 6/5.
Unknown nest	**Nest-01**	5/13/2015	38.524234	-122.759065	No	Old small/medium-sized stick nest (jay-sized), in madrone.
	Nest-02	5/13/2015	38.506989	-122.761084	No	Old medium-sized nest (Cooper's hawk) in poplar.
	Nest-03	5/13/2015	38.532502	-122.765497	No	Large, unoccupied raptor nest in eucalyptus adjacent to Faught Road, approximately 1000 feet west of power line. Status unknown, though within RTHA-04 territory.

Table 2. Bird species observed or likely to occur within Fulton-Fitch Mountain project area and nesting phenology[1].

Common Name	Scientific Name	Observed?	Earliest Confirmed Breeding	Latest Confirmed Breeding
Turkey Vulture	*Cathartes aura*	Yes	April 13 (nest-building)	September 1 (nest with young)
White-tailed Kite	*Elanus leucurus*	Yes	February 10 (nest-building)	July 13 (recently fledged young)
Northern Harrier	*Circus cyaneus*	Yes	April 15 (occupied nest)	July 6 (recently fledged young)
Sharp-shinned Hawk	*Accipiter striatus*	No	May 5 (occupied nest)	n/a
Cooper's Hawk	*Accipiter cooperii*	Yes	February 28 (nest-building)	August 16 (recently fledged young)
Red-shouldered Hawk	*Buteo lineatus*	Yes	March 20 (nest-building)	July 8 (recently fledged young)
Red-tailed Hawk	*Buteo jamaicensis*	Yes	April 5 (occupied nest)	July 5 (adult attending young)
Golden Eagle	*Aquila chrysaetus*	Yes	May 18 (occupied nest)	June 12 (occupied nest)
American Kestrel	*Falco sparverius*	Yes	May 13 (occupied nest)	July 23 (adult attending young)
Ring-necked Pheasant	*Phasianus colchicus*	No	April 12 (recently fledged young)	June 20 (adult attending young)
Wild Turkey	*Meleagris gallopavo*	Yes	May 11 (adult distraction display)	July 31 (adult attending young)

1 Breeding dates are from the Sonoma County Breeding Bird Atlas (Burridge 1995)

Common Name	Scientific Name	Observed?	Earliest Confirmed Breeding	Latest Confirmed Breeding
California Quail	*Callipepla californica*	Yes	April 5 (recently fledged young)	August 14 (adult attending young)
Rock Pigeon	*Columba livia*	Yes	April 21 (nest-building	July 4 (occupied nest)
Band-tailed Pigeon	*Patagioenas fasciata*	Yes	August 30 (recently fledged young)	October 27 (recently fledged young)
Mourning Dove	*Zenaida macroura*	Yes	March 19 (nest-building)	July 13 (adult attending young)
Barn Owl	*Tyto alba*	No	April 12 (recently fledged young)	August 6 (occupied nest)
Western Screech-Owl	*Megascops kennicottii*	No	March 20 (recently fledged young)	June 19 (nest with young)
Great Horned Owl	*Bubo virginianus*	No	April 14 (nest with young)	May 23 (occupied nest)
Northern Pygmy-Owl	*Glaucidium gnoma*	No	June 19 (adult attending young)	n/a
Anna's Hummingbird	*Calypte anna*	Yes	February 15 (adult attending young)	July 4 (adult attending young)
Allen's Hummingbird	*Selasphorus sasin*	No	March 9 (nest-building)	June 15 (occupied nest)
Belted Kingfisher	*Megaceryle alcyon*	No	May 15 (occupied nest)	August 13 (nest with young)
Acorn Woodpecker	*Melanerpes formicivorus*	Yes	April 8 (recently fledged young)	August 24 (adult attending young)
Red-breasted Sapsucker	*Sphyrapicus ruber*	No	June 6 (occupied nest)	June 13 (adult attending young)
Nuttall's Woodpecker	*Picoides nuttallii*	Yes	April 22 (nest with young)	July 8 (adult attending young)
Downy Woodpecker	*Picoides pubescens*	Yes	April 28 (nest with young)	August 16 (recently fledged young)
Hairy Woodpecker	*Picoides villosus*	No	May 10 (adult attending young)	July 19 (recently fledged young)
Northern Flicker	*Colaptes auratus*	Yes	May 6 (occupied nest)	July 22 (adult attending young)
Pileated Woodpecker	*Dryocopus pileatus*	Yes	April 6 (nest with eggs)	August 31 (recently fledged young)
Olive-sided Flycatcher	*Contopus cooperi*	No	June 18 (nest with young)	July 27 (occupied nest)
Western Wood Pewee	*Contopus sordidulus*	Yes	May 15 (nest with young)	July 18 (adult attending young)
Pacific-slope Flycatcher	*Empidonax difficilis*	Yes	May 9 (occupied nest)	July 19 (nest building)
Black Phoebe	*Sayornis nigricans*	Yes	April 4 (occupied nest)	August 11 (recently fledged young)
Ash-throated Flycatcher	*Myiarchus cinerascens*	Yes	May 11 (occupied nest)	July 30 (recently fledged young)
Western Kingbird	*Tyrannus verticalis*	Yes	April 27 (occupied nest)	July 22 (recently fledged young)
Tree Swallow	*Tachycineta bicolor*	No	March 31 (occupied nest)	July 8 (recently fledged young)
Violet-green Swallow	*Tachycineta thalassina*	Yes	April 13 (occupied nest)	July 13 (recently fledged young)
Northern rough-winged Swallow	*Stelgidopteryx serripennis*	No	April 30 (occupied nest)	June 21 (recently fledged young)
Cliff Swallow	*Petrochelidon pyrrhonota*	No	April 7 (occupied nest)	July 15 (nest with young)

Common Name	Scientific Name	Observed?	Earliest Confirmed Breeding	Latest Confirmed Breeding
Barn Swallow	*Hirundo rustica*	Yes	April 9 (nest-building)	July 29 (nest with young)
Steller's Jay	*Cyanocitta stelleri*	Yes	April 14 (recently fledged young)	August 15 (adult attending young)
Western Scrub Jay	*Aphelocoma californica*	Yes	March 29 (nest-building)	July 15 (fledgling)
American Crow	*Corvus brachyrhynchos*	Yes	March 29 (nest-building)	June 30 (adult attending young)
Common Raven	*Corvus corax*	Yes	April 10 (occupied nest)	July 13 (adult attending young)
Chestnut-backed Chickadee	*Poecile rufescens*	Yes	April 8 (adult attending young)	July 15 (adult attending young)
Oak Titmouse	*Baeolophus inornatus*	Yes	March 13 (adult attending young)	July 12 (adult attending young)
Bushtit	*Psaltriparus minimus*	Yes	March 1 (adult attending young)	June 15 (adult attending young)
White-breasted Nuthatch	*Sitta carolinensis*	No	April 19 (adult attending young)	July 29 (recently fledged young)
Brown Creeper	*Certhia Americana*	Yes	May 10 (occupied nest)	July 4 (recently fledged young)
Bewick's Wren	*Thryomanes bewickii*	Yes	March 25 (occupied nest)	July 19 (recently fledged young)
House Wren	*Troglodytes aedon*	No	April 22 (occupied nest)	June 29 (adult attending young)
Western Bluebird	*Sialia mexicana*	Yes	April 9 (nest-building)	July 5 (occupied nest)
Swainson's Thrush	*Catharus ustulatus*	No	May 28 (adult attending young)	July 4 (adult attending young)
American Robin	*Turdus migratorius*	Yes	April 22 (adult attending young)	July 15 (adult attending young)
Northern Mockingbird	*Mimus polyglottos*	Yes	May 3 (nest-building)	August 21 (adult attending young)
European Starling	*Sturnus vulgaris*	Yes	April 19 (nest with young)	July 10 (adult attending young)
Cassin's Vireo	*Vireo cassinii*	No	April 8 (adult attending young)	July 18 (adult attending young)
Hutton's Vireo	*Vireo huttoni*	No	April 20 (nest-building)	July 11 (adult attending young)
Warbling Vireo	*Vireo gilvus*	No	April 19 (recently fledged young)	July 4 (adult attending young)
Orange-crowned Warbler	*Oreothlypis celata*	Yes	April 23 (adult attending young)	July 5 (recently fledged young)
Yellow Warbler	*Setophaga petechial*	No	June 15 (occupied nest)	June 28 (adult attending young)
Black-throated Gray Warbler	*Setophaga nigrescens*	No	June 6 (adult attending young)	June 20 (adult attending young)
Wilson's Warbler	*Cardellina pusilla*	No	April 1 (nest with eggs)	July 28 (adult attending young)
Yellow-breasted Chat	*Icteria virens*	No	May 2 (nest with eggs)	June 15 (adult attending young)
Western Tanager	*Piranga ludoviciana*	No	May 10 (nest-building)	July 10 (recently fledged young)
Black-headed Grosbeak	*Pheucticus melanocephalus*	No	April 27 (occupied nest)	July 4 (adult attending young)

Common Name	Scientific Name	Observed?	Earliest Confirmed Breeding	Latest Confirmed Breeding
Lazuli Bunting	*Passerina amoena*	No	June 3 (adult attending young)	July 2 (adult attending young)
Spotted Towhee	*Pipilo maculatus*	Yes	April 29 (adult attending young)	August 15 (adult attending young)
California Towhee	*Melozone crissalis*	Yes	April 20 (adult attending young)	August 10 (nest with young)
Song Sparrow	*Melospiza melodia*	Yes	March 18 (adult attending young)	July 27 (recently fledged young)
Dark-eyed junco	*Junco hyemalis*	Yes	April 18 (nest with young)	July 12 (adult attending young)
Western Meadowlark	*Sturnella neglecta*	No	May 25 (nest with eggs)	July 2 (recently fledged young)
Brewer's Blackbird	*Euphagus cyanocephalus*	Yes	April 7 (nest-building)	July 3 (recently fledged young)
Brown-headed Cowbird	*Molothrus ater*	No	April 25 (nest with eggs)	July 20 (adult attending young)
Bullock's Oriole	*Icterus bullockii*	No	April 2 (occupied nest)	May 24 (recently fledged young)
Purple Finch	*Haemorhous purpureus*	No	May 19 (nest-building)	June 21 (occupied nest)
House Finch	*Haemorhous mexicanus*	Yes	April 6 (occupied nest)	July 15 (recently fledged young)
Lesser Goldfinch	*Spinus psaltria*	No	March 28 (nest-building)	July 16 (recently fledged young)
House Sparrow	*Passer domesticus*	Yes	April 5 (nest-building)	June 30 (occupied nest)

Restoration Ecology
THE JOURNAL OF THE SOCIETY FOR ECOLOGICAL RESTORATION INTERNATIONAL

Exhibit E-4

The Disconnect Between Restoration Goals and Practices: A Case Study of Watershed Restoration in the Russian River Basin, California

Juliet Christian-Smith[1,2] and Adina M. Merenlender[3]

Abstract

Over the past two decades, watershed restoration has dramatically increased internationally. California has been at the forefront, allocating billions of dollars to restoration activities through legislation and voter-approved bonds. Yet, the implications of restoration remain ambiguous because there has been little examination of restoration accomplishments and almost no analysis of the political context of restoration. This article addresses these gaps, utilizing a case study of the Russian River basin in Northern California. We identify trends that shed light on both the ecological and the political implications of restoration at a basin scale by examining a database of 787 restoration projects implemented in the Russian River basin since the early 1980s. Although a total of over $47 million has been spent on restoration in the basin, dominant forms of restoration are limited in scope to small-scale projects that focus on technical solutions to site-specific problems. The majority of restoration efforts are devoted to road repair, riparian stabilization, and in-stream structures, accounting for 62% of all projects. These types of projects do not address the broader social drivers of watershed change such as land and water uses. We suggest that restoration can become more effective by addressing the entire watershed as a combination of social and ecological forces that interact to produce watershed conditions.

Key words: ecological restoration, geographic information systems, Mediterranean-climate streams, post project monitoring.

Introduction

The amount of public investment in restoration is increasing, accounting for more than a billion dollars annually in the United States alone (Bernhardt et al. 2005). Yet, there is limited understanding of ecological patterns (Kondolf 1995, 1997; Downs and Kondolf 2002) and social implications associated with restoration (Gobster and Hull 2000; Higgs 2003). A recent study compiled coarse-scale data on restoration efforts nationwide (Bernhardt et al. 2005), concluding that little is known about the outcomes of restoration because postproject monitoring and assessment are extremely limited. A growing literature on biophysical monitoring has attempted to address this gap, focusing primarily on site-level analyses of ecological and geomorphic metrics (Harris et al. 2005). However, these measures do not address social aspects of restoration like the institutional context, which many credit as determining where and how restoration is done (Lufkin 1991).

The objective of this article is to better understand how and why restoration occurs the way that it does. The central questions that we address are: (1) Where is restoration happening; (2) How is restoration happening?; and (3) How has the practice of restoration changed over time? In answering these questions, we discover a disconnect between restoration goals and practices that we investigate further in the Discussion and Conclusions by asking: Why does this disconnect exist? and How can it be bridged? Our methods focus on analyzing a database of 787 restoration projects implemented in the Russian River basin, California, over 21 years. Although this article primarily analyzes the long-term dataset, we have also conducted extensive interviews with restoration practitioners and participated in restoration activities throughout the Russian River watershed, which informs our interpretation of the data (Christian-Smith 2006).

In order to understand where restoration is happening, we examine the spatial distribution and landscape attributes of restoration projects using a geographic information system (GIS) database of restoration project locations throughout the basin and available data layers on landscape features such as land use/land cover and lot size. This examination provides insight into the types of landowners who are primarily benefiting from the current practice of restoration and the ecological context in which it occurs. In order to understand how restoration is happening, we devote particular attention to the often overlooked institutional framework—the agencies and organizations involved in funding and implementing restoration. We analyze how policy language and funding priorities—are—translated—into—on-the-ground—practices,

[1] The Pacific Institute, 654 13th Street, Oakland, CA 94612, U.S.A.
[2] Address correspondence to J. Christian-Smith, email jchristi@nature.berkeley.edu
[3] Department of Environmental Science, Policy, and Management, University of California, Berkeley, 163 Mulford Hall # 3114, Berkeley, CA 94720-3114, U.S.A.

doi: 10.1111/j.1526-100X.2008.00428.x

focusing on the three agencies most involved in funding restoration activities in the Russian River basin. Finally, in order to understand how the practice of restoration has changed since the early 1980s, we examine trends in the types of projects implemented, their costs, and the organizations involved.

Methods

We employ a case study approach, focusing on an area of concentrated restoration effort and funding for several decades. The Russian River basin is located on the North Coast of California, straddling Mendocino and Sonoma Counties (Fig. 1). It is roughly 80 miles long, drains 1,485 square miles, and has an average annual discharge of 1.6 million acre-feet. Current land uses include timber harvesting, ranching, gravel mining, and intensive agriculture. Approximately 98% of the Russian River basin is privately owned. Although the majority of the basin is characterized by low-density rural development, the southern portion is experiencing a boom in suburban and urban development around the city of Santa Rosa (U.S. Census 2006*a*, 2006*b*).

Over the past three decades there have been several major institutional sources of funding for restoration projects in the Russian River basin. These include the California Department of Fish and Game (CDFG), the U.S. Department of Agriculture (USDA), and the Sonoma County Water Agency (SCWA). These agencies have

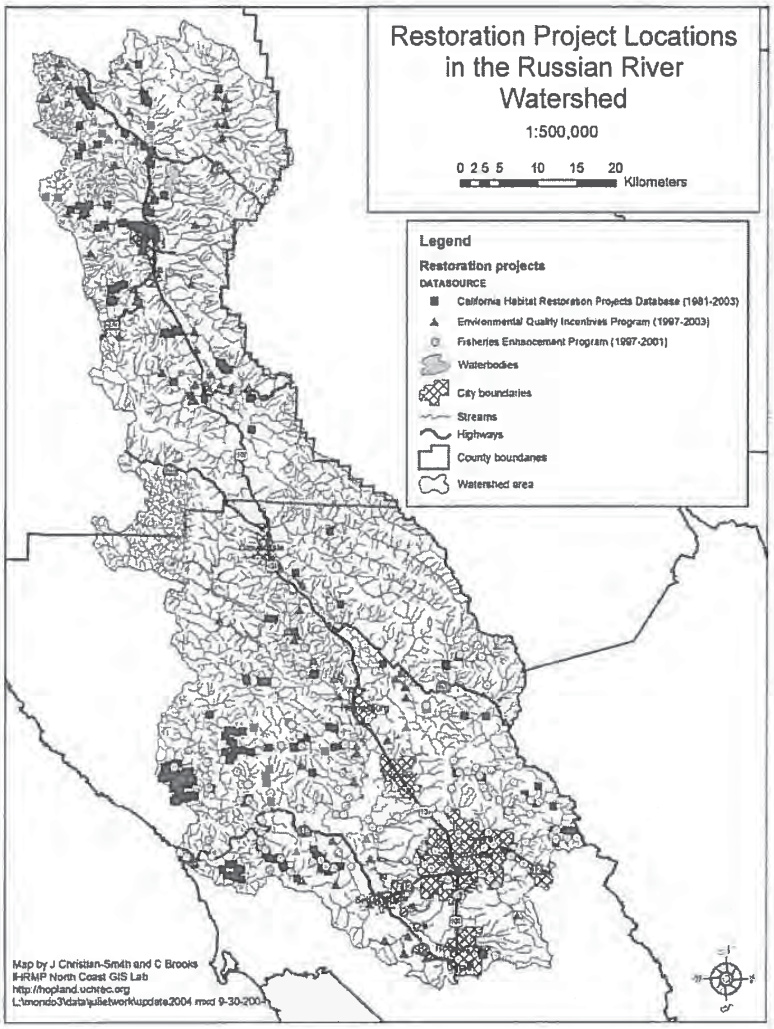


Figure 1. Restoration project locations within the Russian River Basin.

distributed funds for restoration activities from federal sources (Pacific Salmonid Fisheries Act) and state sources (California Senate Bills and voter-approved Propositions) through a variety of grant programs including: CDFG's Fisheries Restoration Grant Program, the USDA's Environmental Quality Incentives Program, and SCWA's Fisheries Enhancement Program. The priorities of these grant programs vary and thus, the characteristics of projects associated with each differ in some interesting ways that will be noted in the Results and Discussion sections.

In order to analyze the spatial distribution of restoration projects at the basin scale, we built upon an existing GIS of the Russian River basin. The first step was to collect and compile geographic coordinates and project details for restoration projects throughout the Russian River basin in an ArcMap database. We gathered GIS data from the CDFG California Habitat Restoration Projects Database describing projects funded through the Fisheries Grants Restoration Program (1981–2003). Second, we gathered and digitized map-based data and associated project information for restoration activities funded by the USDA Environmental Quality Incentives Program (1997–2003). Finally, we gathered and converted AutoCAD data and associated project descriptions describing restoration activities funded by the SCWA Fisheries Enhancement Program (1997–2001). We clipped the combined spatially explicit databases to the boundaries of the Russian River basin.

The resulting database of restoration projects included a total of 787 projects that were implemented in the Russian River basin between 1981 and 2003. Although this encompasses a variety of funding sources, it does not capture many of the smaller projects implemented without agency funding. Therefore, it does not represent the entire universe of restoration projects present in the basin and may bias the outcomes toward larger-scale projects. However, it does provide a comprehensive representation of the types of projects that receive the majority of public funds. The spatial distribution of these projects, along with associated grant programs, is displayed in Figure 1. To determine the randomness of the spatial distribution of restoration project locations in relation to land use classes, we utilized a Monte Carlo simulation that took the empirical probabilities of land uses in the basin and simulated the distribution of the 787 project locations 1,000 times, using a macro script in Excel. We then calculated the z statistic by comparing the means from the observed and simulated distribution of project locations across four major land use categories. The test is considered statistically significant if the difference between the two means is significantly different than zero (as measured by the p value of the z score).

In order to analyze the practice of restoration, we looked at the various kinds of restoration projects that were implemented over time. First, we extracted the "work types" associated with restoration projects from the GIS database to define the most prevalent forms of restoration. Projects that involved more than one practice were categorized based on the practice that received the greatest amount of funding. In addition, we examined how restoration project types, costs, and associated organizations have changed over time. Second, we examined the economic context of restoration by extracting restoration costs from the GIS database and associating these with policy changes and a growing restoration industry (Gustaitis 2004; Baker 2005). Finally, we examined the institutionalization of particular restoration practices by analyzing the policy language and funding priorities of three agencies most involved in restoration activities in the Russian River basin.

Results

Our research reveals distinct patterns in the locations and types of projects that are funded by three major funding institutions in the Russian River basin. The following results demonstrate the prevalence of site-specific, technical approaches (particularly in-stream, riparian, and road-related improvements). Other objectives that are included in restoration goals and policies such as water quality, water quantity, habitat acquisition, and education are not widely addressed by the current practice of restoration in the basin. These results are relevant not only in a regional context but also internationally because an international survey of river restoration across 35 countries documents the prevalence of technical approaches and the implementation at reach or subreach scales (Wheaton et al. 2006).

Where is Restoration Happening?

To examine different landscape attributes associated with restoration project locations, we first looked at land cover and land use. Over half of the restoration projects had associated land use data available from the county tax assessor's office and Landsat TM satellite imagery. Based on this data, from both Sonoma and Mendocino Counties, the majority of restoration projects were located on four land uses classes: timberland, rangeland, rural residential land, and vineyards. "Rangeland" includes land classified by the tax assessor as rangeland or pastureland along with areas without land use data that are classified by Landsat TM satellite imagery as having hardwood/chaparral land cover. "Rural residential" includes land that has one or fewer units per acre. Higher densities are classified as suburban and urban.

Figure 2 displays the percent of restoration projects associated with each of the four most common land use classes and juxtaposes that with the percent of the watershed area in each of the four land use classes. Timberland and rangeland had the highest number of restoration projects associated with each land use class (117 and 116 projects, respectively). However, it is important to note that rangeland occupies a much larger area, accounting for nearly 60% of the total acreage in the Russian River basin, whereas timberland accounts for less than 10% of the total acreage in the basin. The difference between the

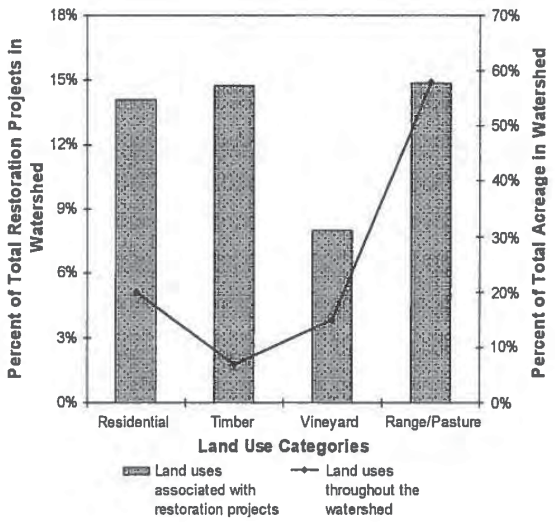


Figure 2. Restoration and land use.

observed and the expected values for residential and vineyard land use classes were not statistically significant (p values of 0.26 and 0.42, respectively). The difference between observed and expected values for timber and rangeland land uses was highly significant (p values of <0.0001 and 0.003, respectively). Therefore, the real difference in land uses between the restoration project locations and the basin as a whole is due to the over-representation of restoration project points on timberland and the under-representation of restoration project points on rangeland.

Similarly, we examined the distribution of average lot sizes within a 500-m buffer of restoration project locations and compared these to the distribution of average lot sizes throughout the basin. We used five lot size categories: 0–4, 4–14, 14–26, 26–40, and greater than 40 ha. Almost 45% of restoration projects are located in areas with an average lot size of greater than 40 ha. This is not particularly surprising because the basin is dominated by very large, rural properties. However, restoration projects are over-represented on medium to large average lot sizes of 14–40 ha. There are approximately 15% more restoration projects in areas that have average lot sizes of 14–40 ha than would be expected by looking at the distribution of lot sizes across the basin. We theorize that this is associated with the goals of the funding programs and the privatized landscape (Discussion section).

How is Restoration Happening?

Here, we examine the practice of restoration as a physical and political process, beginning with an analysis of how policy language and goals are translated on-the-ground by three primary agencies involved in restoration activities in the Russian River basin. First, the CDFG Fisheries Restoration Grants Program is the dominant funding source in the Russian River basin and in many coastal areas of California. Between 1981 and 2006, CDFG invested over $180 million and supported approximately 2,600 salmonid restoration projects (CDFG 2006). California Senate Bill 271 (Thompson & Ducheny 1997) created the Salmon and Steelhead Trout Restoration Account that provides the CDFG with much of the funding to support projects that improve fish habitat. Section 4 of Senate Bill 271 states restoration goals:

"Projects that restore habitat for salmon and anadromous trout species that are eligible for protection as listed or candidate species under state or federal endangered species acts shall be given top funding priority...Projects may implement instream, riparian, water quality, water quantity, and watershed prescriptions and shall be designed to restore the structure and function of fish habitat" (Senate Bill 271 1997, sections 4b & 4c).

The legislation goes on to define that 65% of the money shall be used for on-the-ground salmon habitat protection and restoration, with 75% of that amount going specifically to "watershed (upslope) and riparian area protection and restoration activities." Only 35% of the money can be allocated to other uses like watershed evaluation, watershed planning, watershed organization support and assistance, public school watershed, and fishery education programs (Senate Bill 271, section 4d 1 & 2).

The Fisheries Restoration Grants Program project solicitation package reiterates that the objective of the program is to fund projects that are consistent with the goal of salmon and steelhead trout conservation and restoration (CDFG 2006). This package includes a list of 22 approved project types like habitat acquisition, upslope restoration, watershed education, flow meters, and other relatively diverse restoration practices. However, an analysis of the 726 funded projects between 2001 and 2006 reveals that there are clear trends in the types of projects approved (Fig. 3). Habitat acquisitions and conservation easements, postproject monitoring and maintenance, water conservation, and water measuring devices are

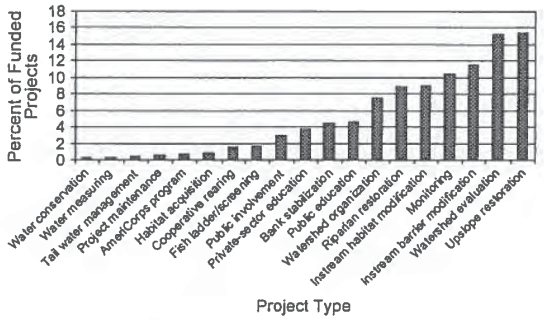


Figure 3. Project types funded by CDFG fisheries restoration grants program, 2001–2006.

among the project types with fewer than 20 funded projects. On the other hand, upslope watershed restoration and watershed evaluation each account for over 100 funded projects.

A closer examination of project descriptions reveals that almost 40% of projects focus on site-specific in-stream and riparian work (this includes projects from several different categories: in-stream barrier modification, in-stream habitat restoration, riparian restoration, and in-stream bank stabilization), 28% of projects are associated with some sort of assessment, and 28% of projects are associated with road improvement (almost all of the projects categorized as upslope restoration are road related). In addition, nearly half of the projects categorized as watershed evaluations and assessments involve inventories of road crossings and sediment production from road surfaces. This clearly illustrates the disconnect between broad policy goals that suggest a wide variety of restoration strategies and the comparatively narrow on-the-ground practices, as 91% of practices can be categorized as assessment, in-stream, riparian, or road repair work.

Second, the USDA's Environmental Quality Incentives Program implemented 499 projects in Sonoma and Mendocino Counties between 1997 and 2002 (Natural Resources Conservation Service 2002). The Environmental Quality Incentives Program Final Rule, issued by the USDA Commodity Credit Corporation (Federal Register 1997) explains that it is a voluntary program for agricultural producers, authorized at $1.3 billion over 7 years. Section 1466.6 of the Final Rule explains that "the participant shall develop and submit a conservation plan for the farm or ranch unit of concern that, when implemented, protects the soil, water, or related natural resources in a manner that meets the purpose of the program, is acceptable to NRCS [National Resource Conservation Service], and is approved by the conservation district. This plan forms the basis for an EQIP [Environmental Quality Incentives Program] contract." Although particular conservation techniques are not specified by the legislation, they are provided in the state of California's approved practices that list over 100 approved practices.

Again, by examining the actual categories of funded projects, a less diversified picture emerges. In Sonoma and Mendocino Counties, the majority of implemented practices involve constructing access roads (9%), fencing (11%), riparian protection (13%), and structures for water control (21%). Many of these measures address sediment production and nonpoint source pollution, which are increasingly being regulated—most recently by the Environmental Protection Agency's new total maximum daily load provisions that specify the maximum amount of a pollutant that a waterbody can receive from point and nonpoint sources.

Finally, the SCWA Fisheries Enhancement Program funded 63 projects in the Russian River basin. The restoration program was funded, in part, through the Pacific Salmonid Restoration Act that the head of the Water Agency played a key role in coordinating and lobbying for in Congress. The specific goals of the program are stated as: (1) to work cooperatively and in conjunction with other federal, state, and local agencies to preserve, enhance, and restore fishery habitats and resources; (2) to develop research programs to study the fisheries within affected watersheds; and (3) to assist the environmental compliance section of the agency in the assessment of impacts, the writing of environmental documents, and permit compliance for the agency for projects which may effect fisheries resources (SCWA 2006). It is the last of these that is particularly interesting because restoration is specifically being linked to mitigation in the program's stated objectives.

Examining the Fisheries Enhancement Program's annual reports from 1997–2001 reveals a clear preference for funding internal agency projects along with surveys, studies, and research—much of which is required to protect endangered species. For instance, a "Fish Rescue Activities" project was awarded $15,000–20,000 during the 1997–1998 funding cycle. An examination of the project description reveals that the agency operates several pumping stations and infiltration ponds for its water supply and distribution network that trap fish (including endangered salmonids). The project paid for labor to capture and release trapped Chinook salmon and steelhead trout back into the Russian River main stem.

In summary, the results presented in Figure 4 show that the most common types of restoration across all three funding sources were riparian improvements (including bank stabilization, invasive plant removal, and riparian revegetation), road improvements (including culvert replacements/removals, road paving, and installing rolling dips), surveys (including field studies of fish habitat and abundance), and in-stream improvements (including altering the channel morphology to meet Rosgen [Rosgen 1994] stream-type classifications, installing structures such as large woody debris, and barrier removal). Less common in practice are activities related to education, water conservation, and upland restoration.

How Has the Practice of Restoration Changed Over Time?

Finally, we examine how the proportion of different project types changed between 1981 and 2003. The results

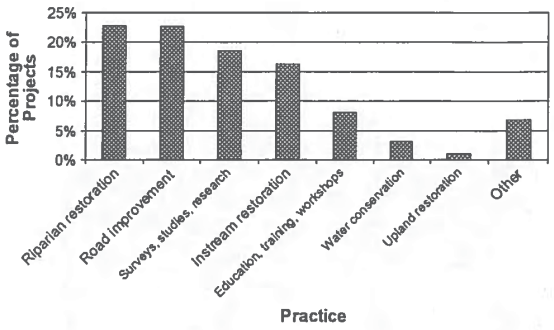


Figure 4. Restoration project practices.

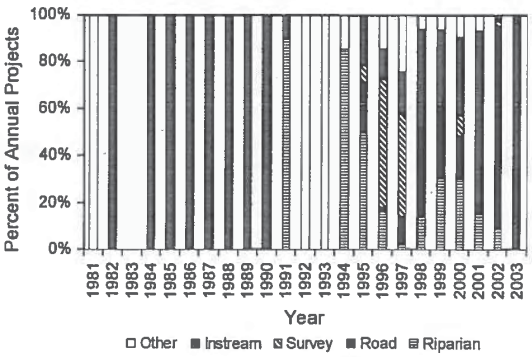


Figure 5. Restoration practice, 1981–2003.

show that restoration practice has shifted over time from primarily in-stream work through the 1980s to include a higher proportion of riparian- and road-related work in the 1990s and 2000s (Fig. 5). Major changes in practice can be seen at several time points. In 1991, riparian-related restoration activities became important (accounting for 90% of the annual projects), though they have since declined in prevalence. In 1995, both road-related work and surveys began to be common practices. Although the survey and research work dropped off after 2001, road-related work has persisted. In 2002, road-related work accounted for nearly 80% of all projects.

Along with changing practices, there have also been changing costs associated with restoration activities. The total investment in restoration has, predictably, increased over time (Fig. 6). Still, there has been considerable fluctuation and some substantial increases. Most markedly, between 1997 and 1998, the total cost of restoration activities rose from below $1 to $8 million, and from 2002 to 2003, costs jumped from just below $3 million to nearly $16 million. The per project cost of restoration has also increased from an average of almost $19,000 in 1981 to a little over $700,000 in 2003.

With the increased funding, there have been an increasing number of institutions and organizations associated with restoration activities. The organizations involved

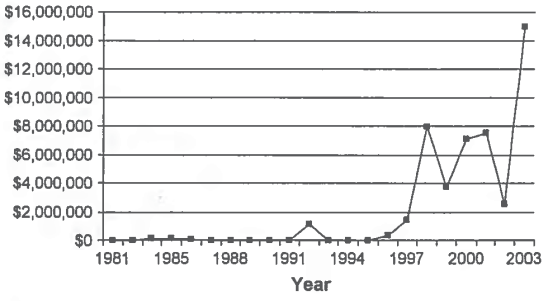


Figure 6. Total investment in restoration, 1981–2003.

with restoration significantly increased in 1998 from a handful of agencies to over 20 different entities. Interestingly, between 1998 and 2003, the character of these organizations changed from primarily federal and state agencies along with local nonprofits to an increasing number of private restoration, design, and engineering firms including Pacific Watershed Associates, Bioengineering Associates, Prunuske and Chatam, Dragonfly Stream Enhancement, Forest Soil and Water Inc., Doyle and Company, and Watershed Science. This growing "restoration industry" (Gustaitis 2004; Baker 2005) specializes in particular types of work, primarily engineering-oriented solutions at a site scale.

Discussion and Conclusions

Our results illustrate where and how hundreds of restoration projects were done over a 20-year period in the Russian River and compare these outcomes with the intended goals of restoration as articulated by the agencies involved in restoration statewide. The resulting disconnect between restoration goals and outcomes on the ground points to a restoration implementation crisis that requires new directions in order to bridge the gap between intension and practice.

In terms of where restoration happens, the over-representation of restoration project points on timberland and the under-representation of restoration projects on rangeland may be attributed to the focus of several granting programs on restoring upstream salmonid spawning habitat, which is often timberland in the Russian River basin. Two of the main restoration funding programs are interested in fisheries restoration and thus are more focused on spawning regions that are found in higher elevations of the basin. These steep uplands have lower population densities and larger parcel sizes. In addition, landownership in the basin is almost completely private and therefore conducting restoration requires finding willing landowners, gaining the legal right to access property through landowner agreements, and establishing trust and cooperation to ensure the restoration project is implemented correctly and maintained. There can be diminishing returns when attempting to work with many small property owners. Thus, large, rural landowners who are primarily engaged in agriculture and timber extraction benefit most from the current pattern of restoration.

When looking at the entire database, the most common restoration practices in the Russian River basin include: riparian, road, and in-stream improvements, which together account for 62% of the projects in the database. Some surveys and research were conducted, but the funding source that provided almost all of the support for these activities terminated in 2001. The focus on stream and road improvements can be explained, in part, by the emphasis on the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1998), which past restoration grant recipients refer to as the "Bible" of stream restoration. Section VI of the manual (Project Planning and

Organization) defines five fish habitat restoration categories: (1) upslope improvements; (2) riparian and bank stability improvements; (3) in-stream habitat improvements (with the stipulation that "Rosgen's stream classification system...provides a basis for evaluating instream structure suitability"); (4) artificial propagation; and (5) watershed stewardship programs. Although there is diversity in the restoration practices outlined, the implementation section is much narrower in scope. Section VII (Project Implementation) covers only in-stream large woody debris and boulder structures (pp. 1–46), fish passage structures (pp. 47–61), and bank stability structures (pp. 62–97) with dozens of design drawings depicting plan views and cross sections. There is little to no guidance regarding upslope improvements, watershed stewardship, education, and land and water conservation—despite that the Department of Fish and Game itself has prioritized water quantity as one of the key "limiting factors" for salmonid survival in the basin (CDFG 2002).

A panelist discussing restoration on the 16 March 2006 edition of the National Public Radio program *Forum* remarked that although road repair and barrier removal projects may not be their top priority in terms of restoring the ecological processes of a stream or bringing back a fishery, the funding is there for this type of work and therefore they "have to get on the boat." Indeed, although the California Salmonid Stream Habitat Restoration Manual defines upslope restoration as improving road drainage, road or trail obliteration, reforestation, or changes in land management (section VI, p. 3), in practice, it is almost exclusively road repair.

Our results demonstrate the increasing costs associated with these types of repairs and show that the total number of restoration projects has increased over time resulting in a greater expense to the public. Examining changing environmental legislation reveals significant incentives and regulatory action to encourage or require restoration like California Senate Bill 271 that passed in 1997, providing substantial funding for restoration in the area. As a response to this increased funding for restoration, a growing restoration industry has emerged that specializes in technical restoration practices. As the results indicate, road improvement has become one of the most prevalent practices in recent years. The design and implementation of road improvements were initially popularized in California by the private firm, Pacific Watershed Associates. One of the founders of the firm was quick to point out that they only work on technical matters of road improvements and do not discuss larger watershed issues (Hight 1998).

Equally significant are those practices that are *not* well represented, which include education for the public and school children, land and water conservation projects to address harmful activities beyond the riparian zone, and upland projects that are focused on changing land use patterns or activities beyond the riparian zone. Therefore, although the goals of restoration are broad, addressing watershed-scale ecological processes and social issues, the actual practice of restoration is primarily restricted to repairing streams and re-routing sediment at specific sites. Why does this disconnect exist? How can it be bridged?

We suggest that the disconnect between restoration goals and practice is closely related to a lack of attention to the social, political, and economic drivers of watershed degradation. Water quantity and flow levels in the Russian River are examples of a larger, and critical, watershed issue that is currently not being addressed by the practice of restoration. In the summer of 2007, the Water Resources Control Board mandated reductions of water use by municipalities and agriculture in the Russian River basin (Rose 2007). This request was made because there was not enough water in existing reservoirs to provide adequate flows for salmon migration and could result in a violation of the Endangered Species Act. Restoring stream flow during the dry season, when almost no rain falls in the basin and demand for water is at its peak, is critical for salmon recovery and requires that the practice of restoration addresses water quantity as listed in the agencies' programmatic goals for their restoration programs. Water quantity in streams is currently not part of the restoration efforts in upland streams, with the exception of the recent efforts by the Mattole Restoration Council and Sanctuary Forest in Humboldt County, California. There, restoration practitioners are tackling the issue of water quantity by working with water attorneys to draft "forbearance" agreements where riparian water rights holders forebear their summer water rights in exchange for off-stream reservoirs (McKee, unpublished report).

Similarly, in the Russian River basin, the Salmon Coalition is exploring ways to provide incentives for altering the use of historic rights in order to improve stream flows in areas designated as critical for salmon recovery. These efforts are currently not seen as "restoration projects" per se and therefore have not received restoration dollars, yet they are critical for salmonid survival. In conclusion, real solutions will only be found when restoration looks beyond the stream to address the entire watershed as a combination of social and ecological forces that interact to produce watershed conditions. Bridging the disconnect between restoration goals and practices will require better coordination of agencies involved in restoration to focus on larger, watershed-scale concerns.

Implications for Practice

- Restoration must address the social and ecological forces that interact to produce watershed conditions in order to create sustainable ecosystems and equitable policies.
- More research needs to be done on the root causes of environmental degradation, and these causes should be understood within a social context, particularly in terms of policy mandates and economic incentives that motivate particular land and water uses.

- Funding should be targeted at modifying the social drivers of environmental degradation by focusing on more transformative changes at a basin-scale, particularly in terms of land and water conservation and management, policy, and education.
- Restoration practices must also include efforts to protect upland habitat from harmful activities beyond the riparian zone associated with land use. Reducing sprawl and agricultural conversion in the uplands would both reduce the demand on water and protect remnant upland habitat.

Acknowledgments

We greatly appreciate those agencies and staff members who contributed data: D. Acomb at the CDFG, C. Mandel at the Natural Resource Conservation Service, and several staff members at the SCWA. We thank the Hopland Research and Extension Center and the Integrated Hardwood Range Management Program for their support. We would like to recognize the financial support we received from the University of California Water Resources Center, the Ford Foundation Community Forestry Fellowship, and the Colman Watershed Fellowship at the University of California, Berkeley. Finally, we would also like to thank C. Brooks and S. Freier for their assistance with GIS, L. Fortmann for her guidance and mentorship, D. Newburn for his land use models, and S. Reed for her help with statistics.

LITERATURE CITED

Baker, J. M. 2005. Socio-economic characteristics and contributions of the natural resources restoration system in Humboldt County, California. Ecological Restoration **23**:5–14.

Bernhardt E. S., Palmer M. A., Allan J. D., Alexander G., Barnas K., Brooks S., et al. 2005. Synthesizing US river restoration efforts. Science **308**:636–637.

CDFG (California Department of Fish and Game). 2002. Draft Russian River basin fisheries restoration plan (available from http://www.krisweb.com/biblio/russian_cdfg_coey_2002_draftrestplan.pdf) accessed 11 January 2007.

CDFG (California Department of Fish and Game). 2006. Fisheries restoration grant program, 2006 proposal solicitation notice, April 5, 2006 (available from http://www.dfg.ca.gov/nafwb/frgp_2006_psn/06-07%20PSN.pdf) accessed 21 May 2006.

Christian-Smith, J. 2006. The politics and practice of watershed restoration: insights from the Russian River watershed, Northern California. Ph.D. dissertation. Environmental Science, Policy and Management Department, University of California, Berkeley.

Downs, P., and G. M. Kondolf. 2002. Post-projects appraisals in adaptive management of river channel restoration. Environmental Management **29**:477–496.

Federal Register. 1997. Environmental Quality Incentive Program final rule. Pages 28257–28292 in Federal Register 62: rules and regulations. Department of Agriculture, Commodity Credit Corporation, National Archives and Records Administration, Washington, D.C.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 1998. California salmonid stream habitat restoration manual. 3rd edition. The California Resources Agency, Sacramento, California.

Gobster, P., and R. B. Hull, editors. 2000. Restoring nature: perspectives from the social sciences and humanities. Island Press, Covelo, California.

Gustaitis, R. 2004. The restoration economy. California Coast and Ocean **20**:12–13.

Harris, R. R., C. M. Olson, S. D. Kocher, J. M. Gerstein, W. Stockard, and W. E. Weaver. 2005. Procedures for monitoring the implementation and effectiveness of fisheries habitat restoration projects. Final report for the California Department of Fish and Game. Center for Forestry, University of California, Berkeley.

Higgs, E. 2003. Nature by design: people, natural process, and ecological restoration. MIT Press, Cambridge, Massachusetts.

Hight, J. 1998. Using tools of destruction to restore redwoods. High Country News December 7, 1998.

Kondolf, G. M. 1995. Five elements for effective evaluation of stream restoration. Restoration Ecology **3**:133–136.

Kondolf, G. M. 1997. Lessons learned from river restoration projects in California. Aquatic Conservation: Marine and Freshwater Ecosystems **8**:39–52.

Lufkin, A., editor. 1991. California's salmon and steelhead. University of California Press, Los Angeles.

Natural Resources Conservation Service. 2002. Natural Resource Conservation Service, Environmental quality incentives program: conservation practices planned and installed by county. Pages 255–256 and 290–291 in Reports for Mendocino and Sonoma Counties (available from http://www.ca.nrcs.usda.gov/programs/eqip2008norcal.html) accessed October 2004.

Rose, B. L. 2007. City leads in cutbacks. Santa Rosa Press Democrat August 7, 2007.

Rosgen, D. 1994. A classification of natural rivers. Catena **22**:169–199.

SCWA (Sonoma County Water Agency). 2006. Fisheries enhancement program (available from http://www.scwa.ca.gov/environment/natural_resources/fisheries_enhancement.php) accessed 12 January 2006.

Thompson, M., and D. M. Ducheny. 1997. California Senate Bill 271. California Senate, Sacramento, California.

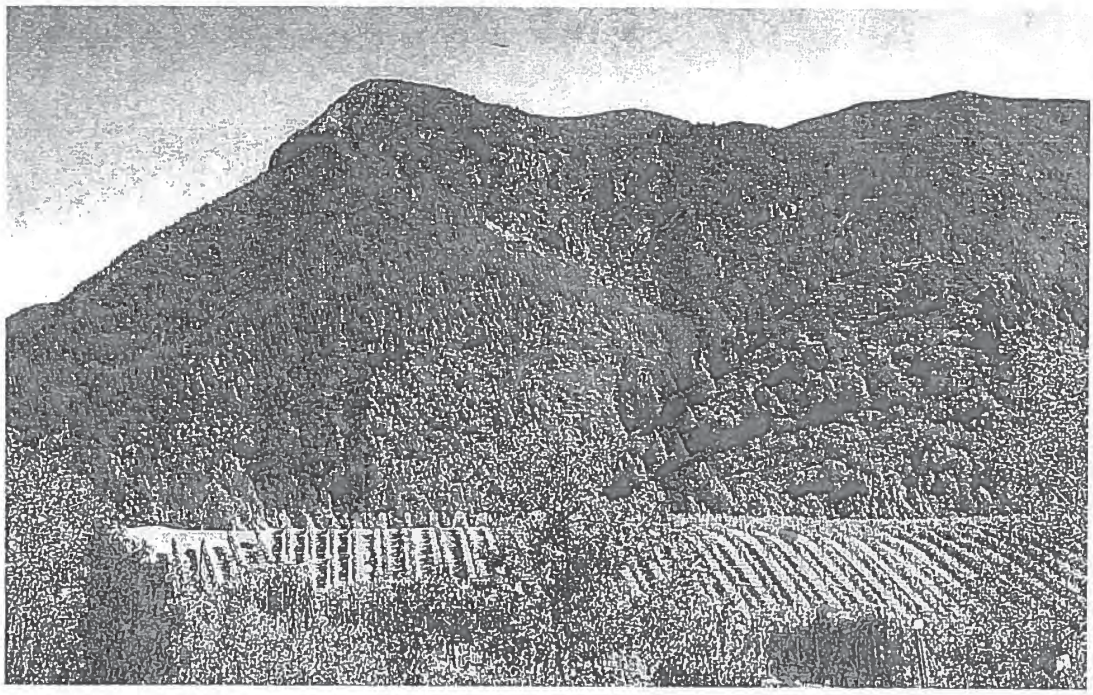
U.S. Census. 2006*a*. Census '90 (available from http://www.census.gov/main/www/cen1990.html) accessed 12 January 2006.

U.S. Census. 2006*b*. Census 2000 gateway (available from http://www.census.gov/main/www/cen2000.html) accessed 12 January 2006.

Wheaton, J. M., S. E. Darby, D. A. Sear, and J. A. Milne. 2006. Does scientific conjecture accurately describe restoration practice? Insight from an international river restoration survey. Area **38**:128–142.

EXHIBIT E5

Exhibit E-5



BEST MANAGEMENT PRACTICES

for

AGRICULTURAL
EROSION AND SEDIMENTATION CONTROL

Produced by:
SONOMA COUNTY GRAPE GROWERS ASSOCIATION
SONOMA COUNTY AGRICULTURAL COMMISSIONER'S OFFICE
ENTERRA ASSOCIATES

COVER CROP

Protecting bare soil surfaces is one of the best ways to prevent soil loss. Grasses, depending on the type, provide short-term soil stabilization for disturbed areas during construction of your project and can serve as long-term permanent soil stabilization for disturbed areas. There are many different seed mixtures that you can choose from. Most important is to be sure that your seed mixture provides over-story and under-story protection. For example a mixture of oats and barley will only provide overstory protection and will only be slightly more effective than if you did nothing. The raindrops can still fall down between the tall plant stalks and hit the dirt. If you mix in some clover and brando brome you will get under-story protection and the soil will have better protection. The amount of seed that you will need depends on the mix that you choose. It can range from 30 lbs per acre for a more permanent type of cover crop to 90 lbs per acre for a quick erosion control soil builder mix. Your seed company will be able to help you determine what mix is best for your project and give you the recommended seed rate. Broadcast your seed in the fall. In order to have adequate protection by the start of the rainy season (Nov. 1) the seed should be planted by mid-September. Initial irrigation will be required for most grasses with follow-up irrigation and fertilization. The cover crop should look like a lawn by Nov 1 (see above picture) in order to provide adequate protection for the soil during the first heavy rains. If you cannot plant by mid-September and irrigate the seed than you must plant your seed in October **and** cover it with straw mulch.applied at the rate of two tons per acre. The following section will give you guidelines on seed mixes for cover crops and application rates

PUBLICATION 8064 FWQP REFERENCE SHEET 10.1

Reference:

Watershed Function

MERILARK PADGETT-JOHNSON is Viticulture Program Coordinator, Allen Handcock College, Santa Maria, California, and **TOM BEDELL** is Extension Rangeland Resource Specialist, Oregon State University.

UNIVERSITY OF CALIFORNIA
Division of Agriculture and Natural Resources
http://anrcatalog.ucdavis.edu

In partnership with
NRCS Natural Resources Conservation Service
http://www.nrcs.usda.gov

Farm Water Quality Planning
A Water Quality and Technical Assistance Program for California Agriculture
http://waterquality.ucanr.org

This REFERENCE SHEET is part of the **Farm Water Quality Planning (FWQP)** series, developed for a short course that provides training for growers of irrigated crops who are interested in implementing water quality protection practices. The short course teaches the basic concepts of watersheds, nonpoint source pollution (NPS), self-assessment techniques, and evaluation techniques. Management goals and practices are presented for a variety of cropping systems.

UC PEER REVIEWED

WHAT IS A WATERSHED?

All life depends on the soil, the water falling on that soil, and the air above and within the soil. Entire societies have disappeared because they didn't properly understand and care for their soil resource. Without productive soil, plant and animal diversity would decrease and our current human population could not be maintained.

We can think of a watershed, using the simplest description, as the land on which water falls from the atmosphere and in which that water is stored underground and then released to other locations over a period of time. All land is part of a watershed.

We can also visualize each watershed as a catchment area divided from the next watershed by topographic features such as ridgetops. The water that falls within a watershed or catchment but is not held or used by existing vegetation will ultimately seep and flow to the lowest point available. It will eventually reach the streams and rivers that drain the system or be stored in ground water until it is removed by pumping.

With respect to watersheds, the hydrologic cycle refers to the process beginning with the water falling to earth in either liquid or solid form (Figure 1). The captured water is either taken up by vegetation, retained in the soil, or percolates through the soil. The water may enter into springs, streams, rivers, lakes, groundwater reservoirs, or the sea. It can then return to the atmosphere by evaporating and start the cycle again.

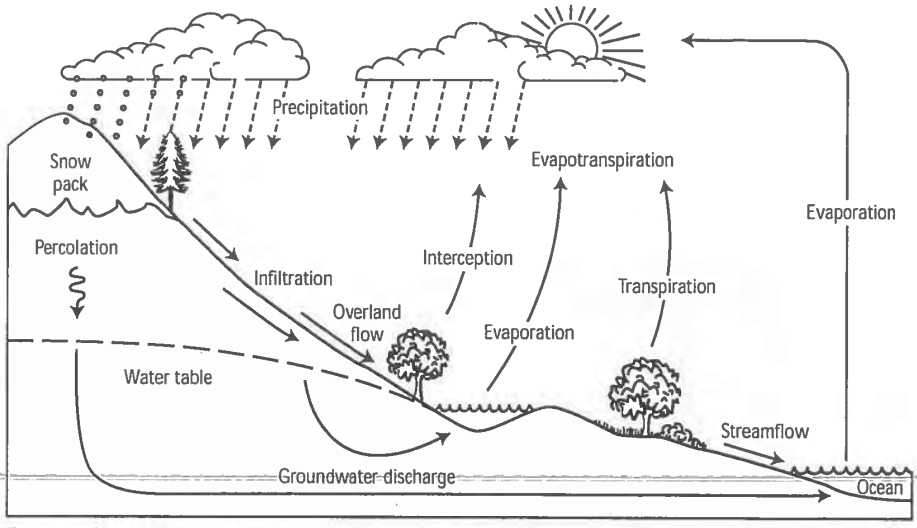


Figure 1. Hydrologic cycle

Ground water is part of the watershed and is tightly linked to the hydrologic cycle within the watershed. It is important, though, that you keep in mind that watersheds have traditionally been defined and managed with respect to surface water and the network of channels and streams that connects to the surface outlet of the watershed. Groundwater basins are defined by the geology underneath watersheds so they do not always have the same boundaries as their overlying watersheds. In this publication we discuss watershed functions that relate to surface water features. For more information on ground water, see the FWQP Reference Sheets on ground water (ANR Publications 8083, 8084, 8085, and 8086).

WATERSHED FUNCTIONS

There are three processes within a watershed that can protect water quality if preserved: *water capture*, *water storage*, and *water release*. A number of circumstances that can interrupt the capture, storage, and beneficial release of water are beyond human control. For example, when warm rains melt snow over frozen ground, the resulting water cannot infiltrate and has no alternative but to run off. A number of steps are available to land managers, however, to preserve these processes.

Capture

Water capture is the process of water's transfer from the atmosphere into the soil. All moisture received from the atmosphere, whether in liquid or solid form, should have the maximum opportunity to enter the ground where it falls.

Land managers can affect the extent of water capture by making it easier for water to infiltrate the soil surface and percolate to greater depths.

Infiltration is the movement of moisture from the atmosphere into and through the soil surface. *Percolation* is the downward movement of water through the soil profile. Several factors affecting the infiltration rate are fixed, such as soil type (primarily texture and depth), topography, and climate, but you can influence infiltration rates by managing soil compaction, soil organic matter, and vegetative cover. The form and pattern of vegetation for any site can be managed to give water the maximum opportunity to penetrate the surface where it falls. This minimizes the overland flow that can otherwise cause erosion and transport pollutants into streams and waterways.

You can manage vegetative structure and the density of plant cover at or near the soil surface in such a way that almost all moisture that falls to the ground will enter the soil. Good infiltration rates are beneficially influenced by

- plant cover that reduces the physical impact of raindrops upon the soil surface, and thereby minimizes soil crusting
- plant cover that increases the roughness of the soil surface, thus decreasing the velocity of runoff water
- root systems that provide channels in the soil for water
- plant litter and organic matter on and incorporated into the soil surface to absorb moisture and help maintain soil structure
- plant cover that traps snow at or very near the soil surface (this will also make the soil freeze more slowly and enhance the water's chance to enter soil during winter months)

Some moisture is captured in the foliage of trees and shrubs. In areas of low precipitation where trees and shrubs dominate a site, these plants often catch snow and even some rain so that it evaporates or sublimates before it has a chance to reach and infiltrate the soil.

Healthy vegetative cover with its accompanying root mass can keep soil more permeable so moisture will more readily percolate into the soil profile for storage. Water often follows the paths of abandoned root channels and live roots into the soil. These paths may penetrate compacted soil layers or deeper horizons. Percolation also is aided by the activity of burrowing animals, insects, and earthworms.

Storage of Water in Soil

Once water is captured in the soil, it is stored between soil particles in the soil profile. Management practices can significantly affect storage capacity on any particular site. Nevertheless, keep in mind that the amount of moisture a given soil can hold depends on the soil's depth, texture, and structure. For example, the available water holding capacity of a clay loam is about 2 inches per foot of soil depth, versus about 1.4 inches per foot of soil depth for a sandy loam.

The kinds and amount of vegetation and the plant community structure can also greatly affect water storage on any particular site. A rangeland site can be dominated by shallow-rooted annual grasses, deep-rooted perennial grasses, shrubs, or trees, or a mixture of these. All of these plants use water at varying depths in the soil profile. A cropland site is typically dominated by a single plant species that draws water from a limited range of depths.

After a soil is saturated, additional water will either percolate deeply or run off the surface. Soil moisture is lost in three ways:

- through plants that grow on the site
- through percolation of excess water through the soil profile
- through direct evaporation from bare soil surfaces

Management practices that reduce evaporation at the soil surface by slowing the movement of air, shading the soil, and reducing temperatures can help conserve moisture.

Beneficial Release

Beneficial release occurs when water is released into ground water or out of the watershed without causing adverse environmental impacts. In this process, water moves through the soil profile to seeps, springs, and ultimately into the streams and rivers that are the water conduits from the uplands. The amount and rate of water released depend on two factors:

1. *Subsurface flow:* the water already in the soils of the uplands, riparian areas, and streambanks in excess of field capacity
2. *Overland flow:* precipitation that exceeds the soil's infiltration rate and flows over the soil surface

The form and amount of vegetation growing in riparian zones directly affect the flow rates of rivers and streams. Vegetation acts to protect streambanks and absorb energy from flowing water. A severe, rapid release of water will occur in straight channels with little resistance to water movement. The energy from the rapid release of water can then erode the streambanks, increasing the water's sediment load and diminishing the water's quality. Vegetation also affects the subsurface flow of water. Without vegetation to remove water from the soil profile by transpiration, the quantity of water from any precipitation that will be released to streamflow will increase.

Land management practices in every part of the watershed will affect the health of the entire watershed. All parts of a watershed are equally important. The upland zone captures and stores water while the riparian zone is the primary release mechanism for the watershed. Proper care of the upland and riparian zones keeps the watershed functioning properly. The ideal condition will keep most water where it falls, reduce runoff, and allow for moderate streamflows.

REFERENCES

Bedell, T. 1995. Rangeland water quality fact sheet No. 4: What is a watershed? http://agronomy.ucdavis.edu/calrng/h04.htm

ACKNOWLEDGMENTS

The authors wish to thank the following for their contributions to this publication: Royce Larsen, UCCE Farm Advisor, San Luis Obispo County; Mary Bianchi, UCCE Farm Advisor, San Luis Obispo County; Tim Prather, Weed Ecologist, College of Agriculture, University of Idaho; and Thomas Harter, UCCE Hydrogeology Specialist, Kearney Agricultural Center.

FOR MORE INFORMATION

You'll find detailed information on many aspects of field crop production and resource conservation in these titles and in other publications, slide sets, CD-ROMs, and videos from UC ANR:

Nutrients and Water Quality, slide set 90/104
Protecting Groundwater Quality in Citrus Production, publication 21521
Sediments and Water Quality, slide set 91/102

To order these products, visit our online catalog at http://anrcatalog.ucdavis.edu. You can also place orders by mail, phone, or fax, or request a printed catalog of publications, slide sets, CD-ROMs, and videos from

University of California
Agriculture and Natural Resources
Communication Services
6701 San Pablo Avenue, 2nd Floor
Oakland, California 94608-1239

Telephone: (800) 994-8849 or (510) 642-2431
FAX: (510) 643-5470
E-mail inquiries: danrcs@ucdavis.edu

An electronic version of this publication is available on the ANR Communication Services Web site at http://anrcatalog.ucdavis.edu.

Publication 8064

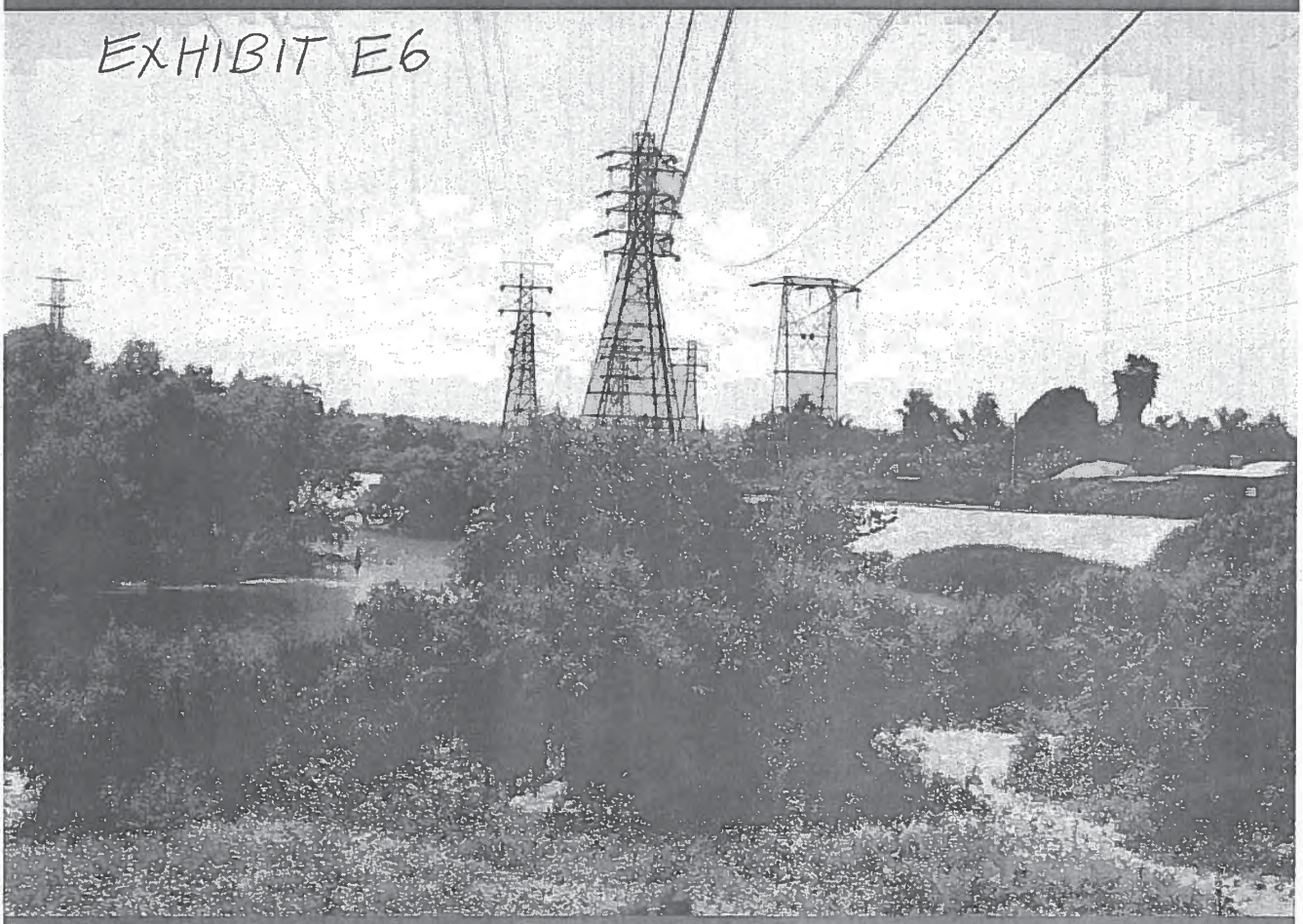
pr-10/02-WJC/CR ISBN-978-1-60107-242-9

This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Natural Resources.

Exhibit E-6.1

Preventing the Spread of Invasive Plants:

EXHIBIT E6



Best Management Practices for Transportation and Utility Corridors

California Invasive Plant Council

Cite this report as: Cal-IPC. 2012. Preventing the Spread of Invasive Plants:
Best Management Practices for Transportation and Utility Corridors. Cal-IPC Publication 2012-01. California Invasive Plant Council, Berkeley, CA. Available at www.cal-ipc.org.

This report was funded through the American Recovery and Reinvestment Act, with funding provided by the USDA Forest Service, State and Private Forestry through the California Department of Food and Agriculture.

Cover photos: Large photo – Utility corridors cross hundreds of miles of landscape and wilderness acting as potential vectors for invasive plant spread. Photo: Courtesy of Southern California Edison. Bottom left photo – Caltrans employees inspecting the performance of a vegetation control mat installed under an existing guardrail along highway. Photo: Jack Broadbent, California Department of Transportation.

Technical Advisory Team

In 2011, the California Invasive Plant Council formed a technical advisory team comprising of transportation, utility, and land management experts in the state. The technical advisory team guided the development of a set of voluntary invasive plant prevention best management practices (BMPs) for transportation and utility corridors.

Don Akau
San Diego Gas & Electric

Patrick Akers
California Department of Food and Agriculture

David Bakke
USDA Forest Service

John Beall
San Mateo County Agriculture Department

Peter Beesley
Pacific Gas and Electric Company

Jack Broadbent
Caltrans Division of Design, HQ Landscape Architecture Program

Doug Brown
Caltrans Division of Design, HQ Landscape Architecture Program

Karen Buhr
California Association of Resource Conservation Districts

Bob Case
California Native Plant Society

Jill Fariss
Southern California Edison

Jennifer Gillies
Caltrans Vegetation Treatment Program

Jay Goldsmith
National Park Service

Johnny Grady
Southern California Gas Company

Steve Hallmark
Sacramento Metropolitan Utility District

Don Houston
Southern California Gas Company

Diane Ikeda
USDA Forest Service

Marla Knight
USDA Forest Service

Parviz Lassai
Caltrans Division of Maintenance, Office of Roadsides

Ellen Mackey
Metropolitan Water District of Southern California/Council for Watershed Health

Jack McCabe
Davey Resource Group

Tony Mediati
California Department of Forestry and Fire Protection

Nelsen Money
Natural Resources Management - Vegetation Management Systems, Inc.

Ken Murray
Caltrans Division of Maintenance, Office of Roadside Maintenance

Keith Robinson
Caltrans Division of Design, HQ Landscape Architecture Program

Ramona Robison
California State Parks

LaTisha Saare
Western Area Power Administration

Susan Savolainen
Metropolitan Water District of Southern California

Tom Smith
California Department of Forestry and Fire Protection

Steve Schoenig
California Department of Fish and Game

Don Thomas
San Francisco Public Utility Commission

Kathy Van Zuuk
USDA Forest Service

Wendy West
UC Cooperative Extension, Natural Resources Program

Andrea Williams
Marin Municipal Water District

Vicki Wojcik
Pollinator Partnership

Other Contributors

Jeff Bodde
Caltrans Division of Maintenance, District 3

Shawn Casteel
Caltrans Division of Maintenance, District 4

Michael Daleo
San Diego Gas & Electric

Kris Griffin
Caltrans Division of Maintenance, District 5

Jim Hanson
Caltrans Division of Construction

Drew Ready
Council for Watershed Health

David Stach
Caltrans Division of Maintenance, District 3

Cal-IPC Staff

Alice Chung, Project Lead
Training Program Specialist

Heather DeQuincy
Outreach Program Manager

Doug Johnson
Executive Director

Arpita Sinha
Training Program Specialist

Jen Stern
Training Program Manager

Contents

Purpose Statement
The goal of this manual is to present voluntary guidelines that help those managing transportation and utility corridors in California to prevent the accidental introduction and spread of terrestrial invasive plants.

Invasive Plants
Federal Executive Order 13112 defines an invasive species as an alien (non-native) species whose introduction does or is likely to cause economic or environmental harm or harm to human health. While the majority of non-native plants do not pose a threat to natural or human systems, the Cal-IPC Invasive Plant Inventory identifies 200 species, approximately 3% of the plant species growing in the wild in California, as invasive. These plants have the capacity to alter native ecosystems, with potential detrimental implications for wildlife communities, fire regimes, water flow, and nutrient cycling. The term "weed" is used interchangeably with invasive plants in this manual.

Background
Transportation and utility corridors are at-risk sites for the introduction and spread of invasive plants. A corridor is a strip of land upon which linear facilities such as pipelines, roads, and power or communication lines are built and maintained. Regular use and the associated potential for soil disturbance within corridors provide opportunities for the movement of invasive plants through the landscape. Transportation and utility corridors may even cross geographic barriers that previously limited the spread of invasive plants.

Utility corridors and roads cross hundreds of miles of landscape and wilderness acting as potential vectors for invasive plant spread. Photo: Courtesy of Southern California Edison

Invasive plant seeds and other reproductive parts can be inadvertently transported by vehicles, equipment, people and animals. Soil and vegetation disturbance during construction and maintenance activities can also create suitable conditions for the establishment of invasive plants, and once invasive plants establish populations, these corridors can become sources of seeds that facilitate further spread. Invasive plant spread can be greatly reduced if agencies and workers implement prevention practices such as cleaning equipment and using weed-free materials.

Best Management Practices (BMPs)
Best Management Practices are methods or techniques found to be the most effective and practical in achieving an objective, such as preventing or minimizing invasive plant spread, while making optimal use of resources.

Prevention BMPs that minimize invasive plant spread in transportation and utility corridors can help:

- Reduce future maintenance needs and cost
- Reduce fire hazards
- Reduce herbicide use
- Enhance visibility, access and safety
- Limit liability for the governing agency or lessee
- Maintain good public relations
- Protect existing wildlife habitat, native plant populations and beneficial insects, as well as threatened and endangered species.

Target Audience
This manual was developed for the gas, electric, water and communication utilities sectors, and state and local transportation agencies. This manual provides task-oriented checklists and practices for field staff who play a direct role in corridor construction and maintenance activities or in preventing the spread of invasive plants. The manual also provides tools for management personnel, whose decisions are critical to prevention activities. These tools include integration strategies for executives, as well as planning guidelines for supervisors, environmental planners and landscape architects.

Scope
The primary focus of this manual is preventing the spread of terrestrial invasive plants. Therefore this manual does not focus on invasive plant control methods; however, control measures are discussed insofar as they relate to prevention. For example, mowing as a control method is not discussed, but because timing of mowing relates directly to potential for invasive plant spread, this aspect is included. Invasive aquatic plants and corridors along levees and railroads are outside of the scope of this manual.

Implementation of BMPs
Effective implementation of prevention BMPs will require a process of continuous learning. These voluntary BMPs were developed with the understanding that each situation and entity has different needs, constraints and resources. The applicability and effectiveness of BMPs will vary with existing land uses, degree of human disturbance, the objectives of the land owners, and the resources available for management activities. A discussion of Prioritizing BMP Implementation appears later in this section on page 4 to help determine which BMPs to emphasize depending on situational factors.

Conducting a thorough pre-activity assessment will help to identify which tasks can spread invasive plants (See Pre-Activity Assessment Outline on page 5). Many of these BMPs may overlap with existing practices or standard mitigations, such as those for Storm Water Pollution Prevention, clean air regulations, pest quarantines, or rare species protections.

Using This Manual
This manual provides BMPs to aid in preventing the introduction and spread of invasive plants. Its recommendations are voluntary; each organization can choose how to best incorporate this information into their operations.

Section I includes overview information on what BMPs are, why they are important, and how to best implement them. This section also provides recommendations for BMP prioritization.

Section II provides detail on a wide range of activity-specific BMPs for preventing the spread of invasive plants. These BMPs are organized into seven chapters: a chapter for general BMPs applicable to all activities, and six activity-based BMP chapters. Each BMP is appropriate for particular situations; users can select those that are suitable for their use. The BMPs described in Section II are structured as follows:

> **BMP Statement: Prevention BMP statements, in bold font, describe practices that can prevent the introduction and spread of invasive plants.**
>
> Considerations:
> a. BMP Considerations are listed below the BMP Statement
> b. BMP Considerations give more information about why the BMP is important, and may include details, suggestions, examples, and issues to consider when applying the BMP.

Section III presents ready-to-use checklists which contain only the BMP statements to provide a quick and portable reference for field activities. The checklists are divided into three categories: Routine Maintenance, New Projects, and Inspection & Cleaning. These checklists can be used as templates and be modified based on your needs.

Section IV has additional resources and information, a glossary and other references.

Definition and Categorization of Activities
Definition and categorization of activities vary among sectors and organizations. A utility company may consider "maintenance" to mean inspection and repair of facilities while a road agency may include activities such as vegetation management, trash management, and installing signage to be maintenance.

For this reason, the definition and scope of each activity and how it may spread invasive plants is described in the introduction of each chapter. When using this manual, consider your activity's scope and potential impact as it relates to the potential to introduce or spread invasive plants. Refer to BMPs in related chapters to customize your prevention practices.

Overall Prevention Principles:

Take time to plan. Proper planning can reduce future maintenance costs by reducing the potential for invasive plant introduction and spread. A good first step is to conduct a pre-activity assessment of the work area to determine which activities could spread weeds and which BMPs are applicable.

Stop movement of invasive plant materials and seeds. The movement of workers, materials and equipment can carry weeds between sites. This manual identifies potential vectors of spread and how to eliminate them or minimize their effects.

Minimize soil and vegetation disturbance. Disturbance can allow invasive plants to colonize a new area. Disturbance should be minimized, and when it is unavoidable, managers should conduct follow-up monitoring to ensure early detection of any invasive plants that may have been introduced.

Maintain desired plant communities. A healthy plant community with native and desirable species provides resistance to invasive plant establishment.

Practice Early Detection and Rapid Response (EDRR). Early detection and eradication of small populations helps prevent the spread of invasive plants and significantly reduces weed management costs. Regular monitoring increases the chances of success.

Prioritizing BMP Implementation

The prevention BMPs in this manual are developed with the understanding that each situation and entity has different needs and resources. This outline can help you select which areas and species to prioritize when integrating BMPs into management activities.

Determine:

1. **Management costs. Prioritize:**
   - Areas where future control costs will be high if invasive plants become established
   - Areas where fire risk is high
   - BMPs with approaches that are measurable in cost and effectiveness

2. **Ecological value of habitats. Prioritize:**
   - Areas with threatened or endangered species and habitat
   - Areas of high ecological or conservation value
   - Areas where invasive plants have not invaded

3. **Context of the area being managed. Prioritize:**
   - Wildland and natural areas
   - Areas with new construction or disturbance
   - Areas containing water bodies
   - Areas with important scenic or recreational resources
   - Areas where adjacent land owners are cooperative
   - Areas where wildland interfaces with urban areas
   - Wildland areas frequented by vehicles, equipment and foot traffic

4. **Treatment of invasive species. Prioritize:**
   - Species known or suspected to be invasive but still in small numbers
   - Species that can alter ecosystem processes
   - Species that occur in areas of high conservation value
   - Species with the potential to require high management costs
   - Species that are likely to be controlled successfully
   - Species determined to be of regional concern as identified through regional partnerships

Pre-Activity Assessment Outline

This assessment outline can help you proactively address activities that have the potential to spread invasive plants. A site assessment and a description of planned activities will need to be completed as part of this pre-activity assessment.

1. **Conduct a site assessment to ascertain:**
   - A list of invasive plant species found in route to and within worksites. Include exact locations and densities, and the species' dispersal mechanisms.
   - A list of priority areas for implementing prevention BMPs. Refer to Prioritizing BMP Implementation on the previous page for guidance on prioritization.

2. **Describe each activity (e.g. roadside mowing, facility inspection, access road grading and maintenance, and pole/tower repair) to ascertain:**
   - Location(s) of the activity
   - Location(s) of access routes
   - Timing for the activity
   - Tools and equipment to be used
   - Materials to be moved, imported or exported
   - Expected alteration of existing vegetation and soil

3. **List the sequence of tasks that are included in the activity. Identify which tasks can be altered to reduce the likelihood of invasive plant spread based on:**

   Task location
   a. Is there a location for this task with less potential to spread invasive plants?
   b. Can access routes be changed to avoid traveling through invasive plant populations?
   c. If materials are being moved, is there a better location for materials to be stored?

   Task timing
   a. Can the task be performed in a different time (earlier/later in the season) or in a different sequence (e.g. spraying after mowing)?
   b. Can invasive plant populations be treated before project tasks commence to reduce the spread of invasive plant parts and seeds?

   Task method
   a. Is there a different method of performing the task that can reduce the risk of spread?
   b. Could using different tools/equipment/materials reduce the risk of spread?
   c. Are weed-free materials available?

4. **Select BMPs from the following chapters to address the potential introduction and spread of invasive plants.**

List of Best Management Practices

Chapter 1: General BMPs

GN1: Provide prevention training to staff and contractors prior to starting work.

GN2: Scout for invasive plants and evaluate risks before activities begin.

GN3: Schedule activities to minimize potential for introduction and spread of invasive plants.

GN4: Designate specific areas for cleaning tools, vehicles, equipment, clothing and gear.

GN5: Designate waste disposal areas for invasive plant materials, and contain invasive plant material during transport.

GN6: Plan travel routes to avoid areas infested with invasive plants.

GN7: Clean tools, equipment, vehicles and animals before transporting materials and before entering and leaving worksites.

GN8: Clean clothing, footwear and gear before leaving infested areas.

GN9: Prepare worksites to limit the introduction and spread of invasive plants.

GN10: Minimize soil and vegetation disturbance.

GN11: After activities, monitor worksites for invasive plants.

Chapter 2: Planning

PL1: Adopt official project or maintenance activity policy to prevent invasive plant spread.

PL2: Include invasive plant risk evaluation as a component of initial project planning and environmental analysis.

PL3: Integrate invasive plant prevention BMPs into design, construction, vegetation management and maintenance planning activities.

PL4: Integrate invasive plant prevention BMPs and monitoring methods into environmental awareness training for staff, contractors and volunteers.

PL5: Coordinate invasive plant prevention efforts with adjacent property owners, regional weed management groups, and local agencies.

PL6: In the initial stage of planning, conduct site assessment for invasive plant infestations and incorporate findings into a GIS database and project drawings or maps.

PL7: Develop monitoring plans to evaluate effectiveness of BMP implementation.

Chapter 3: Materials Management

MM1: Use a weed-free source for project materials.

MM2: Prevent invasive plant contamination of project materials when stockpiling and during transport.

Chapter 4: Vegetation Management

VM1: Schedule vegetation management activities to maximize the effectiveness of control efforts and minimize introduction and spread of invasive plants.

VM2: Develop a mowing policy to minimize the introduction and spread of invasive plants.

VM3: Retain existing desirable vegetation and canopy where possible.

VM4: Keep livestock and support animals clean.

VM5: Render invasive plant material nonviable when disposing of materials on-site.

Chapter 5: Soil Disturbance

SD1: Minimize soil disturbance and transport during project implementation.

SD2: Implement erosion control practices.

SD3: Manage existing topsoil and duff material.

Chapter 6: Revegetation and Landscaping

RL1: Develop revegetation and landscaping plans that optimize resistance to invasive plant establishment.

RL2: Acquire plant materials locally. Inspect delivered plants to ensure plant labels match specifications prior to planting.

RL3: Revegetate and/or mulch disturbed soils as soon as possible.

Chapter 7: Routine Maintenance and Inspection of Facilities

RM1: Identify prevention priorities with resource, facility, or corridor managers prior to starting work.

RM2: Document invasive plant findings and communicate to resource, facility or corridor managers.

RM3: Identify travel direction and cleaning locations prior to starting work.

RM4: Designate lay-down and staging areas outside of infested areas prior to starting work.

RM5: Carry portable cleaning tools that can be used without water.

RM6: Develop brush control policy along access roads to minimize the introduction and spread of invasive plants.

RM7: Minimize soil disturbance when maintaining access roads.

RM8: Maintain facility site to limit the introduction and spread of invasive plants.

with the wind to new areas.

reer, I've never seen a plant as this. It moves incredibly oe DiTomaso, University of ed Research and Information or. "Stinkwort is not included ornia floras, and inhabits dis-, roadsides, pastures, fields, dlands, levees, washes and dal marshes primarily in the o Bay Area, especially the tion. It is also found sporadi- Diego and near Sacramento ding its range very rapidly."

rs are in the early stages of g the life cycle of this wide- ve weed, which resembles tar resented their latest informa- rowers and researchers who 55th Annual UC Davis Weed the campus in mid-July.

Brush, UC Davis doctoral student working on stinkwort with DiTomaso, said stinkwort is mostly a problem on roadsides, but it does appear to be moving into rangeland.

Photo/Bob Johnson

UC Davis doctoral student Rachel Brush shows stinkwort plants during a recent weed field day on campus.

"It is a relatively new weed in California and we're not sure what the introduction was. It tends to do better in the coastal areas, but it has become a problem in most areas of the state," said Brush.

DiTomaso said he thinks that roadsides and riparian areas are most susceptible to stinkwort, but that he had heard of crop and pasture areas that have already been affected.

"It has completely infested a vineyard in Livermore," said John Roncoroni, UC Cooperative Extension weed science farm advisor.

It has also infested a rangeland property outside Fremont that the University of California was considering buying as part of a plant diversity reserve program.

Little is known about stinkwort because until recently there has been relatively little research on the weed in California, or even in its native Mediterranean region.

"The literature review on this is pretty easy to do because there isn't very much. Now we know it is a winter annual; I had thought it was a summer annual." DiTomaso said. Stinkwort is a late-season annual that flowers in October or November.

Stinkwort appears to be a poor competitor, which is why overgrazed pasture would be a likely place for it to spread, Brush said.

Greenhouse and small plot studies are yielding more detailed information about the conditions under which it germinates.

"Understanding when the seeds germinate and how they grow will help us develop control methods," Brush said.

A germination study tracked the fate of seeds planted monthly from November through May. It found that seeds planted

The seeds can even germina low-light conditions, although t are not as vigorous. This fits wit that more vigorous plants can s stinkwort.

UC Davis invasive plant speci Kyser has already done prelimi bicide trials on stinkwort.

This June, he tried applica Roundup, Garlon, Milestone a Dupont contact material.

"We didn't think a contact would do much on plants this l we got pretty good results wit high rate of Garlon, and the two Roundup gave about 90 percent Kyser said.

As researchers learn more a weed's life cycle, they should to fine-tune their recommenda control.

"It would probably be more to come in earlier with a combi foliar and soil materials," Kyser

Although stinkwort has no come a widespread problem o pasture land, it is easy to find v to pastures.

"On Jackson Road outside Sa you see it all along the roadsi isn't in the rangeland," Kyser sa

By 2009, stinkwort had spre Santa Clara County to a dozen in the greater San Francisco B as well as to San Diego County California Invasive Plant Council stinkwort as adapted and likely to virtually every coastal county ly all of the Central Valley.

The Invasive Plant Council l is known about this weed on its site. (www.cal-ipc.org/ip/mana plant_profiles/Dittrichia_graveol

(Bob Johnson is a reporter in He may be contacted at bjoh aol.com.)

California Public Utilities Commission

Proceeding Documents Rulings Decisions

Proceeding Detail

Subscribe Get Involved! Search Results Main Page

A1512005 - Proceeding

Filed By: Pacific Gas and Electric Company

Service Lists: Service List 1

Industry: Electric

Filing Date: December 3, 2015

Category: Ratesetting

Current Status: ACTIVE

Description: Application of PACIFIC GAS AND ELECTRIC COMPANY, a California corporation, for a Permit to Construct the Fulton-Fitch Mountain Reconductoring Project (U39E).

Staff: ALJ: Darwin Farrar (Assigned Dec 18, 2015)
COMMISSIONER: Michael Picker (Assigned Dec 18, 2015)

WESTON RESPONSE TO PROJECT:

2 Photographic exhibit series C7.2 - C7.5 and C8.1 - C8.12

7 Document exhibits

B1

D1 - D6

Sent by Richard and Carolyn Weston
P. O. Box 515
Windsor, CA 95492

Exhibit B-1

Book 759

170

The route of said poles shall be as follows, viz;

Beginning at a point in the easterly boundary line of said premises and running thence North 59° 18' west 110 feet, more or less, to a point from which the northeast corner (marked by an intersection of fences) of said premises bears north 62° 20' east 90.5 feet distant; thence north 59° 18' west 90 feet, more or less, to the northerly boundary line of said premises.

First party does further grant unto second party the right (a) of ingress to and egress from such facilities and second party's facilities on adjacent lands by a practicable route or routes across said premises, (b) to erect, maintain and use gates in all fences which now cross or shall hereafter cross the right or rights of way hereby granted, and (c) to trim, and/or to cut and clear away, any trees and brush whenever, in the judgment of second party, the same shall be necessary for the convenient and safe exercise of the rights hereby granted; provided, however, (1) that in exercising such right of ingress and egress second party shall, whenever practicable, use existing roads or lanes, and shall repair any damage caused by its use thereof, and (2) that all trees which second party shall cut or remove, if valuable for either timber or wood, shall continue to be the property of first party, but all tops, lops, brush and slash shall be burned or removed by second party.

Second party shall indemnify first party against any and all loss and damage which may be caused by the exercise of said right of ingress and egress, or by any wrongful or negligent act or omission of second party or its agents, or employees, in the exercise of any of the rights hereby granted.

In the exercise of said rights second party shall avoid unreasonable interference with such use by first party of said premises as is consistent with the full enjoyment of said rights by second party. First party, however, shall not erect or construct any building or other structure, or drill or operate any sort of well, or permit others so to do, within 25.0 feet of the route hereinbefore described.

The provisions hereof shall inure to the benefit of and bind the respective successors and assigns of the parties hereto.

IN WITNESS WHEREOF first party has executed these presents this 19th day of November, 1947.

Emma E. Baker

Executed in the presence of:
C. Lawrence Taylor
Witness.

ANS
9/27/47

STATE OF CALIFORNIA)
City and County of San Francisco) SS

On this 21st day of November, 1947, before me, FRANK PANTER, a Notary Public in and for said City and County, residing therein, duly commissioned and sworn, personally appeared C. Lawrence Taylor known to me to be the person whose name is subscribed to the within instrument as a witness thereto, who, being by me duly sworn, deposed and said that he resides in the County of Alameda, State of California, that he was present and saw Emma E. Baker (personally known to him to be the same person described in and whose name is subscribed to the within instrument as party thereto) sign and execute the same, and that he, the affiant, thereupon subscribed his name as witness thereto.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal at my office in the said City and County of San Francisco, the day and year in this certificate first above written.

(NOTARY SEAL)

Frank Panter
Notary Public in and for the City and County of San Francisco, State of California.

My Commission expires November 2, 1950.

Recorded at request of Railway Express Agency, Inc. Dec 17, 1947 at 20 mins. past 1 o'clock P. M. in Book 759, of Official Records, page 169, Sonoma County Records.

Serial No. C57452

Herbert B. Snyder, County Recorder

By M. Grant, Deputy Recorder

$2.20 Paid

Copyist Note:--This record is copied just as shown on original instrument.

Copyist: Archer

------oOo------

Cy RAR
North Bay Div
55é U. S. Rev. Stps. Cd.

GMO 92235
Sheet 6

749-157

THIS INDENTURE made by and between MILLER M. McNEAR and KATHLEEN McNEAR, husband and wife, hereinafter called first party, and PACIFIC GAS AND ELECTRIC COMPANY, a California corporation, hereinafter called second party.

WITNESSETH: that:

In consideration of value paid therefor by second party, the adequacy and receipt whereof are hereby acknowledged, first party does hereby grant unto second party the right from time to time to erect, construct, reconstruct, replace, remove, maintain and use such poles with all necessary and proper crossarms, braces, anchors, guys and other appliances and fixtures for use in connection

Book 759

171

therewith, and suspend therefrom, maintain and use such wires and/or cables, as second party may deem necessary for the transmission and distribution of electric energy and for private telephone and telegraph purposes of second party, together with a right of way therealong, over and across those certain premises, situate in the County of Sonoma, State of California, which are described as follows, viz:

That certain parcel of land, situate in Rancho Sotoyome, conveyed by George L. Proctor to Miller M. McNear et ux by deed dated March 19, 1947 and recorded in the office of the County Recorder of said Sonoma County in Book 732 of Official Records, at page 187.

The route of said poles shall be as follows, viz;

Beginning at a point in the southerly boundary line of said premises from which the southeast corner of said premises bears south 89° 39' east 4135.1 feet distant and running thence north 46° 26½' west 2493.3 feet; thence north 59° 18' west 890 feet, more or less, to the westerly boundary line of said premises,

First party does further grant unto second party the right (a) of ingress to and egress from such facilities and second party's facilities on adjacent lands by a practicable route or routes across said premises, (b) to erect, maintain and use gates in all fences which now cross or shall hereafter cross the right or rights of way hereby granted, and (c) to trim, and/or to cut and clear away, any trees and brush whenever, in the judgment of second party, the same shall be necessary for the convenient and safe exercise of the rights hereby granted; provided, however, (1) that in exercising such right of ingress and egress second party shall, whenever practicable, use existing roads or lanes, and shall repair any damage caused by its use thereof, and (2) that all trees which second party shall cut or remove, if valuable for either timber or wood, shall continue to be the property of first party, but all tops, lops, brush and slash shall be burned or removed by second party.

Second party shall indemnify first party against any and all loss and damage which may be caused by the exercise of said right of ingress and egress, or by any wrongful or negligent act or omission of second party or its agents, or employees, in the exercise of any of the rights hereby granted.

In the exercise of said rights second party shall avoid unreasonable interference with such use by first party, of said premises as is consistent with the full enjoyment of said rights by second party. First party, however, shall not erect or construct any building or other structure, or drill or operate any sort of well, or permit others so to do, within 25.0 feet of the route hereinbefore described.

The provisions hereof shall inure to the benefit of and bind the respective successors and assigns of the parties hereto.

IN WITNESS WHEREOF, first party has executed these presents this 19th day of November, 1947.

Miller M. McNear
Kathleen McNear

Executed in the presence of
C. Lawrence Taylor
Witness

ANS
9/27/47

STATE OF CALIFORNIA)
City and County of San Francisco) SS

On this 21st day of November, 1947, before me, FRANK PANTER, a Notary Public in and for said City and County, residing therein, duly commissioned and sworn, personally appeared C. Lawrence Taylor, known to me to be the person whose name is subscribed to the within instrument as a witness thereto, who being by me duly sworn, deposed and said that he resides in the County of Alameda, State of California, that he was present and saw Miller M. McNear and Kathleen McNear (personally known to him to be the same persons described in and whose names are subscribed to the within instrument as parties thereto), sign and execute the same, and that he, the affiant, thereupon subscribed his name as witness thereto.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, at my office in the said City and County of San Francisco, the day and year in this certificate first above written.

(NOTARY SEAL) Frank Panter

Notary Public in and for the City and County of San Francisco, State of California.

My Commission expires November 2, 1950.

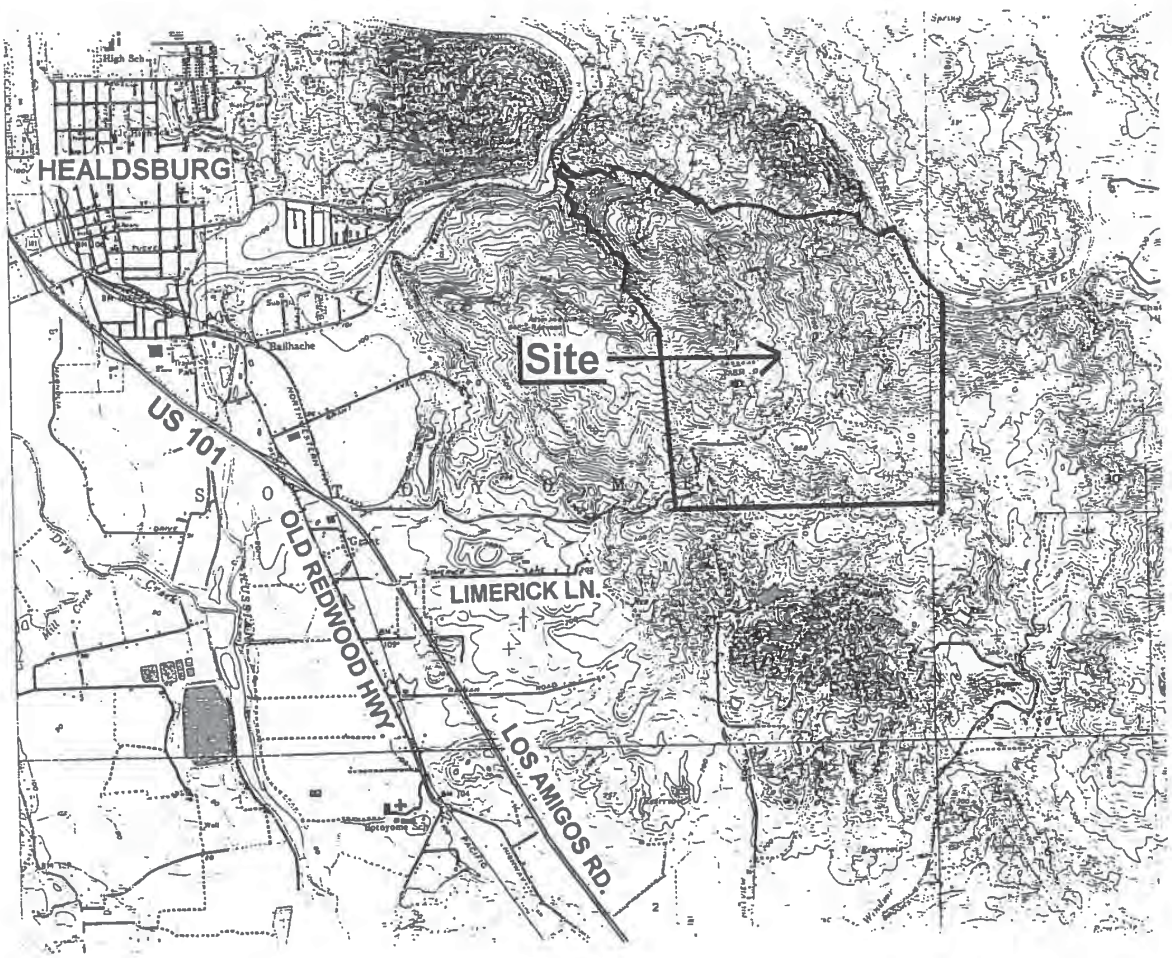
Recorded at request of Railway Express Agency, Inc., Dec 17, 1947 at 21 mins. past 1 o'clock P. M. in Book 759, of Official Records, page 170, Sonoma County Records.

Serial No. C57453 Herbert B. Snyder, County Recorder
$2.10 Paid By M. Grant, Deputy Recorder
Copyist: Archer

Compared Book ... Doc. ...

EXHIBIT D - 20

Exhibit D



WESTON PROPERTY
Location Map

SOURCE:
United States Geological Survey
Healdsburg 7.5 min. Quadrangle

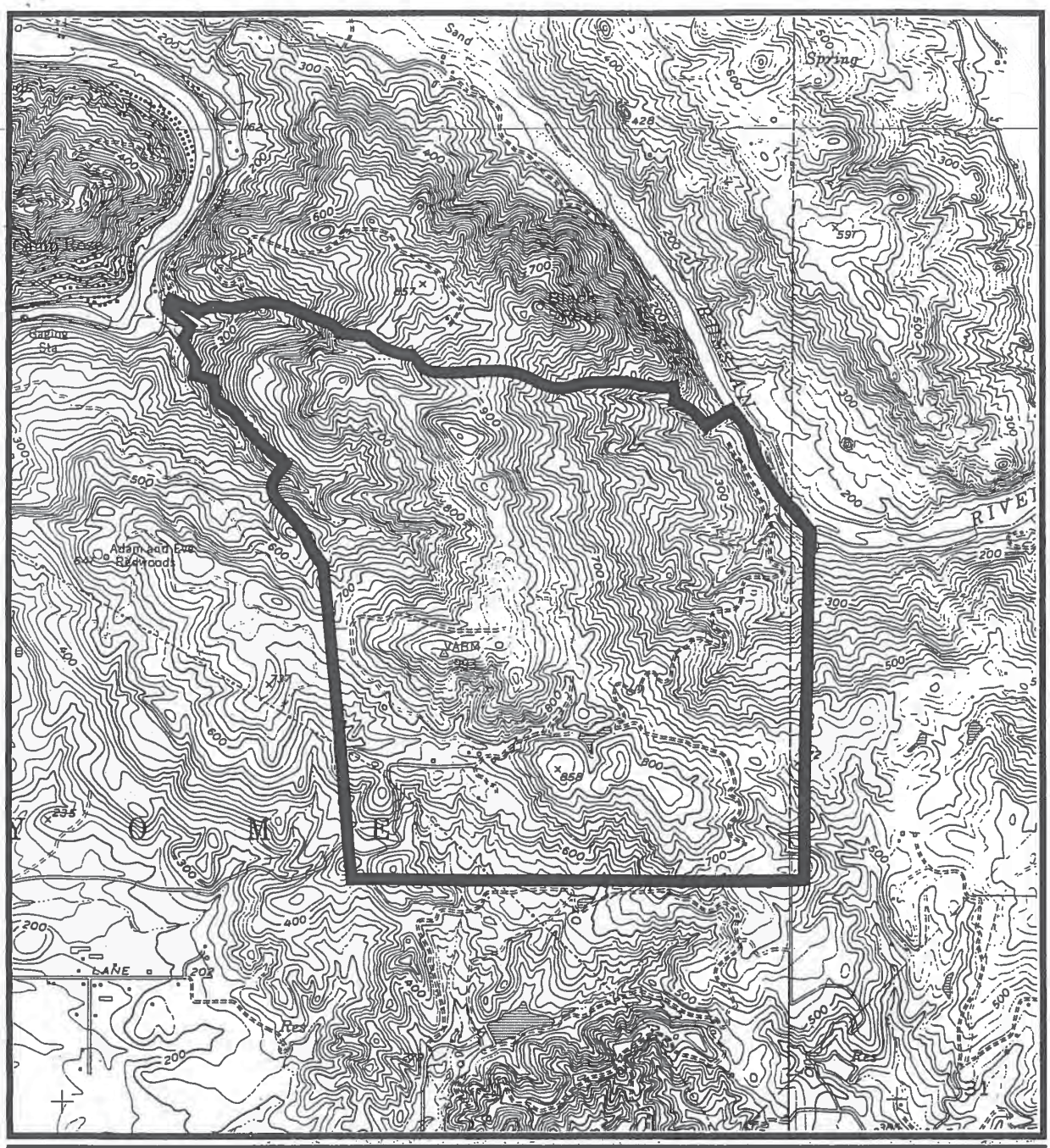
Prepared by:
Sonoma County Agricultural Preservation and Open Space District staff.

NORTH

0 4000 8000
scale in feet

EXHIBIT 1

NOTE: This map is for illustrative purposes only, and is not intended to be a definitive property description.



WESTON PROPERTY

Topographic Map

SOURCE:
United States Geological Survey
Healdsburg 7.5 min. Quadrangle

Prepared by:
Sonoma County Agricultural Preservation and Open Space District staff.

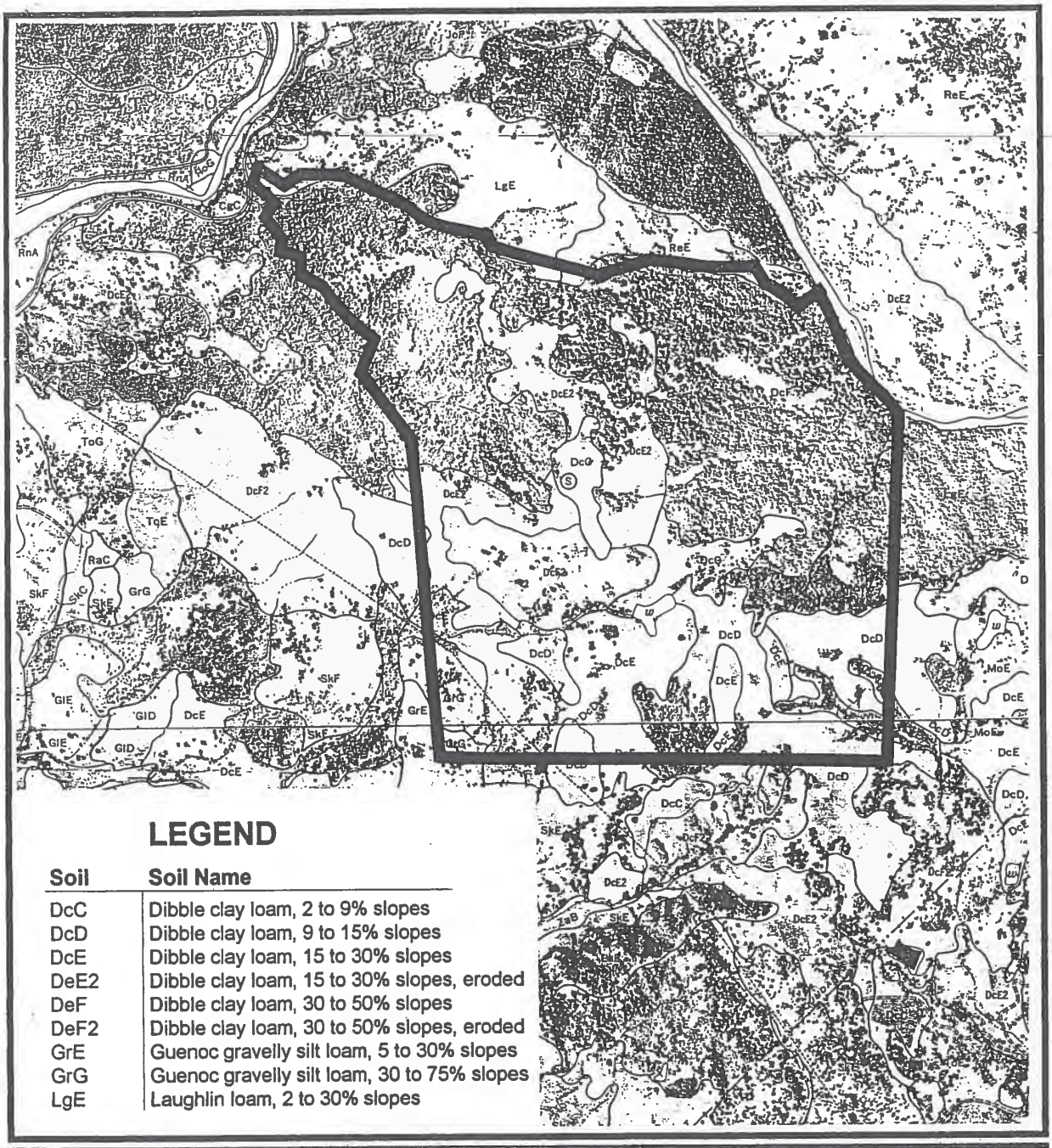
NORTH

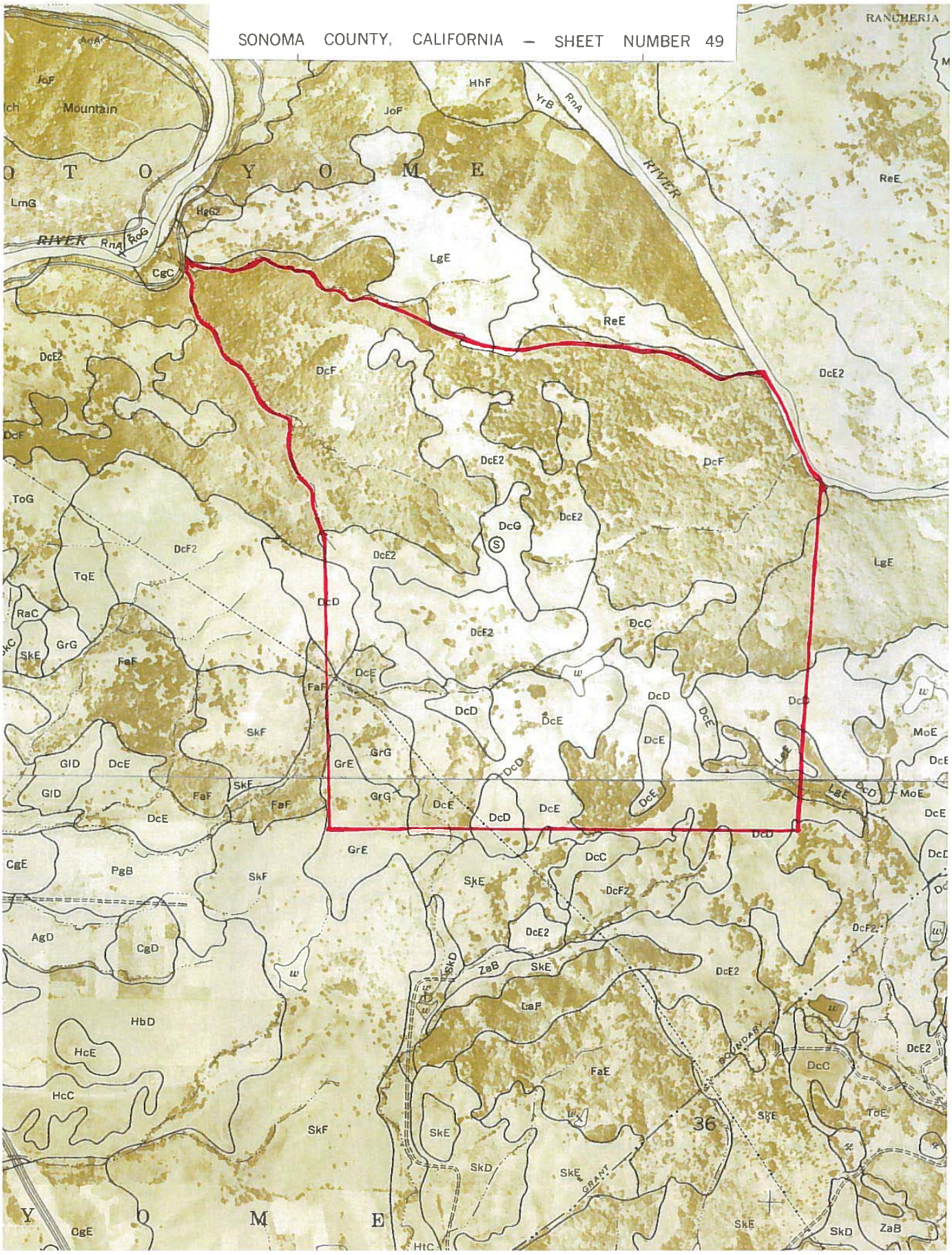
0 2000 4000

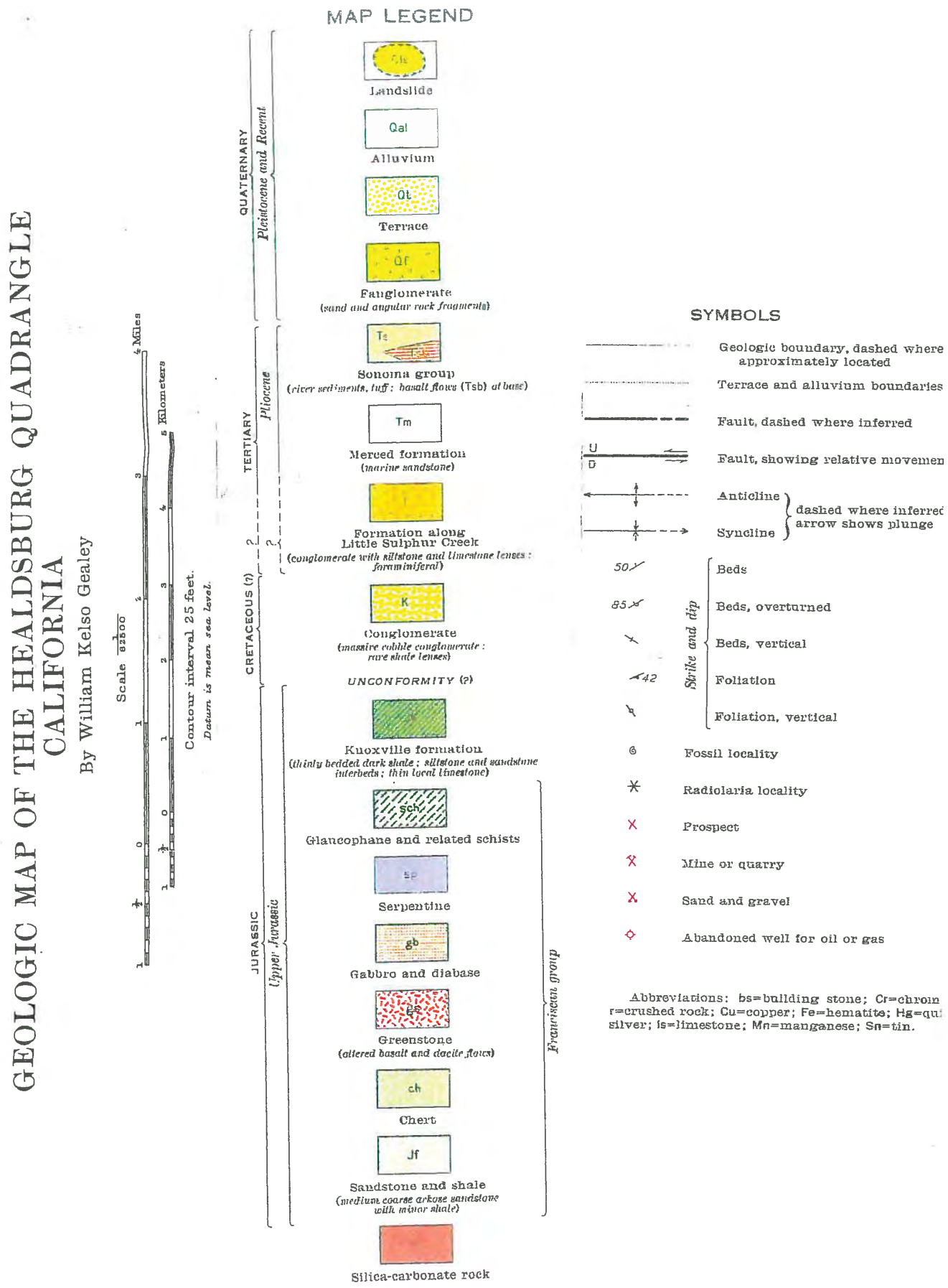
scale in feet

EXHIBIT 2

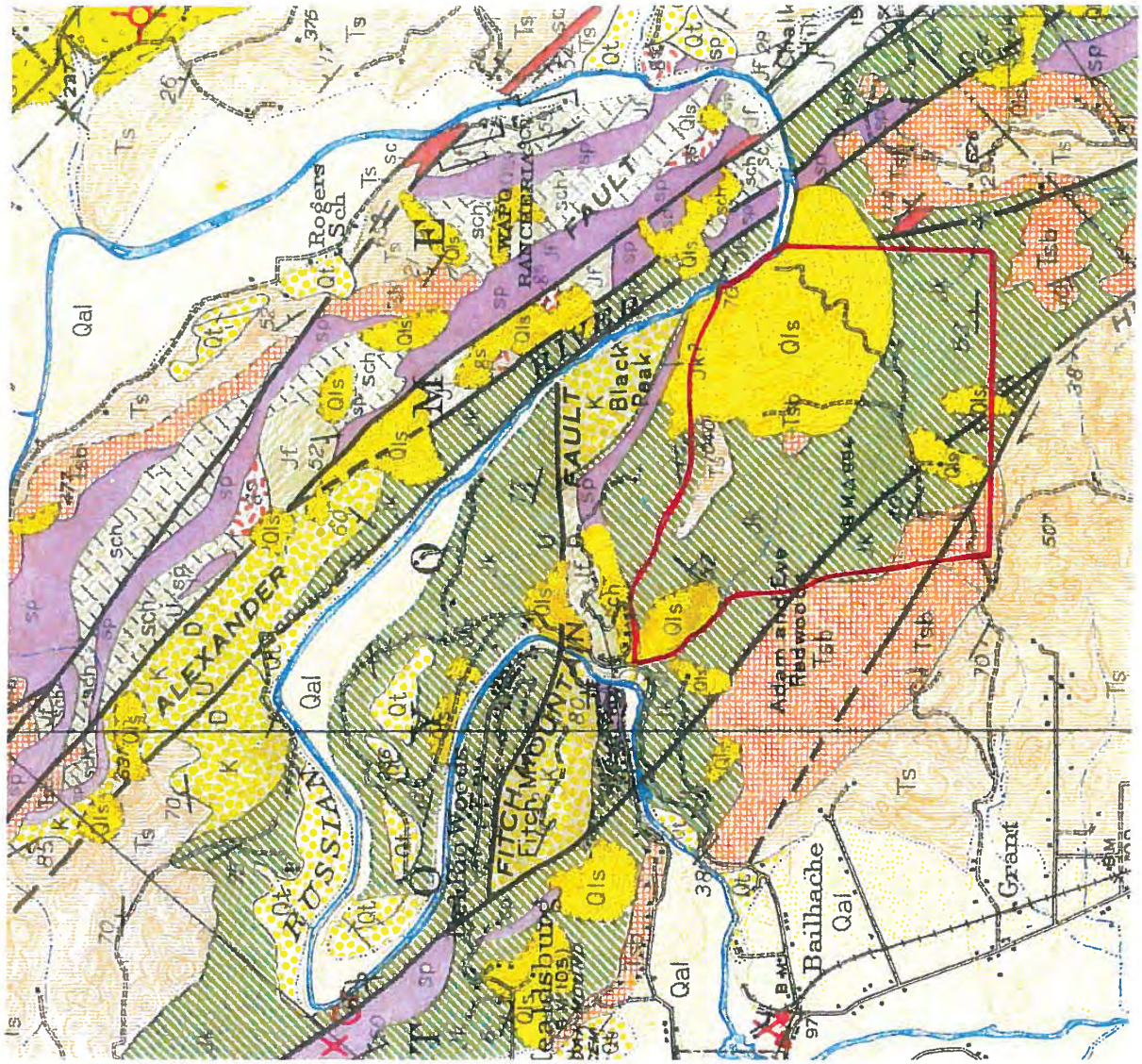
NOTE: This map is for illustrative purposes only, and is not intended to be a definitive property description.


LgE
ReE
RnA
DcE2
DcE
DcD
DcC
DeF2
ToG
TqE
RaC
SkF
SkE
GrG
GrE
GIE
GID
MoE
DeF
DeE2
LeB
LEGEND
Soil | Soil Name
DcC | Dibble clay loam, 2 to 9% slopes
DcD | Dibble clay loam, 9 to 15% slopes
DcE | Dibble clay loam, 15 to 30% slopes
DeE2 | Dibble clay loam, 15 to 30% slopes, eroded
DeF | Dibble clay loam, 30 to 50% slopes
DeF2 | Dibble clay loam, 30 to 50% slopes, eroded
GrE | Guenoc gravelly silt loam, 5 to 30% slopes
GrG | Guenoc gravelly silt loam, 30 to 75% slopes
LgE | Laughlin loam, 2 to 30% slopes
WESTON PROPERTY
Soils Map
SOURCE: SCS Soil Survey of Sonoma County, 1972
Prepared by:
Sonoma County Agricultural Preservation and Open Space District staff.
NORTH
0
2000
4000
scale in feet
EXHIBIT
3
NOTE: This map is for illustrative purposes only, and is not intended to be a definitive property description.


SONOMA COUNTY, CALIFORNIA — SHEET NUMBER 49
RANCHERIA
Mountain
T O Y O M E
RIVER
RnA
YrB
HhF
JoF
LmG
HgG
RoG
CgC
LgE
ReE
DcE2
DcF
ToG
DcF2
TqE
RaC
SkE
GrG
FaF
DcD
DcC
SkF
GID
GrE
CgE
PgB
AgD
CgD
HbD
HcE
HcC
ZaB
LaF
FaE
ToE
SkD
GRANT
BOUNDARY
36
HtC


GEOLOGIC MAP OF THE HEALDSBURG QUADRANGLE CALIFORNIA
By William Kelso Gealey
Scale 1/62500
Miles
Kilometers
Contour interval 25 feet.
Datum is mean sea level.
MAP LEGEND
QUATERNARY
Pleistocene and Recent
Landslide
Qal
Alluvium
Qt
Terrace
Qf
Fanglomerate
(sand and angular rock fragments)
TERTIARY
Pliocene
Ts
Tsb
Sonoma group
(river sediments, tuff; basalt flows (Tsb) at base)
Tm
Merced formation
(marine sandstone)
Formation along Little Sulphur Creek
(conglomerate with siltstone and limestone lenses; foraminiferal)
CRETACEOUS (?)
K
Conglomerate
(massive cobble conglomerate; rare shale lenses)
UNCONFORMITY (?)
Knoxville formation
(thinly bedded dark shale; siltstone and sandstone interbeds; thin local limestone)
Sch
Glaucophane and related schists
sp
Serpentine
gb
Gabbro and diabase
gs
Greenstone
(altered basalt and dacite flows)
ch
Chert
Jf
Sandstone and shale
(medium coarse arkose sandstone with minor shale)
Franciscan group
JURASSIC
Upper Jurassic
Silica-carbonate rock
SYMBOLS
Geologic boundary, dashed where approximately located
Terrace and alluvium boundaries
Fault, dashed where inferred
U
D
Fault, showing relative movemen
Anticline
Syncline
dashed where inferred
arrow shows plunge
50
85
42
Strike and dip
Beds
Beds, overturned
Beds, vertical
Foliation
Foliation, vertical
Fossil locality
Radiolaria locality
Prospect
Mine or quarry
Sand and gravel
Abbreviations: bs=building stone; Cr=chrom
r=crushed rock; Cu=copper; Fe=hematite; Hg=qu
silver; ls=limestone; Mn=manganese; Sn=tin.

Geologic Map of the Healdsburg Quadrangle



OPEN FILE REPORT 79-15

ENVIRONMENTAL GEOLOGIC ANALYSIS OF THE CHALK HILL ROAD STUDY AREA, SONOMA COUNTY, CALIFORNIA

by

Charles F. Armstrong

Mapping Assistance by

David L. Wagner

and

Sonoma State Geology Students:

Steve Belluomini
Jennifer East
David Thormahlen
Bill Ward

Prepared in cooperation with the Sonoma County Community and Environmental Services Agency

1978

California Division of Mines and Geology
1416 Ninth Street, Room 1341
Sacramento, California 95814

PLATE I

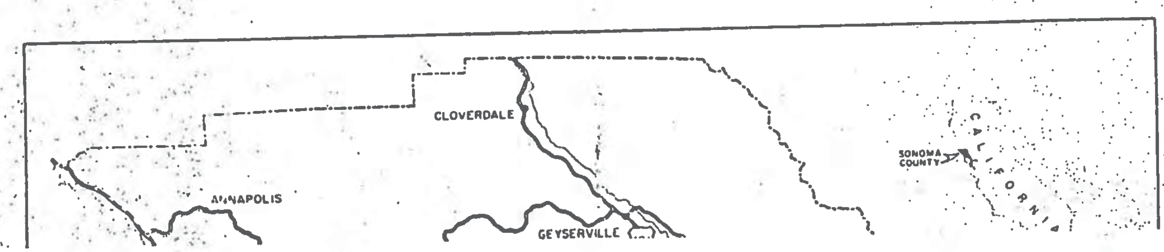
GEOLOGY OF THE CHALK HILL ROAD STUDY AREA, SONOMA COUNTY

BY
CHARLES F. ARMSTRONG, DAVID L. WAGNER, STEVE BELLUOMINI,* JENNIFER EAST,* DAVE THORMAHLEN,* AND BILL WARD*
1978

*Volunteer State Employees, Sonoma State College, Rohnert Park, California

SCALE 1:24,000

CONTOUR INTERVAL 40 FEET



EXPLANATION

Depositional contact; solid line where well located; dashed where approximately located.

Fault; solid line where well located; long dash where approximately located; short dash where inferred; dotted where concealed; query indicates additional uncertainty.

Normal fault; approximately located; U on upper block, D on lower block.

Fault related shearing.

Fault-related geomorphic features that may be indicative of late Quaternary to Holocene activity:

① Deflected or pirated drainage

② Sag pond or ponded alluvium

③ Abrupt change in stream gradient

④ Scarp

⑤ Saddle or notch

⑥ Deflected interfluve

⑦ Bench

⑧ Linear depression

Anticline, approximately located; arrow shows direction of plunge

Syncline; arrow shows direction of plunge

Strike and dip of bedding:

30 Inclined

⊕ horizontal

vertical

45 overturned

Strike and dip of layering in volcanic rocks

Spring

Plate 1 Geology of the Chalk Hill Study Area

PLATE 2

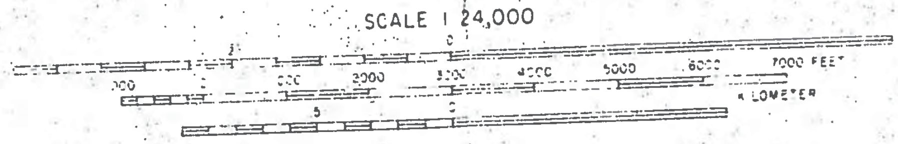
GEOLOGIC HAZARDS OF THE CHALK HILL ROAD STUDY AREA, SONOMA COUNTY

BY

CHARLES F. ARMSTRONG

1978

SCALE 1 24,000



CONTOUR INTERVAL 40 FEET

DATUM IS MEAN SEA LEVEL

EXPLANATION

FAULT RUPTURE HAZARD ZONES

S — Portions of the Healdsburg and Chalk Hill-Redwood Hill fault zones where active fault breaks are likely to be encountered. SITE GEOLOGIC REPORTS should be required prior to the issuance of permits to preclude the siting of new structures for human occupancy across the trace of an active fault. Furthermore, the area within 50 feet of an active fault should be assumed to be underlain by active branches of that fault unless proven otherwise by an appropriate geologic investigation (Hart, 1977).

NOTE: These zones are not official Alquist-Priolo Special Studies Zones; refer to Special Studies Zones maps: Healdsburg and Mark West Springs Quadrangles.

RELATIVE SLOPE STABILITY ZONES

Landslides, all types; queries (?) indicate uncertainty of existence; dashes indicate uncertainty of boundary; arrows show general direction of movement.

Areas where accelerated erosion is occurring; steep slopes without vegetative cover or areas adjacent to streams where rapid downcutting and dissection is occurring.

F — Franciscan melange, Great Valley Sequence undifferentiated, serpentinite, and older landslide deposits; highly susceptible to slope failure.

E — Quaternary alluvium and terrace deposit, Glen Ellen and Sonoma tuff; unconsolidated, semi-consolidated, and tuffaceous bedrock adjacent to down-cutting streams, on steep slopes, or where sheared.

D — Mark West Andesite and Great Valley Sequence sandstone and conglomerate; well consolidated bedrock which is sheared or where slopes are steep.

RECOMMEND SITE GEOLOGIC STUDIES BE REQUIRED PRIOR TO ISSUANCE OF PERMITS

C — Quaternary alluvium and terrace deposit; natural slopes are too gentle for failure unless dissected or undercut by streams; cut slopes are subject to failure if too steep. Some of these areas probably are subject to 100-year flood inundation. Refer to Sonoma County Water Agency for information on flooding potential.

B — Franciscan melange, Great Valley Sequence undifferentiated, serpentinite, older landslide deposit; Glen Ellen and Sonoma tuff; sheared, disaggregated, and semi-consolidated bedrock; all of which are stabilized on ridge tops or gentle slopes.

A — Mark West Andesite and Great Valley Sequence sandstone and conglomerate; well-consolidated bedrock of all types on ridge tops or gentle slopes.

Plate 2 Geologic Hazards of the Chalk Hill Study Area

Special Report 120

GEOLOGY FOR PLANNING IN SONOMA COUNTY

by

M.E. HUFFMAN, Geologist

C.F. ARMSTRONG, Geologist

CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
801 K Street
Sacramento, CA 95814

including

"SEISMICITY, GROUND SHAKING, AND LIQUEFACTION POTENTIAL"

by

Roger W. Greensfelder, Seismologist

1980
(Reprinted 2000)

PREPARED IN COOPERATION WITH THE SONOMA COUNTY PLANNING DEPARTMENT

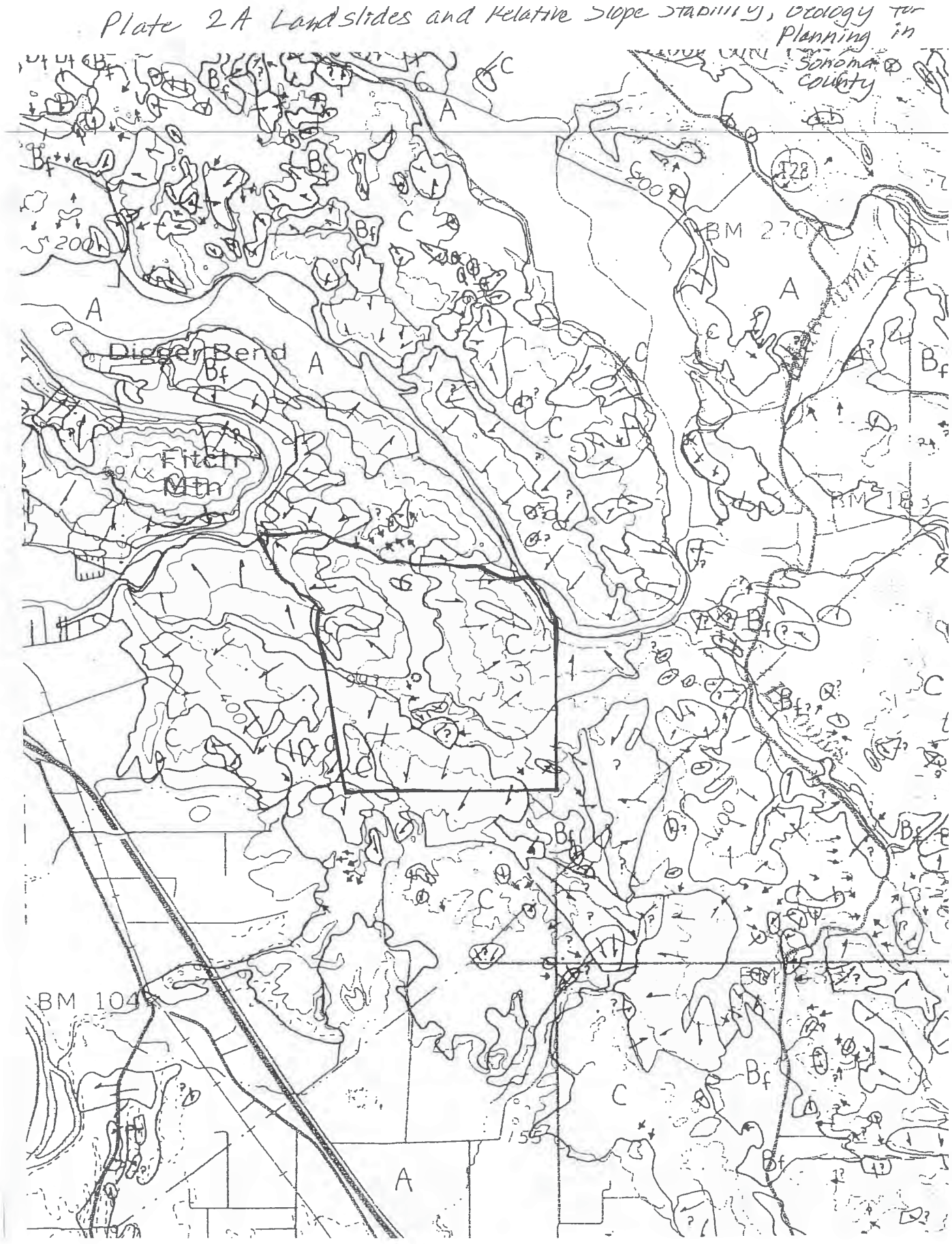


Plate 2A Landslides and Relative Slope Stability, Geology for Planning in Sonoma County
Digger Bend
Fitch Mtn
BM 270
BM 104
A
B
C

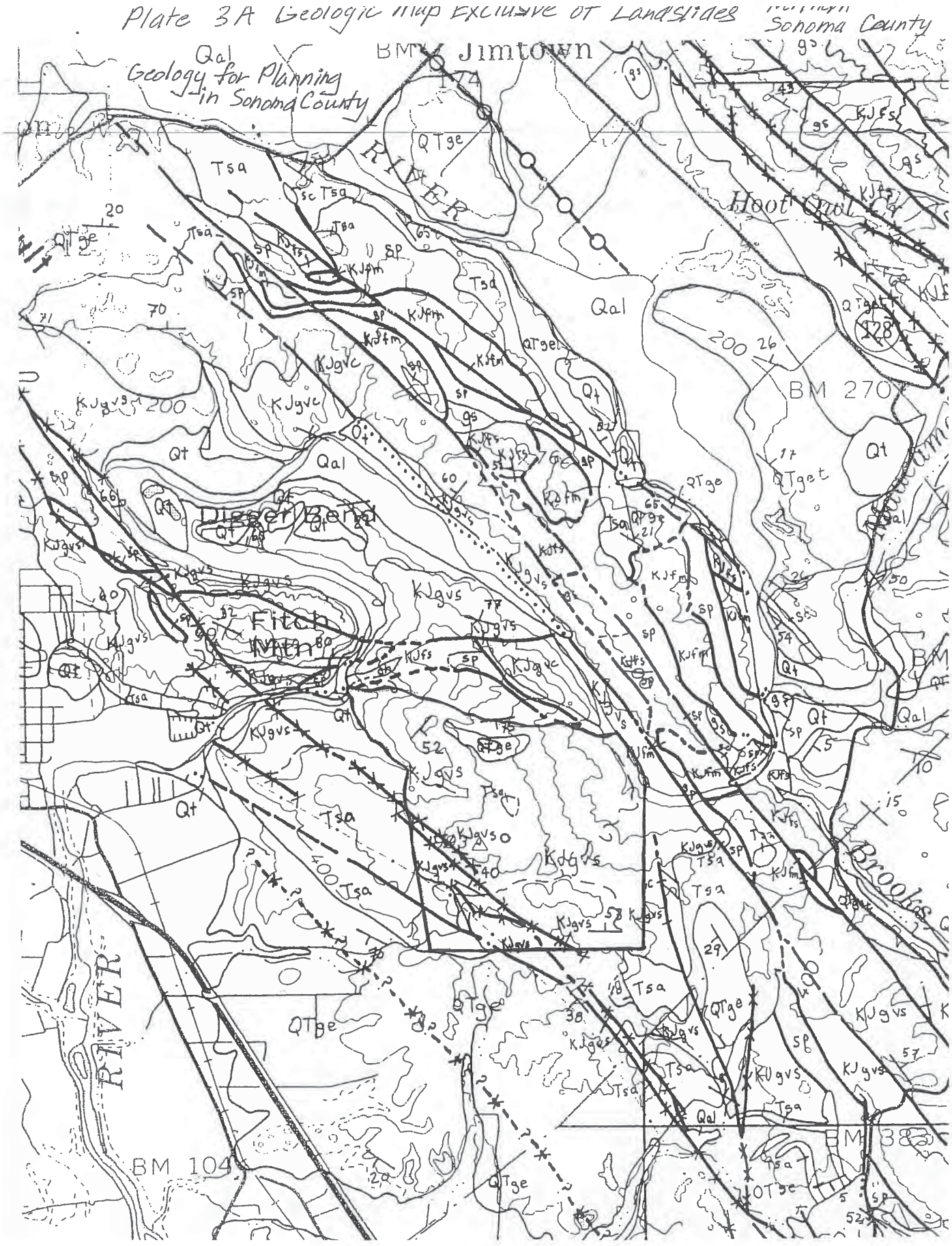
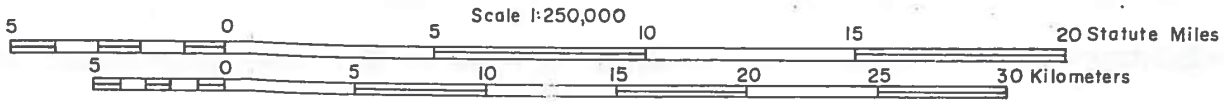


Plate 3A Geologic Map Exclusive of Landslides
Sonoma County
Geology for Planning
in Sonoma County
Jimtown
RIVER
Hoot Owl
Digger Bend
Fitch Mtn
BM 270
BM 104
Brooks
Qal
Qt
QTge
Tsa
KJgvs
KJfs
KJfm
KJgvc
Kdgvs

Plate 4 Geology for Planning in Sonoma County

EARTHQUAKE EPICENTERS

Compiled by Roger W. Greensfelder



1977 SYMBOLS

U.S.G.S. (1)	U.C.B. (2)	RICHTER MAGNITUDE RANGE (inclusive)
Y	Y	Less than 0.0
★	★	0.0
X	X	0.1 - 0.9
		1.0 - 1.9
		2.0 - 2.9
		3.0 - 3.9
		4.0 - 4.9
		5.0 - 5.9
	[3]	8.3

1-Epicenters by the U.S. Geological Survey 1969-1973. Only class A epicenters accurate to ±2Km are shown.

2-Epicenters by University of California, Berkeley 1910-1971. See text for discussion of accuracy of epicenter location.

3-California earthquake of April 18, 1906 presumed epicenter location (Reid, 1910, p.11)

U.S. Geological Survey seismometer station

National Earthquake Mechanism Laboratory seismograph station

[4]

Strong Motion Accelerographs *(number inside is number of seismographs in area of square)*

—?—?—···· Potentially active fault-considered to have been active in Quaternary time *Queried where uncertain, dotted where concealed*

···· Possibly active fault-possibly active in Quaternary time *Dotted where concealed*

N

45'

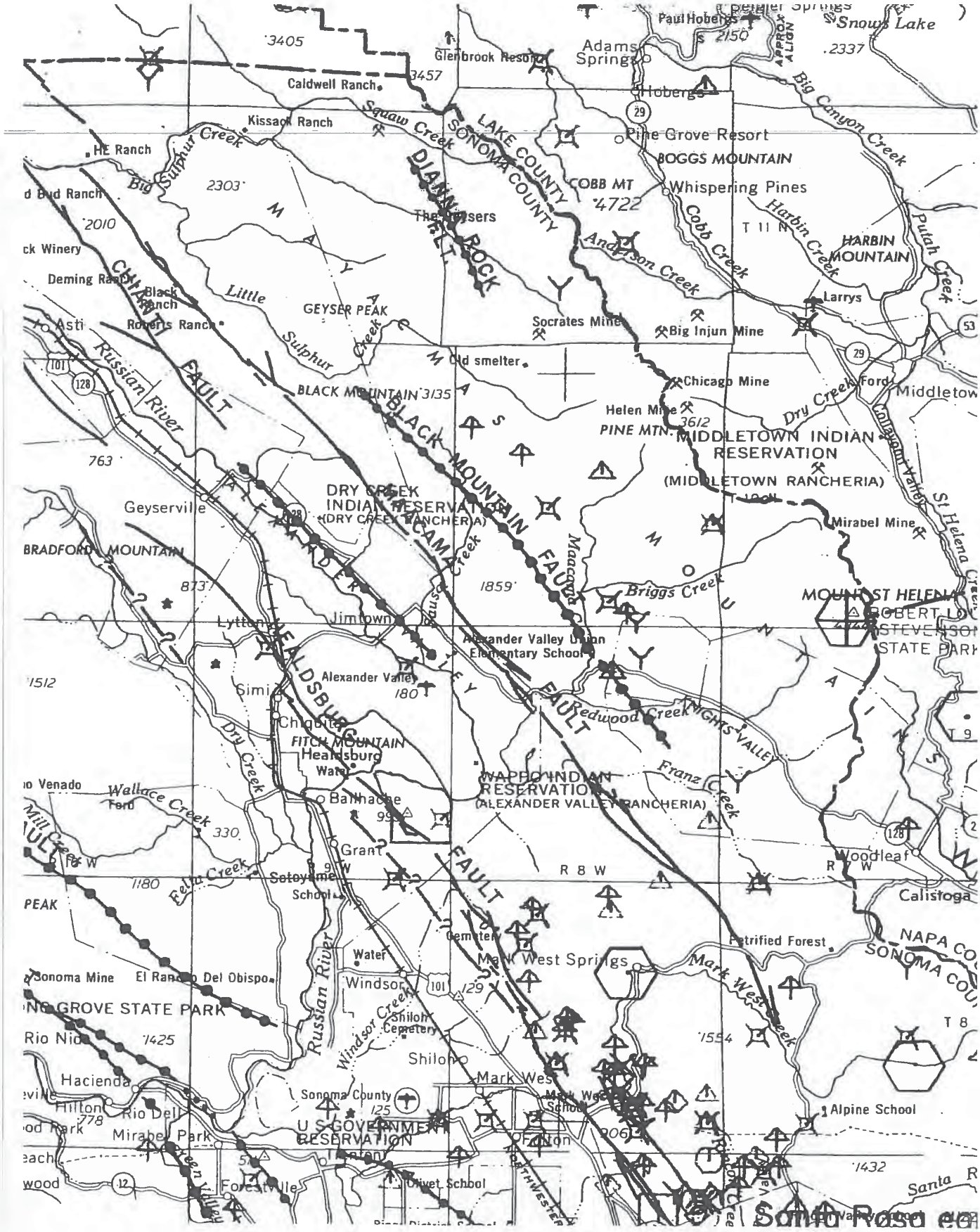

Earthquake Epicenters 1971 Plate 4 Geology for Planning in Sonoma County
Caldwell Ranch
Kissack Ranch
Glenbrook Resort
Adams Springs
Paul Hoberg
Snows Lake
Hoberg's
Pine Grove Resort
BOGGS MOUNTAIN
Whispering Pines
COBB MT
4722
Cobb Creek
Harbin Creek
HARBIN MOUNTAIN
Putah Creek
Big Canyon Creek
Squaw Creek
LAKE COUNTY
SONOMA COUNTY
DIAMOND ROCK FAULT
Big Sulphur Creek
Anderson Creek
Larrys
Socrates Mine
Big Injun Mine
Old smelter
Chicago Mine
Ford
Middletown
Dry Creek
Collayomi Valley
St Helena
Little Sulphur Creek
GEYSER PEAK
BLACK MOUNTAIN 3135
BLACK MOUNTAIN FAULT
Helen Mine
3612
PINE MTN.
MIDDLETOWN INDIAN RESERVATION
(MIDDLETOWN RANCHERIA)
Mirabel Mine
Asti
Deming Ranch
Black Ranch
Roberts Ranch
Russian River
CHANNEL FAULT
Geyserville
DRY CREEK INDIAN RESERVATION
(DRY CREEK RANCHERIA)
BRADFORD MOUNTAIN
873
1859
Maacama Creek
Briggs Creek
MOUNT ST HELENA
ROBERT LOUIS STEVENSON STATE PARK
Jimtown
Alexander Valley Union Elementary School
Alexander Valley
180
Healdsburg
Chiquita
FITCH MOUNTAIN
Water
Dry Creek
HEALDSBURG FAULT
Redwood Creek
KNIGHTS VALLEY
Franz Creek
WAPPO INDIAN RESERVATION
(ALEXANDER VALLEY RANCHERIA)
Wallace Creek
Ford
Venado
Mill Creek
Grant
Foss Creek
Setoyome School
Woodleaf
Calistoga
R 8 W
R 7 W
T 9
T 8
PEAK
1180
330
Cemetery
Petrified Forest
Mark West Springs
Mark West Creek
NAPA COUNTY
SONOMA COUNTY
Sonoma Mine
El Rancho Del Obispo
NO GROVE STATE PARK
Windsor
Windsor Creek
Shiloh Cemetery
Shiloh
Rio Nido
1425
1554
Hacienda
Sonoma County
125
Mark West School
Alpine School
Hilton
778
Rio Dell
Mirabel Park
U S GOVERNMENT RESERVATION
Fulton
906
Forestville
Olivet School
Green Valley
Santa Rosa
1432
763
1512
2303
2010
3405
3457
2150
2337
101
128
29
53
12

Plate 1 Geology of Alexander Valley and Healdsburg Area

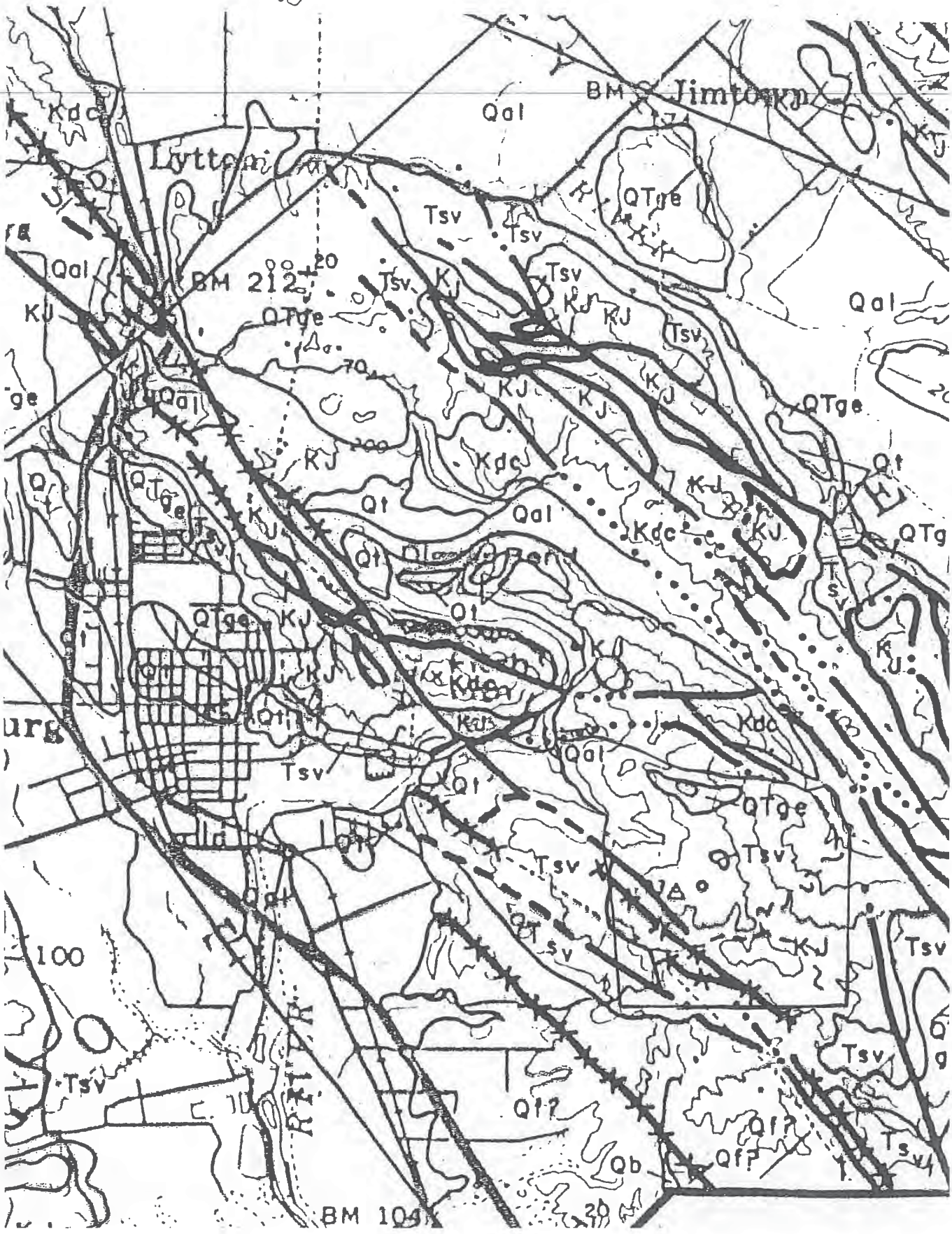


Exhibit C-7

C 7.2

C 7.2

C 7.2

C 7.2

C7.2

C7.2

C7.2

C7.2

C 7.2

C 7.2

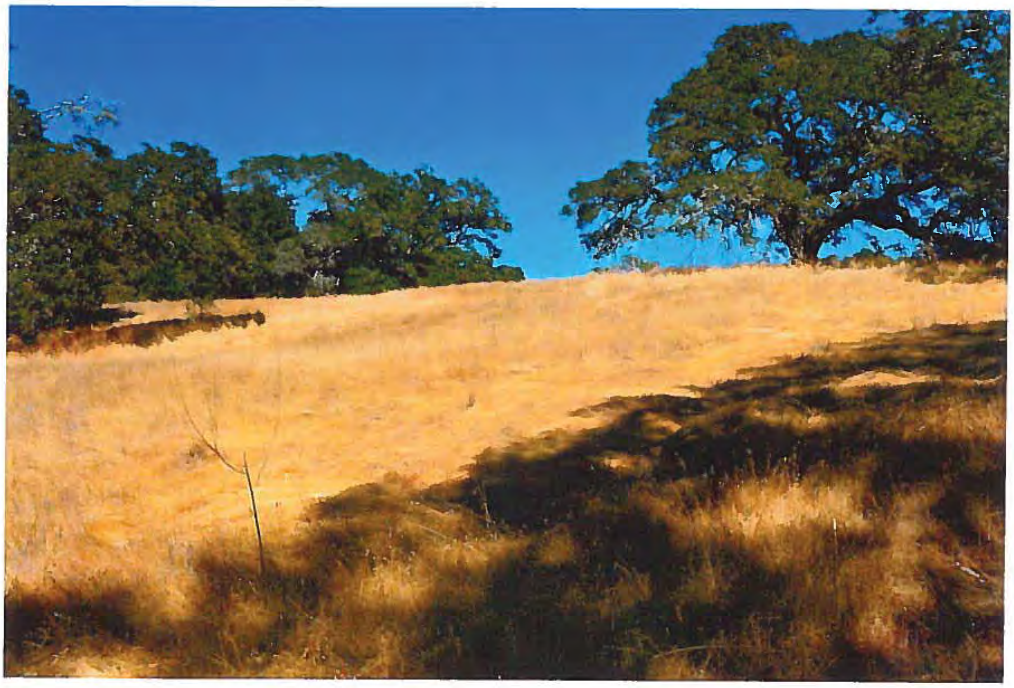
C 7.2

C 7.2

C7.2

C7.2

C7.2



C7.2

C7.2

C7.2

C7.2

C7.3

C 7.3

C 7.3

C 7.3

C 7.3

C7.3

C7.3

C 7.3

C 7.3

C 7.3

C 7.3

C 7.3

C 7.3

C 7.4

C 7.4

C 7.4

C 7.4

C 7.4

C 7.4

C7.4

C7.4

C 7.4

C 7.4

C7.4

C7.4

C7.4

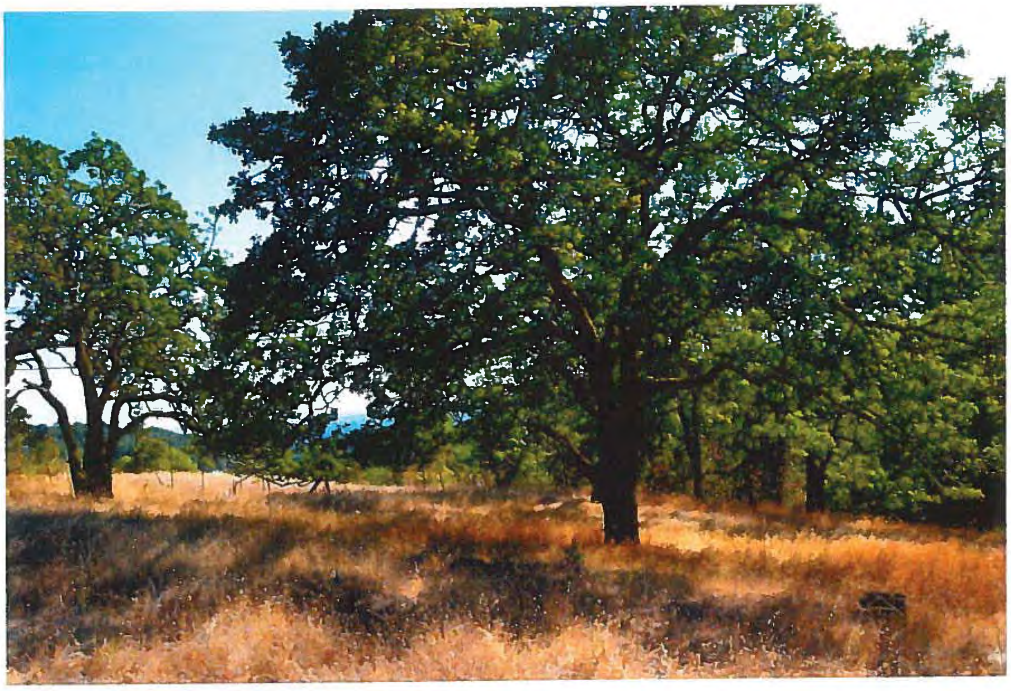
C7.4

C 7.4

C 7.4

C7.4

C7.5



C7.5

C 7.5

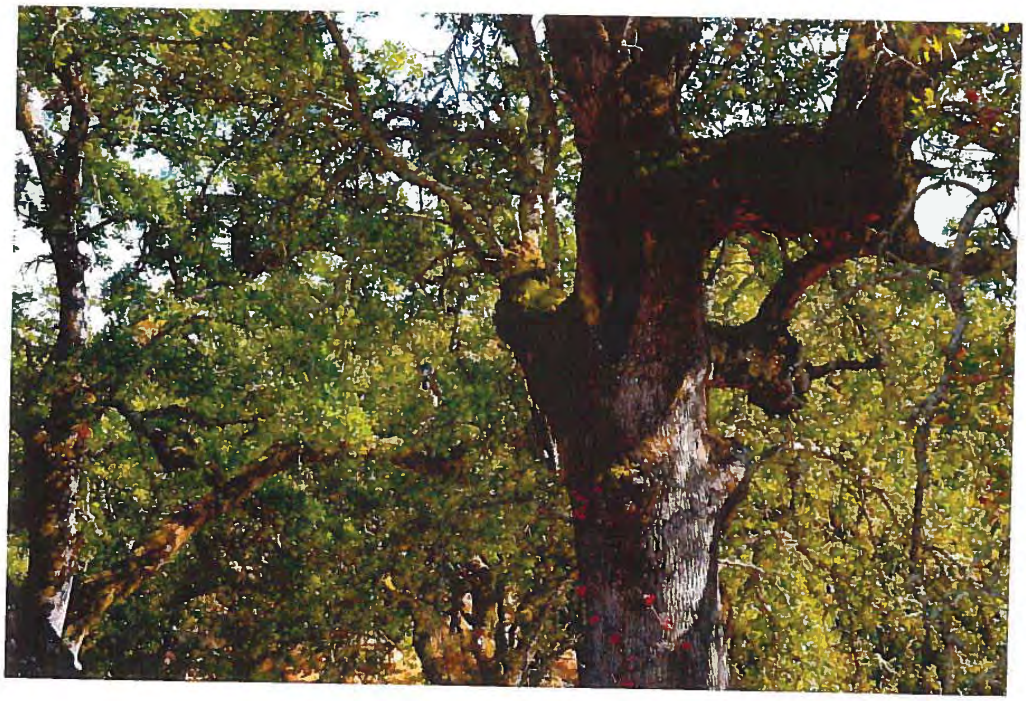
C 7.5

C 7.5

C 7.5

C-7.5

C7.5



C7.5

C7.5

C7.5

Exhibit C-8

C 8.1

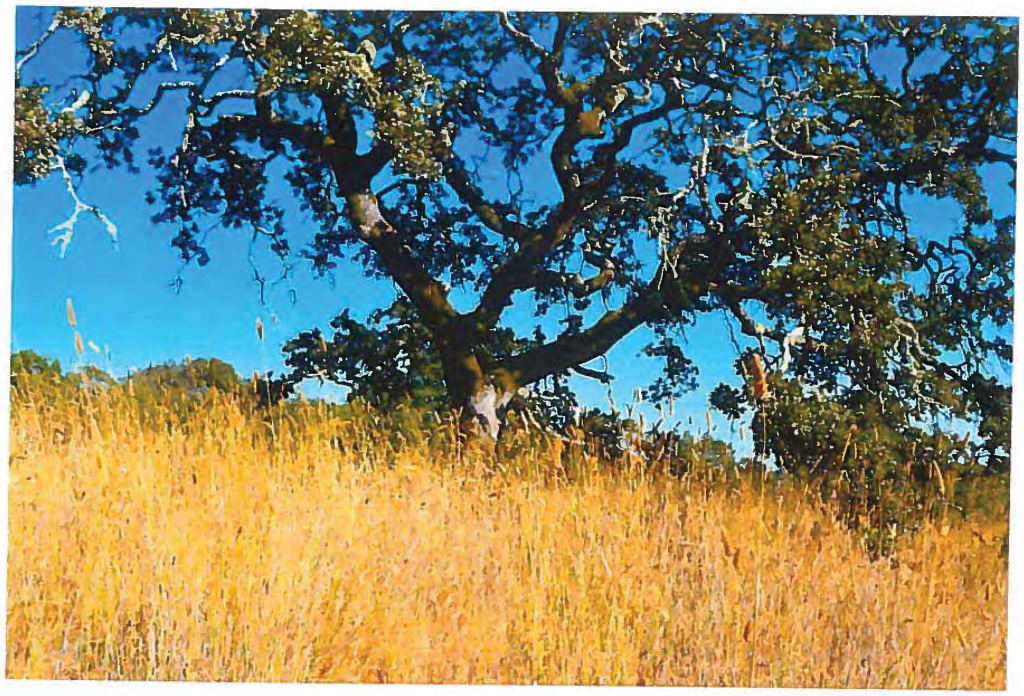
C 8.1

C8.1

C8.2

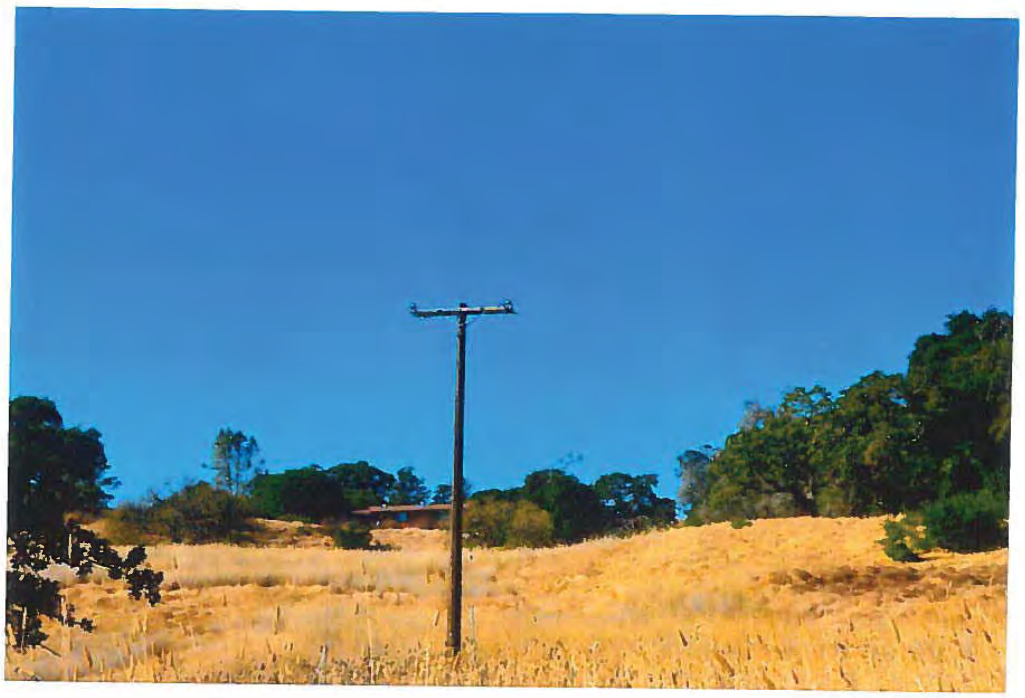
C8.3

C8.3



C 8.3

C 8.3



C8.3

C8.3

C 8.3

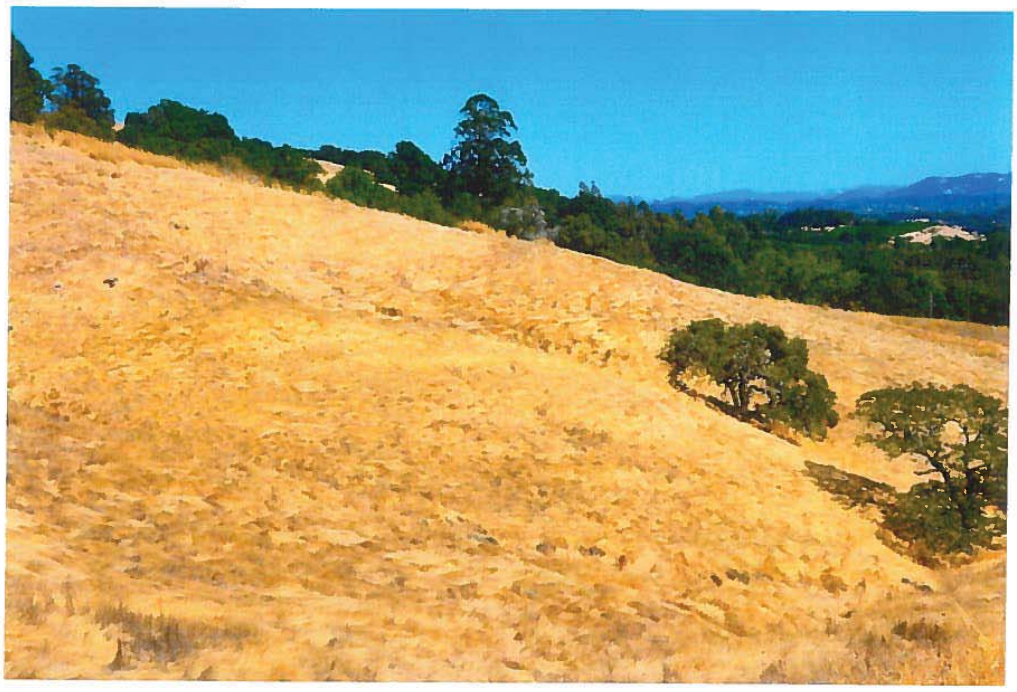
C 8.3

C8.4

C8.4

C 8.4

C 8.4



C 8.5

C 8.6

C 8.6

C 8.6

C8.7

C8.8

C 8.8

C 8.9

C 8.9

C 8.9

C8.9

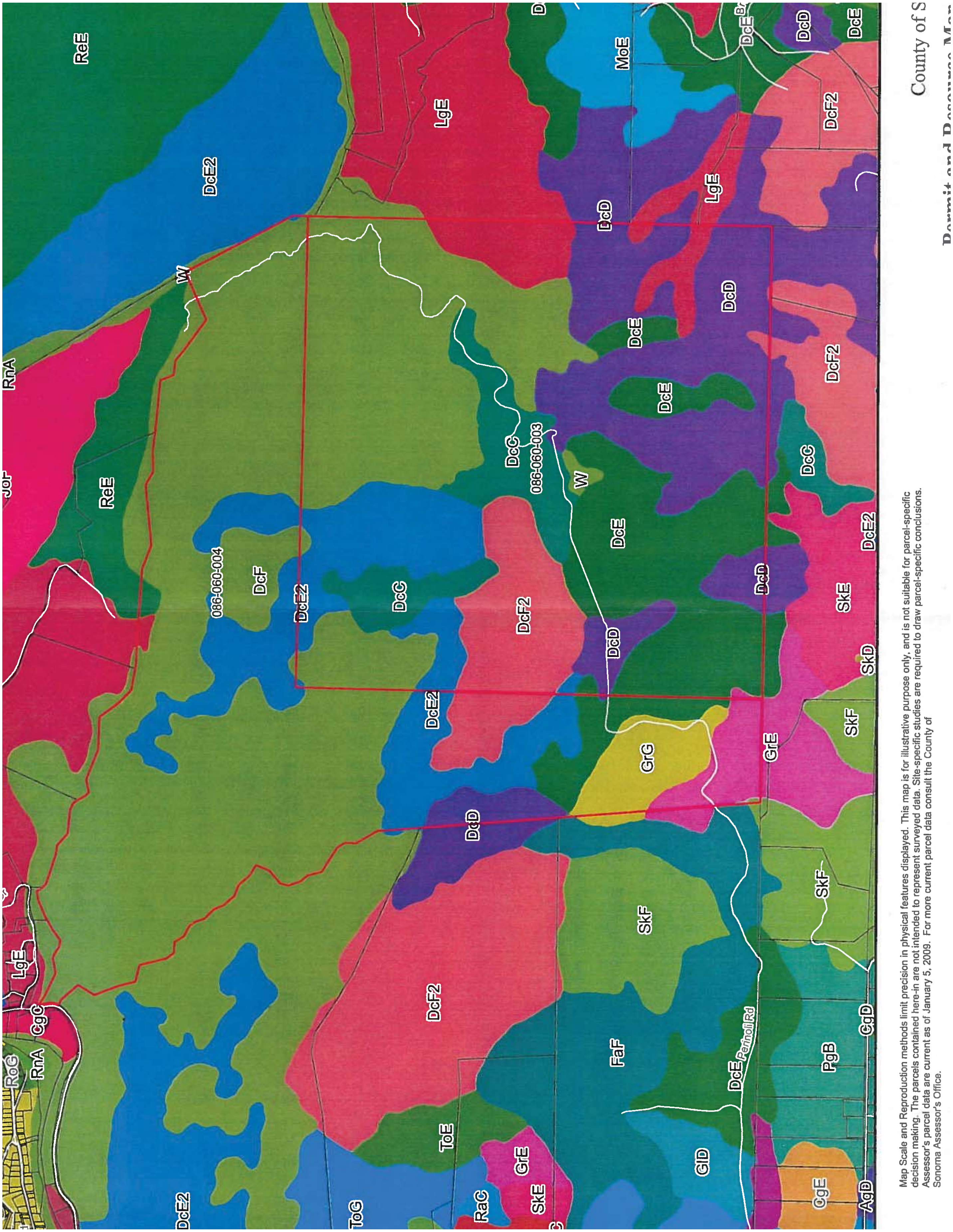
C8.10

C 8.10

C 8.11

C8.11

C8.12


ReE
DcE2
LgE
MoE
DcD
DcE
DcF2
W
RnA
086-060-004
DcF
DcC
086-060-003
GrG
GrE
SkF
SkE
SkD
DcE2
FaF
PgB
CgD
GlD
CgE
AgD
ToE
ToG
RaC
Peracoli Rd
County of S
Map Scale and Reproduction methods limit precision in physical features displayed. This map is for illustrative purpose only, and is not suitable for parcel-specific decision making. The parcels contained here-in are not intended to represent surveyed data. Site-specific studies are required to draw parcel-specific conclusions. Assessor's parcel data are current as of January 5, 2009. For more current parcel data consult the County of Sonoma Assessor's Office.

5.7.6 Response to Letter P-3

The commenter's letter included several discussions that could be divided reasonably into a few major topics. Master responses (MRs) were prepared to address issues raised that pertained to CEQA requirements. Specific responses below (e.g., P-3.1, P-3.2 …) reference the MRs where applicable.

Master Responses to Letter P-3

MR-1 **PG&E Easements and Access Rights**

The CPUC does not consider land rights issues when determining whether to approve or deny a PTC application. *Section 2: Project Description* of the Draft IS/MND includes information on PG&E easements and access rights as they pertain to construction access routes and work areas, as well as to identify any anticipated easement changes that have the potential to result in an environmental impact, as defined under CEQA. PG&E would be responsible for obtaining any necessary access rights through landowner agreements before entering properties where no such access rights exist, as stated on page 2-20 of the Draft IS/MND. Obtaining easements and access rights is outside the purview of CEQA.

The study areas shown in *Section 2: Project Description* and the Biological Resources Technical Report support the environmental resource evaluation and impact analysis presented in the Draft IS/MND. The study area buffer distances are based on industry standards and the limits within which direct and indirect impacts could occur, as determined by qualified professionals. The study areas likely encompass easement areas, but the study area does not define the easement. As previously stated, PG&E would be responsible for obtaining any necessary access rights through landowner agreements before entering properties where no such access rights exist, as stated on page 2-20 of the Draft IS/MND. Obtaining easements and access rights is outside the purview of CEQA.

MR-2 **Economic and Financial Issues**

The project would not involve economic or social factors that would result in a significant effect on the environment; therefore, these issues are not addressed in the IS/MND. Individual concerns regarding economic or financial loss are not considered a significant effect on the environment (CEQA Guidelines Section 15382). Refer to MR-6 for a discussion on vegetation impacts and restoration. Refer to MR-7 for a discussion on ground disturbance and soil stabilization.

MR-3 **Conservation Easements**

The commenter's description of the history of their property acquisition and operation, and of the formation and management of their conservation easement with the Sonoma County Agricultural Preservation and Open Space District is

acknowledged. The Sotoyome Conservation Easement and Windsor Oaks Conservation Easement are identified in *Section 3.10: Land Use and Planning* of the Draft IS/MND, on Figure 3.10-2 on page 3.10-3. The label on the figure has been changed to Sotoyome Highlands Conservation Easement, and the following description was added under Land Use on page 3.10-1 for clarity:

> The Sonoma County Agricultural Preservation and Open Space District acquires and preserves regionally important land in the County by acquiring a partial interest in the land through a purchase or donation of a conservation easement (Sonoma County Agricultural Preservation and Open Space District 2017). The proposed project alignment passes through two of the District's conservation easements in the Northern Segment, the Sotoyome Highlands Conservation Easement (also known as "The Weston Ranch") and the Windsor Oaks Conservation Easement, as shown on Figure 3.10 2.

Although the CPUC has sole jurisdiction over the sighting and design of the project, and local land use plans, polices, and regulations would not preclude the CPUC from approving the project, CPUC practice is to disclose and analyze potential conflicts with local land use and zoning designations. The proposed project would not change existing land uses, which includes conservation easements, as described on page 3.10-10 of the Draft IS/MND.

The CPUC sent notices to the General Manager of the Sonoma County Agricultural Preservation and Open Space District in August 2016 and July 2017. The notices informed the District that the CPUC was in the process of preparing an environmental document for the project, where to obtain information about the project, and how to submit comments and questions. The District did not provide any comments or feedback to the CPUC in response to the notices.

The CPUC also sent notices to local government officials in July 2017, including county supervisors and town council members. The government officials did not provide any comments or feedback to the CPUC in response to the notices.

MR-4 **Project Information, Communication, and Transparency**

PG&E completed the noticing requirements specified in General Order (GO) 131-D § XI for a PTC application, which included mailing letters to property owners within 300 feet of the proposed project, publishing public advertisements, and posting signs in the project area. The CPUC is not involved in PG&E's independent pre-application outreach and coordination with landowners, including the information PG&E choses to provide landowners prior to or after filing their application with CPUC, beyond verification of the noticing requirements per GO 131-D § XI of. Information requests pertaining to CPUC's environmental review must be directed

to the CPUC or its designated contractors in order to be considered as part of the CEQA process.

The commenter describes subscribing to the CPUC's formal proceedings docket as an interested party. Interested parties are notified when legal notices become available that are relevant to the CPUC's administrative law proceeding, which is a separate but parallel process to the CEQA environmental review process defined in the CPUC's Rules of Practice and Procedure (Rule 1.4).

With respect to the CEQA environmental review process, key information used to prepare the environmental document has been posted to the CPUC's website for public review as it becomes available. Exceptions to public disclosure requirements under CEQA include trade secrets (Public Resources Code [PRC] § 21160), and location of archaeological sites and sacred lands and information about tribal cultural resources (CEQA Guidelines Section 15120(d), PRC § 21082.3[c]). Information that is not available for public review is identified as confidential.

Section 2: Project Description of the Draft IS/MND was developed using PG&E's PEA project description, as well as information provided by PG&E in response to CPUC's data needs requests. The project description for the Draft IS/MND supersedes all prior project descriptions developed by PG&E and their contractors. The level of detail provided in the Draft IS/MND project description is intended to provide sufficient information to complete a thorough impact analysis and to disclose an accurate range of potential construction methods that may be undertaken to complete the project. The IS/MND impact analyses and mitigation measures address the maximum degree of impacts that could potentially occur (e.g. a worst-case-scenario).

The project description and CPUC's impact analysis presented in the Draft IS/MND considers the potential for minor project refinements to account for final engineering and design specifications, and to account for any unforeseeable changes to the site conditions. Such refinements would be minor, restricted to the project study area, and subject to applicable environmental requirements and resource avoidance. Procedures for minor project refinements are described in *Section 4: Mitigation Monitoring and Reporting Program,* on page 4-2 of the Draft IS/MND.

MR-5 **Helicopters**

PG&E proposes the use of both ground-based construction equipment and helicopters to replace poles and conductor in the Northern Segment as stated in *Section 2.6: Construction* starting on page 2-19 of the Draft IS/MND. Proposed helicopter use would not result in a significant impact with implementation of mitigation, as described in the Draft IS/MND (refer to *Section 3.3: Air Quality, Section 3.4: Biological Resources, Section 3.7: Greenhouse Gas Emissions, Section 3.8: Hazards and Hazardous Materials, Section 3.11: Noise,*

Section 3.14: Recreation, Section 3.15: Transportation and Traffic, and Section 3.16: Utilities and Public Services); therefore, there is no CEQA-basis for restricting helicopter use beyond the conditions identified in the mitigation measures.

Helicopter use during power and transmission line construction is common practice for PG&E and other utilities. Helicopters can be used to reduce the duration of construction and the amount of vegetation and ground disturbance caused by ground-based equipment. Helicopters would not necessarily eliminate the need for ground-based equipment at pole locations, but would likely reduce the amount of ground-based impacts that could occur.

Mitigation measures in the IS/MND would not allow PG&E to evict landowners who live close to helicopter LZs and touch down areas, as the commenter states. As described in *Section 3.15: Transportation and Traffic*, pages 15-22 to 15-24 of the Draft IS/MND, MM Traffic-2 requires PG&E to implement safety procedures when operating helicopters near public areas (i.e., approximately 50 to 100 feet), such as installing guard structures or positioning flaggers, or clearly marking the areas with signs and flagging and restricting public access. If residences must be temporarily evacuated during helicopter activities in the Southern Segment, MM Traffic-2 requires PG&E to coordinate the timing of such activities with the affected landowners and residents. MM Traffic-2 does not give PG&E the authority to evict landowners. Temporary evacuation must be agreed to by landowners and residents.

MM Noise-3 restricts helicopter landing or touchdown within 500 feet of residences unless agreed to in writing by the affected residents (refer to *Section 3.11: Noise* of the Draft IS/MND). Helicopter touch down would occur in designated "open areas" within the project study area that are level and free of dense vegetation, environmental resources, and other obstacles (refer to *Section 2.6.2: Work Areas and Access*, page 2-23). Flat and open areas that may be suitable for helicopter touch down are shown on maps in Appendix A. Not all of the areas shown on the maps may be suitable for helicopter touch down in all circumstances. Helicopter pilots would be responsible for selecting safe areas to land that are not otherwise restricted by applicable mitigation measures or FAA regulations.

PG&E and its helicopter contractor are responsible for following applicable FAA rules and regulations (refer to *Section 3.15: Transportation and Traffic*, pages 15-21 to 15-23 of the Draft IS/MND). The duration of helicopter activities would be limited, and the noise levels from helicopters at the closest receptors would not reach levels that would require hearing protection for the duration of exposure.

Refer to Response P-3.24 for additional information on helicopter use.

MR-6 **Ground Equipment and Access Routes**

PG&E has identified project-specific access routes for ground equipment to reach each work area and pole location, and in some cases additional secondary access routes and backup access routes to the same work areas. The analysis in the Draft IS/MND addresses environmental impacts from the access routes identified by PG&E.

Exhibit C-1 of the comment letter shows the path of Perinoli Road (#1) and overland access routes identified by PG&E that may be used to access Poles 73 to 79 (#2 [north], #2 [south], #3, #4, #5, and #6). PG&E has not proposed grading or blading on the overland routes identified in Exhibit C-1. The following description of overland routes is provided in the Draft IS/MND *Section 2: Project Description*, on page 2-21:

> Overland routes are identified where no preexisting road or trail is present, or where previously existing routes have been substantially overgrown. Overland routes would be accessed by vehicles unless it is determined that the terrain is too steep to safely operate vehicles. In such cases, workers would drive vehicles as far as possible and continue following the overland route on foot. Overland footpaths may also be identified at the time of construction between helicopter touch down areas and pole work areas, as described below under Helicopter Access. Vegetation clearing or mowing may be required to establish overland travel routes and footpaths, but grading or blading the ground surface would not occur. New permanent access roads would not be created.

PG&E submitted comments that correct the description for vegetation clearing and grading for proposed access routes. Grading and vegetation clearing may occur up to 8 feet from centerline, and vegetation trimming could occur to a height of 14 feet aboveground.

Perinoli Road would not be expanded. The access road category along Perinoli Road was changed from paved to unpaved per the commenter's note. This change is reflected on the maps provided in Appendix A.

The commenter raises numerous concerns about the steepness and stability of a slope immediately east of the property where a proposed overland route is identified from Perinoli Road to Pole 76 (#3 on Exhibit C-1). Although grading or blading is not proposed on the overland route, substantial surface disturbance could occur from operating heavy equipment on the slope. The commenter has provided information that indicates soil on the slope may be unstable, and disturbing the steep slope during overland equipment travel could be avoided by using the alternate routes south of Pole 76. Accordingly, the access route segment (#3 on Exhibit C-1) for the Final IS/MND has been removed from the maps included in the

project description and Appendix A, and the access route would not be used during construction.

For all other project areas suspected of having unstable soils or landslide susceptibility, MM Geology-1 on page 3.6-19 of the Draft IS/MND requires that a professional geotechnical engineer conduct a geotechnical investigation in such areas and shall add the analysis to the Geotechnical Investigation Report required by APM GS-3. The Geotechnical Investigation Report shall provide site-specific recommendations for poles, work areas, and access routes where there is an elevated risk of geologic hazards. Where geotechnical hazards are found to occur, appropriate engineering design and construction measures from the Geotechnical Investigation Report shall be incorporated into the final project designs, as deemed appropriate by a California-licensed Geotechnical Engineer or Certified Engineering Geologist. Design measures that would mitigate seismic and landslide-related impacts shall include, but are not limited to, retaining walls, removal of unstable materials, and avoidance of highly unstable areas. If other overland routes are found to be unstable or unsuitable for use, and modification of the road was not feasible, it would likely be avoided or use would be limited, such as to pedestrian access only.

Development of a permanent all-weather road (#2 [south] in Exhibit C-1) is not currently proposed by PG&E as part of this project, unless recommended by the geotechnical engineer per MM Geology-1.

MR-7 **Vegetation Impacts and Restoration**

The impact analysis for vegetation disturbance and removal primarily focuses on how the project could affect the sensitivity, habitat characteristics, or protection status of vegetation resources, as defined in *Section 3.4: Biological Resources* of the Draft IS/MND. Land disturbance and soil stabilization are discussed separately in MR-8.

Restoration described in the IS/MND refers to facilitating the regrowth or replacement of substantially impacted vegetation, to the extent possible. Restoration procedures are intended to ensure the project does not result in inadvertent conversion of a substantial amount of habitat or does not have other impacts related to vegetation loss. Where protected trees are removed or substantially trimmed, PG&E would be required to plant new trees or pay for the planting of new trees, as described in APM BIO-10 and MM Biology-7, and MM Biology-9 (refer to *Section 3.4: Biological Resources* of the Draft IS/MND).

MM Biology-7 requires PG&E to map the types and boundaries of vegetation resources within undeveloped project areas prior initiating construction, and to develop a Revegetation, Restoration, and Monitoring Plan to ensure impacts to such resources are restored adequately. MM Biology-7 specifies the required contents of the plan, including appropriate performance standards, monitoring procedures,

reporting procedures, and corrective actions to implement if the performance standards are not met. The CPUC would review the plan for adequacy and require PG&E to make any necessary revisions prior to authorizing construction activities to begin. The CPUC would inspect all project areas at the beginning of, during, and following construction activities to verify the accuracy of PG&E's mapping and reports, and to ensure disturbed vegetation is restored and stabilized, as defined in the CPUC-approved plan. Performance standards would be designed to achieve the final restoration goals within 3 years after construction, as described in the plan; however, monitoring and corrective actions could continue for a longer period to ensure adequate restoration, as set forth in the plan and to the satisfaction of CPUC.

Commenter requests to manage restoration on their property by receiving compensation from PG&E or by interviewing and selecting the firm that would perform the restoration procedures in conjunction with CPUC and PG&E. The CPUC's authority over PG&E does not extend to selecting PG&E's contractors, or requiring PG&E to coordinate with private landowners when selecting their contractors. The minimum experience and qualifications of specialists responsible for implementing specific mitigation tasks have been included in the APMs and MMs, as included in the Draft IS/MND, where necessary. The CPUC would verify qualifications, as well as the adequacy and accuracy of their work, as it relates to the requirements set forth in each applicable measure.

MR-8 **Ground Disturbance and Soil Stabilization**

Disturbed ground surfaces and soil would be stabilized, as appropriate, prior to weather events that could result in erosion or sediment transport, as described in *Section 3.8: Hazards and Hazardous Materials* and *Section 3.9: Hydrology and Water Quality* of the Draft IS/MND. Specific BMPs for controlling erosion and sediment, as well as pollution, would be developed by a Qualified SWPPP Developer and included in the SWPPP. The CPUC would review the contents of the SWPPP prior to construction activities as stated in MM Hydrolgy-1 as presented in the Draft IS/MND. MM Hydrology-2 requires a SWPPP monitoring program to ensure all disturbed areas are inspected and treated appropriately, and to ensure BMPs are properly maintained in good working order. SWPPP monitoring would occur from the time of initial disturbance and following construction until 70 percent of the baseline vegetation cover is achieved. Baseline vegetation cover would be documented prior to disturbance, as described in MM Biology-7 (refer to MR-7 above), as presented in the Draft IS/MND.

MR-9 **Monitoring and Enforcement**

The CPUC is responsible for monitoring and enforcing PG&E's compliance with requirements specified in the IS/MND, and as required per PRC § 21081.6 and Section 15097 of the CEQA Guidelines, and described in *Section 4: Mitigation*

Monitoring and Reporting Program of the Draft IS/MND. CPUC, or its designee, will inspect compliance at active work areas on a weekly basis during construction. Where necessary, disturbed areas (i.e., access routes and work areas) would be inspected on an annual or more frequent basis following construction to ensure the areas are adequately restored and stabilized, as specified in applicable APMs and MMs. Should CPUC find that APMs and MMs necessary to reduce or avoid a significant impact are incomplete, ineffective, or impracticable, the CPUC would be responsible for imposing alternative or additional measures on the project that are equal to or greater than the measures identified in the IS/MND, per CEQA requirements.

Individual Responses to Letter P-3

P-3.1 Commenter's descriptions of land ownership, power line distance, and request for withholding of names and address are acknowledged. Commenter's names and addresses at the beginning and end of the comment letter were redacted as requested.

P-3.2 Commenter's descriptions of pole locations on property and PG&E's historic access routes are acknowledged. Refer to MR-5 for a discussion on helicopters. Refer to MR-6 for a discussion on ground equipment and access routes.

P-3.3 Refer to MR-4 for a discussion on the disclosure of project information, communication, and transparency.

P-3.4 Refer to MR-5 for a discussion on communication. Refer to MR-6 for information on ground equipment and access routes.

P-3.5 Refer to MR-4 for a discussion on the disclosure of project information, communication, and transparency.

P-3.6 Refer to MR-4 for a discussion on the disclosure of project information, communication, and transparency.

P-3.7 Refer to MR-1 for a discussion on study areas identified in the IS/MND and survey reports.

P-3.8 Refer to MR-4 for a discussion on the disclosure of project information, communication, and transparency.

P-3.9 The purpose of the Water Crossing Mapping memo was to identify the locations where access could impact jurisdictional water features and where agency permits may be required. The analysis assumes a worst-case-scenario for impacts to wetlands and waterways, and how to mitigate those impact. PG&E's engineers determine the appropriate access given the biological constraints.

P-3.10 Refer to MR-4 for a discussion on communication. Refer to MR-6 for information on ground equipment and access routes.

P-3.11 Refer to MR-4 for a discussion on communication. Refer to MR-6 for information on ground equipment and access routes.

P-3.12 Refer to MR-1 for a discussion on PG&E easements and access rights.

P-3.13 Part 1 of the comment letter was postmarked on August 21, 2017. Part 2 was postmarked on August 22, 2017.

P-3.14 Refer to MR-1 for a discussion on PG&E easements and access rights.

P-3.15 The commenter expressed concerns over property damage, personal injury, financial loss, environmental degradation, fair market value decrease, disruption of normal living routine, and abrogation of legal property rights. Refer to MR-1 for a discussion on PG&E easements and access rights. Refer to MR-2 for a discussion on economic and financial issues. Refer to MR-7 for a discussion on vegetation impacts and restoration. Refer to MR-8 for a discussion on land disturbance and soil stabilization.

Relevant issues related to environmental degradation are addressed in *Section 3.4: Biological Resources* and *Section 3.9: Hydrology and Water Quality* of the Draft IS/MND.

Relevant CEQA issues related to personal injury, health, and disruption of normal living routine are addressed in *Section 3.3: Air Quality, Section 3.6: Greenhouse Gas Emissions, Section 3.6: Geology and Soils, Section 3.8: Hazards and Hazardous Materials, and Section 3.15: Traffic and Transportation*. Refer to P-3.35 through P-3.48 for additional responses to specific comments regarding slope stability.

P-3.16 The commenter states that the CEQA document addresses some, but not all, adverse environmental impacts, and states they suspect "that many of the APM's and MM's will prove to be illusory, arbitrarily (not scientifically), determined, incomplete, ineffective, impracticable, and/or even tokenistic, and superficially compliant with CEQA without any real substance." The impact analysis presented in the IS/MND follows Appendix G of the CEQA Guidelines. PG&E identified APMs to reduce or avoid many of the impacts. The CPUC reviewed PG&E's APMs for adequacy. Many of the original APMs were revised to include additional requirements and performance standards, while other APMs were superseded by more comprehensive MMs. MMs for the project were developed using industry standards, followed examples and lessons learned from past CPUC projects, and were reviewed by qualified discipline specialists, as appropriate. The measures are designed to ensure the stated impacts do not exceed the defined quantitative or qualitative thresholds. The measures are intended to include an appropriate level of

detail to clearly define the required tasks and procedures, conditions of implementation, agency expectations, and verification procedures.

Refer to MR-9 for a discussion on CPUC monitoring and enforcement responsibilities.

P-3.17 The CPUC's Dispute Resolution process would not prevent landowners from their legal right to pursue their grievances and protests in a court of law, nor would it serve as a legal arbitration process. The dispute resolution process is intended to resolve any issues that arise that are relevant to CPUC's authority as CEQA lead agency, or otherwise granted by GO 131-D.

P-3.18 Refer to MR-2 for a discussion on economic and financial issues. Refer to MR-7 for a discussion on vegetation impacts and restoration. Refer to MR-8 for a discussion on land disturbance and soil stabilization.

P-3.19 Refer to MR-7 for a discussion on vegetation impacts and restoration.

P-3.20 Refer to MR-1 for a discussion on PG&E easements and access rights. Refer to MR-2 for a discussion on economic and financial issues. Refer to MR-3 for a discussion on conservation easements.

PG&E issued the following response when asked how any damage to private roads would be addressed: "As a standard practice, PG&E will document road conditions (photograph) prior to project use. If roads are damaged, PG&E will repair damage or compensate property owner."

PG&E clarified that the total construction period in the Northern Segment would last approximately 8 months (refer to *Section 5.8: Applicant Comments*, Comment PG&E 1-10). Various construction activities could occur throughout the entire construction period, but focused construction activities in one area, such as pole and conductor replacement, would occur for a much shorter period (i.e., a few weeks) (refer to Table 2.6-9 on page 2-53 of the Draft IS/MND).

Refer to MR-6 for a discussion on ground equipment and access routes.

P-3.21 Comment is not relevant to CEQA or the CPUC's environmental review.

P-3.22 Refer to MR-6 for a discussion on ground equipment and access routes. Refer to MR-7 for a discussion on vegetation impacts and restoration. Refer to MR-8 for a discussion on land disturbance and soil stabilization. Refer to MR-10 for a discussion on slope stability.

P-3.23 Refer to MR-2 for a discussion on economic and financial issues.

P-3.24 The commenter states noise levels from ground equipment and helicopters would be disruptive. The commenter refers to a discussion on helicopter noise issues in

Section G of the commenter's submission; however, no Section G was submitted with the comment letter. Anticipated noise levels during construction and the associated impacts are adequately described in *Section 3.11: Noise* of the Draft IS/MND.

Helicopter activities in the Northern Segment would be focused on any one single area for a few weeks in total, as described on page 3.11-17 of the Draft IS/MND. MM Noise-3 would be implemented to reduce the effects of helicopter noise to less-than-significant levels. MM Noise-3, as included in the Draft IS/MND, identifies the notification requirements, which include methods for reducing the effects of noise.

> **Public Notice.** Residences and places of worship (e.g., The Cove) within 500 feet from any location where helicopter activities may occur, including flight paths if applicable, shall be provided written notice at least 30 days prior to beginning helicopter activities to inform them of the schedule for helicopter use and potential noise disruptions. Methods for receptors to reduce noise in structures shall be included in the notice (i.e., closing doors and windows facing the alignment). The notice shall describe procedures for submitting any noise complaints during construction and provide a phone number for submitting such complaints, as required by MM Noise-1.

Refer to MR-5 for additional information on helicopters.

P-3.25 Distribution feeder lines connected to project poles or crossed by the project power lines may also be taken out of service during construction activities. If the duration of service interruptions warrants, trailer-mounted generators may be used to provide power to customers and facilities connected to the feeder lines, as stated on page 2-38 of the Draft IS/MND. A single generator would be capable of providing the same level of power as the existing feeder lines, and multiple small generators would not be necessary at each service location. The use of generators to limit service interruptions during reconductoring is described in *Section 2.6.5: Reconductoring* on page 2-42.

Noise levels from the use of generators were analyzed in the IS/MND and noise impacts would not be significant with implementation of mitigation, as described in *Section 3.11: Noise*.

PG&E has not indicated that phone service interruptions would occur during construction. Temporary guard structures (i.e., poles with netting or bucket trucks) would be installed, as needed, to protect overhead utility lines during conductor stringing activities. In the event that phone lines are damaged during construction, PG&E would be responsible for working with AT&T to repair the lines.

P-3.26 Comment is not relevant to CEQA or the CPUC's environmental review.

P-3.27 Refer to MR-1 for a discussion on PG&E easements and access rights.

P-3.28 Comment is not relevant to CEQA or the CPUC's environmental review.

P-3.29 Refer to MR-1 for a discussion on helicopter use. Refer to MR-6 for a discussion on ground equipment and access routes.

P-3.30 Refer to MR-1 for a discussion on PG&E easements and access rights. Refer to MR-6 for a discussion on ground equipment and access routes. Refer to MR-7 for a discussion on vegetation impacts and restoration.

P-3.31 Perinoli Road was identified as a cultural resource in Table 3.5-1 of the IS/MND (P-49-003451 – unnamed "historic road"). The historic road was not addressed in detail in the impacts analysis because it is not considered eligible for listing in the CRHR. The criteria for listing on the CRHR is listed on pages 3.5-1 and 3.5-2 of the Draft IS/MND.

For clarity, the road is now identified in Table 3.5-1 as follows:

Site ID	Description	Eligible for Listing in CRHR?
P-49-003451	Historic Perinoli ~~r~~Road	No

P-3.32 Refer to MR-1 for a discussion on PG&E easements and access rights. Refer to MR-2 for a discussion on economic and financial issues. Refer to MR-6 for a discussion on ground equipment and access routes.

P-3.33 Refer to MR-4 for a discussion on the disclosure of project information, communication, and transparency. Refer to MR-6 for a discussion on ground equipment and access routes. Refer to MR-7 for a discussion on vegetation impacts and restoration.

P-3.34 Refer to MR-5 for a discussion on helicopter landing.

P-3.35 The description of local physiography is accurate. The majority of the alignment falls within 140 and 500 feet amsl; however, the topographic elevations on page 3.6-1 have been revised to more accurately reflect the full elevation range along the project alignment.

> …Elevations along the project alignment range from approximately ~~130~~140 feet amsl to ~~500~~740 feet amsl...

P-3.36 Revisions to the specified sentence have been made on page 3.6-1 to more broadly reference the location of the Great Valley Complex in the region.

> …~~In t~~The northeastern end of the Cotati Valley~~, the northeastern portion of the City of Healdsburg~~ is underlain by the Great Valley Complex...

P-3.37 The scale of features presented in Figure 3.6-1 of the Draft IS/MND is intended to provide a regional perspective of the types of geologic units present in the project area. The brief description of the geologic units that underlie the project alignment and the geologic units that are included in the legend of Figure 3.6-1 in the Draft IS/MND, only refer to those units directly along the project alignment, not those units in the region or underlying other project elements. A review of a recent (2011), detailed geologic map for the Healdsburg 7.5' Quadrangle verified that the geologic units specifically within the project alignment, including pole replacements and overland routes, do not include the Great Valley Complex units (Delattre and Gutierrez 2011).

P-3.38 The scale of features presented in Figures 3.6-2 and 3.6-3 of the Draft IS/MND is intended to provide a regional perspective of the variety and types of soils present in the project area. The soils listed in Table 3.6-1 are not intended to provide an exhaustive list of those present along the project alignment, but to give an understanding regarding the general types of soils and their associated characteristics.

P-3.39 The description regarding the Alquist-Priolo Act in the Draft IS/MND was intended to provide a brief overview and is accurate as stated.

P-3.40 The Healdsburg Fault, identified as most recently active during the Late Quaternary in Figure 3.6-4 of the Draft IS/MND, does not include the fault trace where the 1969 Santa Rosa earthquake epicenters were located. The historically active Rodgers Creek Fault Zone, shown in Figure 3.6-4 of the Draft IS/MND, encompasses these epicenters. Figure 3.6-4 of the Draft IS/MND is intended to provide a regional overview of faulting, as opposed to a detailed view of each fault trace and connection. The following note has been added to the brief discussion of the 1969 Santa Rosa Earthquakes to eliminate any confusion regarding discrepancies in fault names (page 3.6-10):

> [1] The fault traces that originated the 1969 earthquakes are encompassed within the historically active Rodgers Creek Fault Zone shown in Figure 3.6-4, in accordance with the Alquist-Priolo Fault Zone mapping.

P-3.41 The "Earthquake Outlook for the San Francisco Bay 2014-2043" was referenced during preparation of *Section 3.6: Geology, Soils, and Minerals*. Table 3.6-1 of the Draft IS/MND was revised in the Final IS/MND to reflect modeling conducted in 2013. The values for the "30-Year Mean Probability of at least a Magnitude 6.7 Earthquake" were updated as follows:

Fault Zone	30-Year Mean Probability of at least a Magnitude 6.7 Earthquake (%)
Rodgers Creek	~~31~~9 [a]
Alexander-Redwood Hill	ND
Maacama	~~13~~15
West Napa	~~ND~~2
Konocti Bay	ND
Hunting Creek-Berryessa	~~9~~5
Big Valley	ND
San Andreas (North Coast section)	~~22~~ 17
Green Valley	~~3~~5

The following note was added to Table 3.6-2 in the Final IS/MND:

[a] The probability of a 6.7 Magnitude Earthquake was determined for Rodgers Creek Fault Zone in tandem with the Healdsburg Fault, together referred to as the Rodgers Creek – Healdsburg Fault.

P-3.42 Recent literature and Alquist-Priolo Fault Zone mapping does not indicate that the Alexander-Redwood Hill Fault and Healdsburg Fault have been combined into one fault zone (Delattre and Gutierrez 2011, Bryant 1992).

P-3.43 As APM GS-1 on pages 3.6-20 and 3.6-21 of the Draft IS/MND notes, soft or loose soils would be avoided, dependent upon site-specific conditions. Soft and loose soil that cannot be avoided must be stabilized adequately through implementation of the measures identified in APM GS-1. As discussed further in MR-6, equipment would be restricted from the overland route on the slope above Pole 75, if merited, per MM Geology-1.

P-3.44 The mitigation measure (MM Geology-1) requires a geotechnical investigation be prepared by a qualified professional, which is adequate, per the requirements of CEQA, to minimize the potential for destabilization from construction activities in areas of instability.

P-3.45 The information regarding the properties of the Dibble clay loam soil presented in Table 3.6-1 of the Draft IS/MND was provided to give the reader an understanding of the types of soils and their characteristics on a regional scale, as opposed to a granular scale. The Dibble clay loam soil has a moderate shrink-swell potential, as noted in the table. The Dibble clay soil that underlays the clay loam, does have a high shrink-swell potential. The shrink-well potential for Dibble clay loam in Table 3.6-1 was changed from "Moderate" to "Moderate to High" in response to the comment. The analysis under Impacts c) and d) have been revised to reflect this change. The restrictions placed upon this soil series by the Sonoma County Grading Ordinance have been noted. One overland road segment has been revised to exclude

vehicles, in light of concerns regarding the presence of unstable soils, as further described in MR-6.

Revisions to the analysis under Impact c) are as follows (pages 3.6-16 and 3.6-17 of the Draft IS/MND):

> Soil collapse occurs when shrink-swell soils shrink during the dry season. Clear Lake clay soil identified in Table 3.6-1 has a high shrink-swell potential. Dibble clay loam soil has a moderate shrink-swell potential, but is underlain by Dibble clay, which has a high shrink-swell potential. ~~This soil~~Clear Lake clay soil is in a small portion of the Southern Segment where no ground-disturbing activities would occur. Soils with a moderate or moderate to high shrink-swell potential are located along the northern half of the Northern Segment ~~under the most northern~~ and a small portion of the Southern Segment~~southern portions of the project alignment.~~; T~~t~~he remaining portions of the project alignment would be underlain by soils with low shrink-swell potential. Construction activities such as pole replacement and grading along access in the Northern Segment would be unlikely to increase the risk of soil collapse in the area~~.~~ since these activities would not result in increasing water in the soils that causes collapse. Construction, as proposed, in soils with moderate to high shrink-well potential would not increase the potential for the soils to collapse beyond existing conditions. Impacts would be less than significant.

Revisions to the analysis under Impact d) are as follows (page 3.6-17 of the Draft IS/MND):

> Soils that underlay the project alignment generally have a low or moderate shrink-swell potential, and ~~only one~~a few soil~~s~~ ~~has~~have a high shrink-swell potential, as listed in Table 3.6-1. Soils with moderate shrink-swell potential are in the most northern and southern portions of the project alignment, and the soil with high shrink-swell potential is found in a small portion of the Southern Segment. Soils that exhibit moderate to high shrink-swell potential are found in the most northern portion of the project alignment. Although some pole replacement~~s in the Southern Segment is~~are proposed to occur in ~~an~~ area~~s~~ underlain by moderate or high shrink-swell soil, the risk to life and property would not increase. No impact on life or property from expansive soil would occur.

P-3.46 The scale of Figure 3.6-1 is intended to provide a regional overview. The information presented in this comment regarding the types of geologic units present on the Weston Ranch do not conflict with Figure 3.6-1. As a note, the acronyms used to represent each geologic unit in Figure 3.6-1 differ from the geologic map presented in Exhibit D, as the acronyms vary by geologic map. As previously described, in accordance with recent geologic maps, the proposed project elements would not be

constructed on Great Valley Complex units (Delattre and Gutierrez 2011). Figure 3.6-1 and recent geologic maps (2011) confirm the presence of Mark West Andesite (referred to as Volcanic Rocks in Figure 3.6-1) and Glen Ellen Formation (referred to as Sediments [early Pleistocene and/or Pliocene] in Figure 3.6-1) underlying the project area, which is consistent with the information identified by the commenter.

Potential impacts due to presence of shrink-swell soils are analyzed under Impact c) and Impact d) (pages 3.6-16 and 3.6-17 of the Draft IS/MND). Minor changes to the analyses were made in response to comments provided, as discussed in response to comment P-3.44.

P-3.47 The information presented regarding landslide hazards present on the Weston Ranch property do not conflict with the brief description of landslide hazard along the Northern Segment presented in *Section 3.6: Geology, Soils, and Minerals*. An analysis of the potential for landslides and destabilization due to construction of the proposed project is provided under Impact c). Site specific evaluations regarding the hazard for instability within Weston Ranch and other areas with a potential for destabilization along the project alignment, would be conducted as required by MM Geology-1.

P-3.48 Figure 3.6-4 in the Draft IS/MND is intended to provide a regional overview of fault zone locations. The figure does not display all known or suspected fault traces for each fault zone. A review of a recent geologic map (2011), revealed that the power line does not cross any known or suspected fault trace on the Weston Ranch (Delattre and Gutierrez 2011). Regardless, APM GS-3 requires the geotechnical investigation to identify potentially active fault traces and fault zones, as well as to evaluate the potential for surface rupture.

The information provided regarding fault zones on the Weston Ranch and regionally has been reviewed and noted.

P-3.49 The impacts analysis in *Section 3.4: Biological Resources* of the Draft IS/MND follows Appendix G of the CEQA guidelines. The species and habitat addressed in the section include those listed by a state or federal agency as endangered, threatened, rare, or otherwise protected, per CEQA requirements. *Section 3.4.1: Definitions*, explains the approach for defining biological resources in the IS/MND. CEQA does not require an analysis of impacts on other species or habitat that do not meet these definitions.

As stated in *Section 3.4: Biological Resources*, the project would involve a minimal amount of permanent development and habitat loss where seven new TSPs would be installed (approximately 0.002 acre in total). Temporary vegetation impacts would be restored following construction (refer to MR-7 for more information).

P-3.50 The normal load conditions would not increase as part of the proposed project. The proposed project would involve reconductoring existing power and transmission lines to ensure more reliable service during peak loading conditions, as stated in *Section 2.3: Project Objectives* of the Draft IS/MND. As stated in *Section 3.13: Population and Housing*, the proposed project would increase electrical service reliability for existing and planned growth and would not induce substantial population growth in the area.

P-3.51 Impacts on wildlife corridors are addressed under Impact D starting on page 3.4-36 of the Draft IS/MND.

P-3.52 Direct and indirect impacts on nesting birds are addressed under Impact a) starting on page 3.4-24 of the Draft IS/MND. Impacts on suitable nesting habitat are addressed under Impact d). MM Biology-5 specifies comprehensive requirements for detecting active bird nests and avoiding the nests.

Indirect impacts on nesting birds from construction noise are addressed under Impact d) starting on page 3.4-28 of the Draft IS/MND. As stated in *Section 3.11: Noise*, noise-sensitive receptors are land uses where normal human activities could be affected by excessive noise.

P-3.53 Refer to MR-7 for a discussion on vegetation impacts and restoration.

Direct and indirect impacts on watersheds and water features, including mitigation for addressing the impacts (i.e., erosion and sediment control), are addressed in *Section 3.9: Hydrology and Water Quality* of the Draft IS/MND.

P-3.54 The commenter raises the issue that spreading hay on bare soil may create wild pig habitat that could lead to erosion. Erosion and sediment control BMPs would be specified in a project specific SWPPP as described in MM Hydrology-1, as presented in the Draft IS/MND. SWPPP implementation and BMP effectiveness would be monitored as described in MM Hydrology-2.

P-3.55 MM Biology-8, as presented in the Draft IS/MND, is intended to reduce the potential for substantially introducing or spreading invasive weeds that could degrade the environment and impact habitat for special-status species. The commenter is correct, some level of invasive weeds could be introduced or spread even with implementation of MM Biology-8; however, the potential impact would be reduced to less-than-significant levels.

P-3.56 Refer to MR-1 for a discussion on PG&E easements and access rights.

P-3.57 Refer to MR-3 for a discussion on Conservation Easements.

5.8 APPLICANT COMMENTS

This section includes the comments received from the Applicant (PG&E), with individual comments delineated and followed by responses to each comment. The responses follow the numbered comments from the letter.

5.8.1 Comment Letter PG&E-1

Pacific Gas and Electric Company

David Thomas
Senior Land Planner
Environmental Management – Electric Transmission

245 Market Street, Room 1054D
San Francisco, CA 94105

O: 415.973.5885 M: 415.238.0027

August 21, 2017

Dear Ms. Orsaba:

Pacific Gas and Electric Company (PG&E) appreciates the considerable effort expended by Commission staff and their consultant to prepare the environmental review for the proposed Fulton-Fitch Mountain Reconductoring Project (project), and welcomes the opportunity to submit the following minor comments and revisions on the Draft Initial Study (IS) and Mitigated Negative Declaration (MND):

Chapter 2, Project Description

1. **Page 2-12, Table 2.4-1, Proposed Reconductoring and Pole Replacement by Segment.** Approximately 1.8 miles of the Fulton-Hopland 60 kV line will be replaced in the Southern Segment and 8.1 miles replaced in the Northern Segment.
2. **Page 2-19, Section 2.5.3 Substations.** Last paragraph, last sentence states "No oil-filled equipment is currently in the substation and none is proposed." Please revise this sentence to state: "The proposed project does not include replacement or installation of any oil-filled equipment."
3. **Page 2-21, Table 2.6-1, Access Routes and Establishment Requirements.** Note (a) states: "Grading and vegetation clearing could occur along any existing unpaved access route up to approximately 8 feet (grading and vegetation clearing) and 14 feet (vegetation/tree limb trimming) from the centerline..." This should be revised to state "Grading and vegetation clearing may occur up to 8 feet from centerline of existing unpaved access roads, and vegetation trimming could occur to a height of 14 feet aboveground..."
4. **Section 2.6.2, Work Areas, Staging Areas.** Please note that pull sites may also be used to stage materials.
5. **Page 2-25, Table 2.6-3, Staging Areas.** Please change the maximum workspace area for SA/LZ-1 and S/LZ-2 to 1 acre. Change the total area for SA/LZ-3 to 10.3 acres. Change the maximum workspace area for SA/LZ-10 to 1.1 acres.
6. **Page 2-27, Table 2.6-4, Pull Sites.** Please note that during site preparation, pull sites may require up to a 20-foot temporary work area buffer around their mapped perimeters to safely establish the work areas.
7. **Page 2-29, Vegetation Disturbance.** The third sentence states: "Vegetation along access roads could be cleared up to 16 feet from the centerline (32-foot corridor)." This should be changed to "8 feet from the centerline (16-foot corridor)." The same revision is required to note (f) in Table 2.6-6, Estimated Vegetation Disturbance, Ground Disturbance, and Cut-and-Fill.
8. **Page 2-32, Watercourse Crossings.** Please delete the following sentence: "At one crossing location (crossing FFX24) an existing culvert would be replaced." No existing culvert is located at this site; PG&E would use steel plates or a temporary bridge as at other locations.

9. **Page 2-34, Pole Installation.** The second and third sentences of the second paragraph state: "Guy wire anchors would be installed as needed on LDSPs within approximately 5 feet of the pole to balance line tension and provide additional stability. Typically, new guy wires would be installed within 5 feet of the pole and at pole locations where they are currently installed on existing poles." Please revise these sentences to state: "Guy wire anchors would be installed as needed on LDSPs locations to balance line tension and provide additional stability. Existing guy leads are located within approximately 12 to 40 feet of existing structures. Typically, new guy wires would be installed within approximately 5 feet of their existing configuration at pole locations where they are currently installed on existing poles."
10. **Page 2-48, Section 2.6.13, Schedule.** Under current plans, reconductoring in the Southern Segment would begin immediately following the end of reconductoring in the Northern Segment, and is currently scheduled to begin mid-December 2018 and extend through February 2019, not September 2019 through January 2020, as stated. However, please note that the construction scheduling is preliminary, approximate, and subject to change.
11. **Appendix A: Project Detail Maps, page 4.** PG&E would like to revise the access route into LZ-2, as shown in the attached figure. The newly identified access route utilizes recently improved gravel roads, removes a tight turn into the landing zone, and reduces the amount of vegetation that would need to be trimmed at the crossing. The previously identified route would be kept as backup.
12. **Appendix A: Project Detail Maps, page 6.** PG&E would like to add an alternative overland access route into LZ-3 from Shiloh Ridge Road.

Section 3.4, Biological Resources

13. **Page 3.4-3, list of survey reports.** "Biological Resources Survey Report" should be "Biological Resources Technical Report."
14. **Page 3.4-7, Special-Status Plants.** The first paragraph states that 22 plants have a "high or moderate potential to occur" in the project study area; however, Table 3.4-4 on page 3-8 shows seven of these 22 plants as having low potential to occur. Please revise the text to state that "three plants have high potential and 12 plants have moderate potential to occur."
15. **Table 3.4-4, Special-Status Plant Species.** In addition to the 22 species listed in the table, PG&E's background research identified an additional 12 plant species as having high, moderate, or low-moderate potential to occur in the project area. These species were identified in the project's 2012 Biological Resources Technical Report[1] and, along with all 77 plant species identified in the report, were included in the list of species to survey for during appropriate blooming periods.
    As an update, PG&E recently completed three rounds of rare plant surveys. No rare plants were observed, and PG&E will forward the report to the CPUC once complete.

[1] Garcia and Associates, 2012. *Biological Resources Technical Report, Pacific Gas & Electric Company's Fulton-Fitch 60kV Power Line Reconductor Project, Sonoma County, California.* Unpublished report prepared for Pacific Gas and Electric Company, San Ramon, CA.

16. **Table 3.4-5, Special-Status Wildlife Species with Moderate or High Potential to Occur in the Project Study Area.** Based on the determinations in the table, the title of the table should be revised to include species with low potential to occur.
17. **Page 3.4-15, Critical Habitat.** Please add "designated" in the third line down before "critical habitat for CTS."
18. **Page 3.4-22, Foothill Yellow-Legged Frog.** The Draft IS/MND states that foothill yellow-legged frogs (FYLFs) "have a moderate potential to occur within the project study area..." Based on the results of focused field surveys and biological reconnaissance, PG&E believes that the potential for FYLF to occur in the project area is low, rather than moderate. In defining probability of occurrences, Table 3.4-3 states, "A moderate potential assessment was also made for species with no or few known recent recorded occurrences/populations but that have *highly suitable habitat* within or adjacent to the project study area. A 'low potential' suitable assessment was made for species with no known occurrences in or near the project study area, but for which *potentially suitable habitat* is present within or near the project study area [emphasis added]." Based on the results of field surveys, PG&E does not believe that highly suitable habitat for FYLF is located within the project area. Furthermore, the definition of low potential in the probability rating in Table 3.4-3 nearly mirrors the CPUC's findings for FYLF in Table 3.4-5 ("Potentially suitable habitat is present in multiple creeks in the project study area.")
19. **Page 3.4-29, Special-Status Mammals.** Neither special-status bat species nor bat maternity roosts were observed during focused surveys of the alignment conducted in 2015.[2]
20. **Page 3.4-34, Construction – Direct Impacts.** The analysis states that the access route would cross two seasonal wetlands, SW13 (crossing FFX23) and SW1 (crossing FFX2). Neither location would be impacted by project access. PG&E has revised access to avoid crossing SW13;[3] the access route that crosses SW1 has been improved by the landowner, and project impacts on this seasonal wetland are no longer anticipated.[4]
21. **Pages 3.4-34, Construction – Direct Impacts.** To better describe the legal standard, please add "if substantial" after "which" in the last sentence, so that it reads: "which, if substantial, would be a significant impact." Minimal loss of wetland habitats may not be a substantial adverse effect.
22. **Page 3.4-36, Construction.** To better describe the legal standard, please add "substantial" between "interfered" and "with" in the last sentence, so that it reads "A significant impact would occur if the proposed project interfered substantially with the movement . . . ." In the following paragraph under **Migratory Wildlife Corridors**, please add "Substantial" before "Interference" in the 7th line from the top of page 3.4-37.
23. **Page 3.4-4, Operation and Maintenance.** We suggest deleting "Operation and Maintenance" above "Permanent Impacts in the SRPCS Plan Area" since these are permanent construction impacts, and moving "Operation and Maintenance" to the next heading. Also suggest simply

---

[2] GANDA, 2015. *Fulton-Fitch Mountain Bat Survey*. Unpublished report prepared for TRC Solutions, Mountain View, CA.

[3] Most recent access routes were provided December 2016.

[4] TRC Solutions, 2017. *PG&E Fulton-Fitch Reconductoring Project, SW2 at pole 62, SW1 at Mount Weske Drive.* Memo to David Thomas, Senior Land Planner, June 9, 2017. Pacific Gas and Electric Company, San Francisco, CA.

replacing "Long-term Project Activities" with "Operation and Maintenance," since no sub-heading is needed.

Section 3.5 Cultural Resources

24. **Page 3.12-8, Section 3.12.4, Impact Analysis, Impact Discussion, Northern Segment.** The first sentence in the first paragraph of this page states: "SDG&E has proposed APMs PAL-1, PAL-2, PAL-3, and PAL-4 to reduce impacts on paleontological resources." This should be revised to state: "PG&E has proposed APMs PAL-1, PAL-2, PAL-3, and PAL-4 to reduce impacts on paleontological resources."

Section 3.12 Paleontological Resources

25. **Page 3.12-7, Construction.** To better describe the legal standard, suggest adding "unique" before "fossil localities" in the first paragraph.

Section 3.15 Transportation and Traffic

26. **Page 3.15-15, Table 3.15-10 Estimated Maximum Daily Construction Traffic.** Both peak hour and non-peak hour daily construction vehicle trips for the Southern Segment are estimated at 200 trips, for a total of 400 daily construction vehicle trips. A more accurate estimate would be below 50 trips for both peak hour and non-peak hour daily construction vehicle trips, for a total of 100 daily trips.

Section 3.17 Mandatory Findings of Significance

27. **Page 3.17-1, Table 3.17-1.** The language in Impact MFOS-1 does not match the language in CEQA Guidelines Section 15065 (a)(1), which was updated to add "substantially" before "degrade the quality of the environment" and before "reduce the number or restrict the range . . . ." The same changes should be made again at the top of page 3.17-2.

    The discussions on page 3.17-3 should be updated to reflect the correct legal standard under both "Rare and Endangered Plants" and "Rare and Endangered Wildlife." PG&E believes it is very unlikely that there would be a substantial reduction in the number or range of rare or endangered plants or wildlife without mitigation as to all of these activities, but at a minimum suggests adding the following revisions:

    - **Rare and Endangered Plants.** 5th line, add "substantially" before "reduce the number . . ."
    - **Rare or Endangered Wildlife.** Suggest revising the paragraph, starting with the second sentence, to read:

      Construction activities could injure or kill rare or endangered wildlife individuals, potentially resulting in a substantial reduction in the number of rare or endangered wildlife species occurring in the project study area. Construction activities would also

result in noise and light impacts, which could affect wildlife breeding behavior or cause nest abandonment, and, therefore, potentially cause a substantial reduction in rare or endangered species numbers. APM BIO-7, APM BIO-8, APM BIO-9, MM Biology-3, MM Biology-4, MM Biology-5, and MM Biology-6 would reduce potentially substantial impacts on the number or range of CTS, American Badger, western pond turtle, California red-legged frog, foothill yellow-legged frog, special-status and protected avian species and special-status and protected bat species, respectively, to less than significant levels. Potentially substantial impacts on the number or ranges of other rare and endangered .....

PG&E appreciates the opportunity to provide these comments. Please feel free to contract me if further information or clarification is necessary.

Sincerely,

David Thomas
Senior Land Planner
Pacific Gas and Electric Company

cc:
David Kraska, Pacific Gas and Electric Company
Jo Lynn Lambert, Attorney for Pacific Gas and Electric Company
Molly Sandomire, TRC Solutions
Tania Treis, Panorama Environmental
Aaron Lui, Panorama Environmental

Enclosures:

Appendix A: Project Detail Maps, pages 4 and 6 (revised)
Errata Sheet A: Typographical Errors

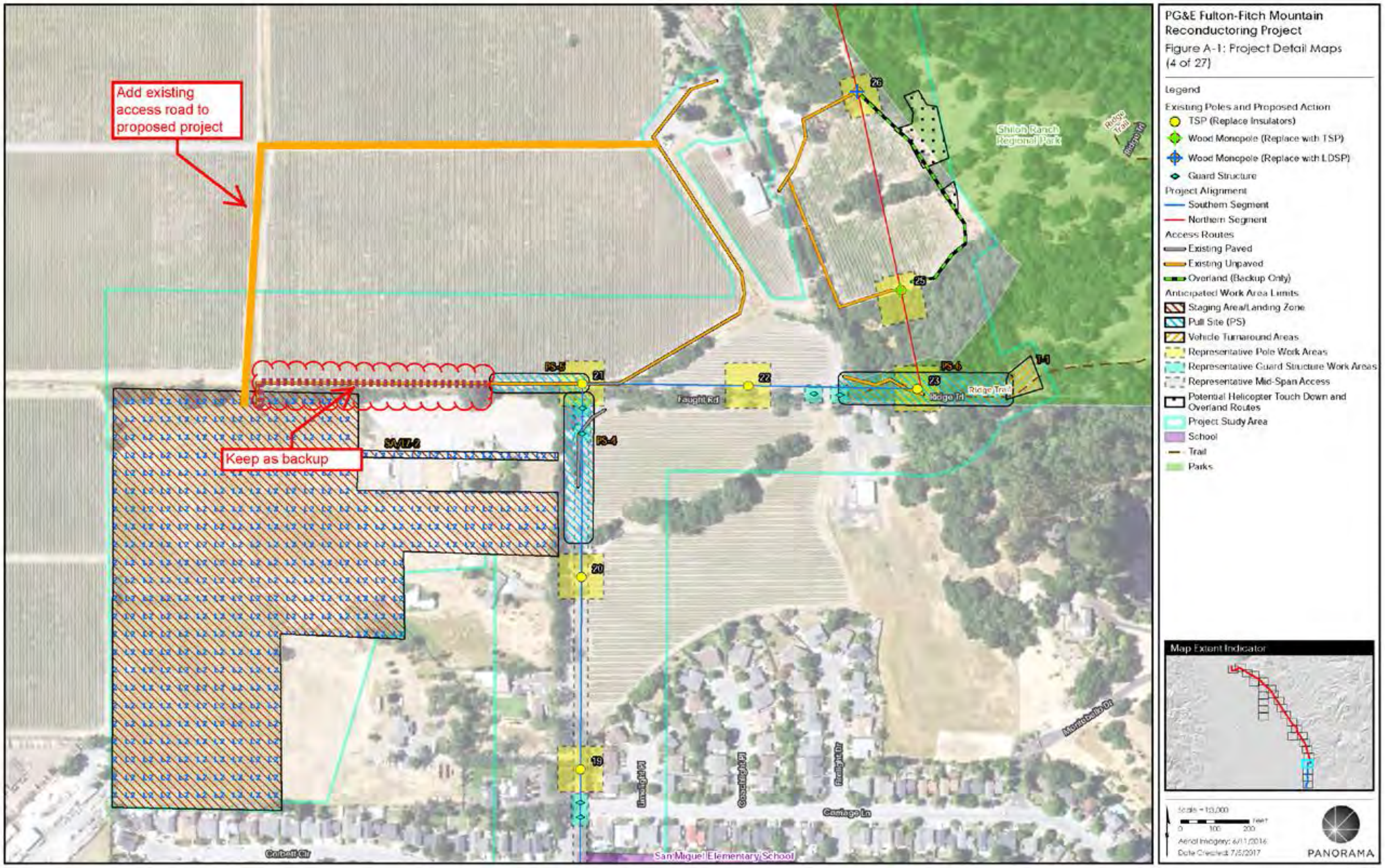
Ms. Orsaba
August 21, 2017
Page 6

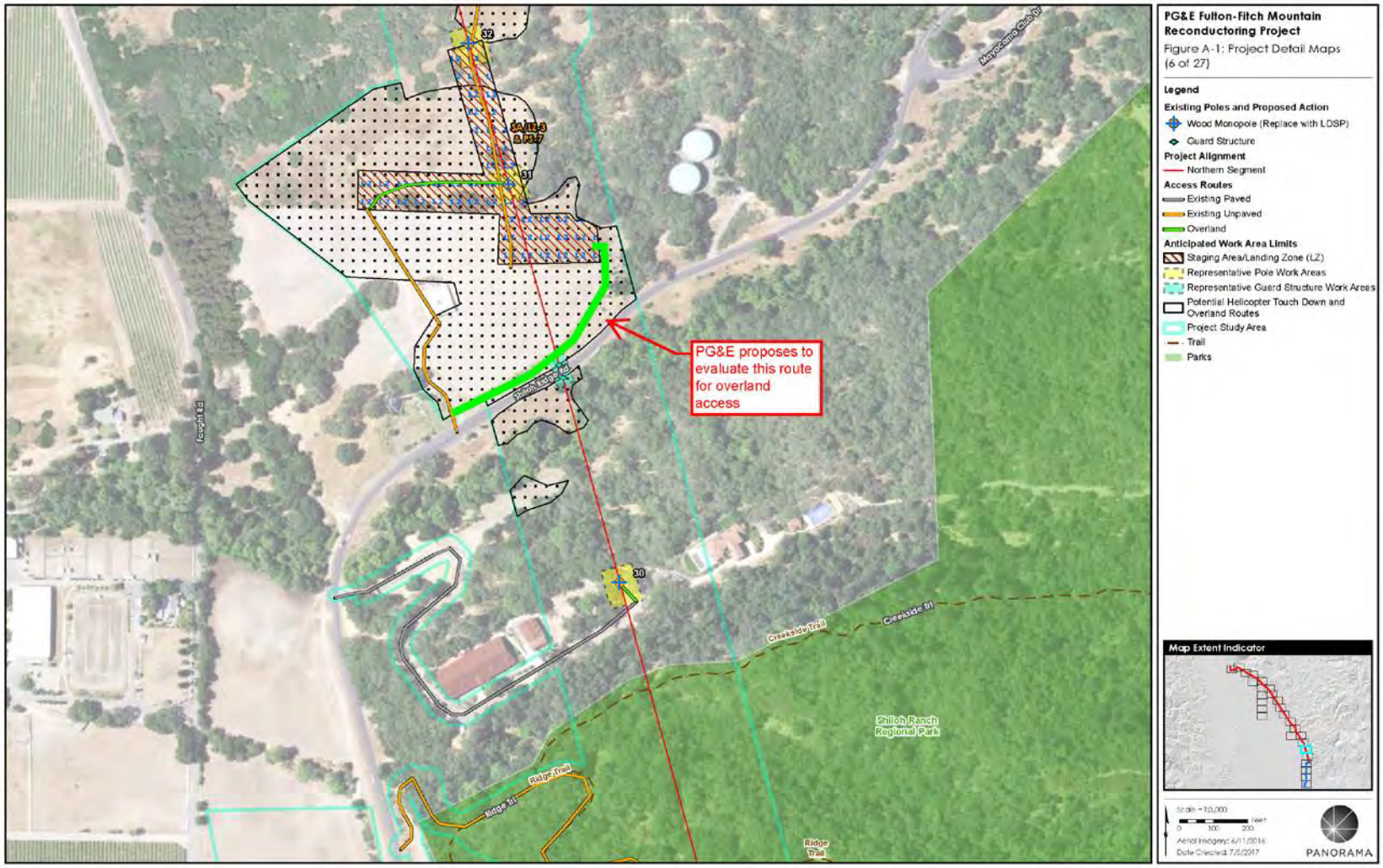
ERRATA SHEET A – Typographical Errors

The following typos were identified when reviewing the MND

1. **Page 2-3:** Third paragraph, last sentence should be "... Section 2.6.2: Work Areas and Access."
2. **Page 2-3**: Last paragraph, first sentence should be "... Geyser-Fulton lines ..." as opposed to "Geyser-Fulton line".
3. **Page 2-12**: Last paragraph, second sentence 'Existing 4/0 aluminum conductor on the Fulton-Hopland line would be replaced with a combination of 477 kcmil ACSS 24/7 strand "Flicker."' Please remove "a combination of" from the sentence.
4. **Page 2-**14: Table 2.5-3: Proposed Pole Dimensions, Note (b), please replace "Mircopile" with "Micropile."

6


Add existing access road to proposed project
Keep as backup
PS-5
21
22
23
PS-6
PS-4
SA/LZ-2
20
19
25
26
Faught Rd
Ridge Tr
Ridge Trail
Shiloh Ranch Regional Park
Carriage Ln
Corbett Cir
San Miguel Elementary School
PG&E Fulton-Fitch Mountain Reconductoring Project
Figure A-1: Project Detail Maps (4 of 27)
Legend
Existing Poles and Proposed Action
TSP (Replace Insulators)
Wood Monopole (Replace with TSP)
Wood Monopole (Replace with LDSP)
Guard Structure
Project Alignment
Southern Segment
Northern Segment
Access Routes
Existing Paved
Existing Unpaved
Overland (Backup Only)
Anticipated Work Area Limits
Staging Area/Landing Zone
Pull Site (PS)
Vehicle Turnaround Areas
Representative Pole Work Areas
Representative Guard Structure Work Areas
Representative Mid-Span Access
Potential Helicopter Touch Down and Overland Routes
Project Study Area
School
Trail
Parks
Map Extent Indicator
PANORAMA


PG&E Fulton-Fitch Mountain Reconductoring Project
Figure A-1: Project Detail Maps (6 of 27)
Legend
Existing Poles and Proposed Action
Wood Monopole (Replace with LDSP)
Guard Structure
Project Alignment
Northern Segment
Access Routes
Existing Paved
Existing Unpaved
Overland
Anticipated Work Area Limits
Staging Area/Landing Zone (LZ)
Representative Pole Work Areas
Representative Guard Structure Work Areas
Potential Helicopter Touch Down and Overland Routes
Project Study Area
Trail
Parks
Map Extent Indicator
PG&E proposes to evaluate this route for overland access
Fought Rd
Creekside Trail
Shiloh Ranch Regional Park
Ridge Trail
PANORAMA

5.8.2 Response to Letter PG&E-1

The responses below follow the numbered comments from PG&E's comment letter.

PG&E-1.1 The lengths of conductor that would be replaced for the Fulton-Hopland 60-kV power line have been corrected in the Final IS/MND, where referenced in the sections and where referenced in *Section 2: Project Description*. Approximately 1.8 miles of the Fulton-Hopland 60-kV line would be replaced in the Southern Segment and 8.1 miles would be replaced in the Northern Segment (previously 1.9 and 7.9 miles, respectively).

PG&E-1.2 The following change was made on pages 2-18 and 2-19 of the Final IS/MND:

> …The proposed project does not include replacement or installation of any oil-filled equipment. ~~No oil-filled equipment is currently in the substation and none is proposed.~~

PG&E-1.3 The following change was made to the note for Table 2.6-1 on page 2-21 of the Final IS/MND:

> Grading and vegetation clearing may occur up to 8 feet from centerline of existing unpaved access roads, and vegetation trimming could occur to a height of 14 feet aboveground. ~~Grading and vegetation clearing could occur along any existing unpaved access route up to approximately 8 feet (grading and vegetation clearing) and 14 feet (vegetation/tree limb trimming) from the centerline, except where the~~ Access routes ~~are~~ located along trails in Sonoma County parks (i.e., Shiloh Ranch Regional Park and Foothill Regional Park)~~, which~~ may be graded and cleared to their existing widths, but would not be expanded.

PG&E-1.4 The following sentence was added to the description of pull sites on page 2-27 of the Final IS/MND:

> …If necessary, pull sites could also be used to stage materials...

PG&E-1.5 On page 2-25 of the Draft IS/MND, the maximum workspace area for SA/LZ-1 and S/LZ-2 was increased to 1 acre, and the maximum workspace area for SA/LZ-10 was increased to 1.1 acre.

The total workspace area for SA/LZ-3 was not increased from 3.11 to 10.6 acres because this larger area represents an older workspace, and portions of this older workspace are not suitable for staging due to recent development. The area described for SA/LZ-3 in Table 2.6-3 and shown in Appendix A of the Draft IS/MND is consistent with the GIS data for project refinements that PG&E provided in response to Data Needs #4. If additional workspace refinements are

necessary, PG&E must submit a request for a minor project refinement, as described in *Section 4: Mitigation Monitoring and Reporting Program*.

PG&E-1.6 No changes are necessary. The following description for pull sites is provided on page 2-27 of the Draft IS/MND and is accurate, as stated.

> …The final boundaries and size of pull sites would depend on the ground conditions and available access options. If necessary, minor refinements would be made to the anticipated pull sites, as described above.

PG&E-1.7 On pages 2-29 and 2-31 of the Final IS/MND, the width of maximum vegetation clearing from the centerline of access routes was reduced from 16 feet to 8 feet.

PG&E-1.8 On page 2-32 of the Final IS/MND, the following sentence was removed:

> ~~…At one crossing location (crossing FFX24) an existing culvert would be replaced…~~

Reference to culvert replacement at FFX24 was also removed in *Section 3.4: Biological Resources* (pages 3.4-20 and 3.4-44 of the Final IS/MND) and Table F-1 in Appendix F to reflect this change.

PG&E-1.9 The following changes were made on page 2-34 of the Final IS/MND:

> …Guy wire anchors would be installed as needed on LDSPs ~~within approximately 5 feet of the pole~~ to balance line tension and provide additional stability. Existing guy leads are located within approximately 12 to 40 feet of existing structures. Typically, new guy wires would be installed within 5 feet of their existing configuration ~~the pole and~~ at pole locations where they are currently installed ~~on existing poles~~…

PG&E-1.10 Based on additional follow up with PG&E, the CPUC understands PG&E's proposed construction schedule has now changed as follows:

Segment/Area	Previous Schedule	Revised Schedule
Northern Segment	July 2018 – July 2019 (12 months) (1)	June 2018 – January 2019 (8 months)
Southern Segment	September 2019 – January 2020 (5 months)	February 2019 – May 2019 (4 months)
Fitch Mountain Substation	July 2018 – May 2019 (3 months; intermittent)	July 2018 – May 2019 (3 months; intermittent)
Total	***July 2018 – January 2020 (18 months)***	***June 2018 – May 2019 (12 months)***

Note:
(1) The air quality and emission calculations assume construction in the Northern Segment would occur from July 2018 – December 2019 & May 2019 – June 2019 (8 months).

Table 2.6-8 in Section 2.6.13 of *Section 2: Project Description* has been updated to reflect this change in the Final IS/MND.

PG&E-1.11 The primary access route to SA/LZ-2 has been changed. This change is reflected on the maps in Appendix A of the Final IS/MND.

PG&E-1.12 The overland access route to SA/LZ-3 has been added. This change is reflected on the maps in Appendix A of the Final IS/MND.

PG&E-1.13 The following change was made on page 3.4-3 of the Final IS/MND:

> Biological Resources ~~Survey~~ Technical Report

PG&E-1.14 The following change was made on page 3.4-7 of the Final IS/MND:

> …Of these 73 species, 22 have a low, moderate, or high ~~or moderate~~ potential to occur~~, and 51 are not expected to occur~~ in the project study area based on the habitat types present or other factors. **Error! Reference source not found.** includes a summary of the 22 special-status plants with a low, moderate, or high potential to occur in the project study area. The remaining 51 species that are not expected to occur in the project study area are identified in Table D-1 located in Appendix D.

PG&E-1.15 Table 3.4-4 of the Draft IS/MND lists the special-status plant species that CPUC's analysis determined have a low, high, or moderate potential to occur in the project study area based on the professional opinion of the CPUC's technical team. The fact that no rare plants were found is acknowledged. These surveys will be reviewed as part of the CPUC's monitoring process, as it pertains to fulfilling the requirements of MM Biology-2, Special-Status Plants.

PG&E-1.16 The titles of Table 3.4-4 and 3.4-5 were changed as follows in the Final IS/MND:

> …with Low, Moderate, or High Potential to Occur in the Project Study Area

PG&E-1.17 The following change was made on page 3.4-15 of the Final IS/MND:

> … Fulton Substation and nearby portions of the project study area are located within designated critical habitat for CTS, and the project alignment would cross Mark West Creek and Pool Creek, which are designated as critical habitat for Central California Coast steelhead.

PG&E-1.18 Comment noted. The CPUC disagrees with PG&E's assessment regarding the presence of suitable habitat for foothill yellow-legged frog and their potential to occur in the project study area. It should also be noted that even if the potential for the species to occur were low, given the presence of suitable habitat,

MM Biology-4 would still need to be implemented to reduce impacts to less than significant.

PG&E-1.19 The 2015 survey for special-status bats was limited to a fraction of the potentially suitable roosting habitat that would be impacted by project activities. Absence cannot be determined based on the limited survey results. MM Biology-6 must be implemented to reduce potentially significant impacts to less than significant levels.

PG&E-1.20 The following change was made on page 3.4-34 of the Final IS/MND:

> Multiple jurisdictional wetlands were identified in the project study area, as described in *Section 3.9: Hydrology and Water Quality* and shown on Figure F-1 in Appendix F. Access routes and work areas for the project would be located near seasonal wetlands. It is anticipated that all seasonal wetlands could be completely avoided by positioning access routes around the wetland boundary or by using existing culvert crossings ~~Access routes identified for the proposed project would cross two seasonal wetlands. One seasonal wetland, SW13, would be crossed (crossing FFX23) during the dry season or by installing temporary crossing materials (i.e., fiberglass mats or temporary bridge, etc.). Driving through the seasonal wetland could damage wetland vegetation or cause rutting in the wetland, which would be a significant impact. A second wetland, SW1, would be crossed using an existing culvert on an unpaved road (refer to crossing point FFX2). Based on the current locations and conditions of proposed access routes and work areas, wetlands in the project study area would not be impacted by grading activities~~; however, access routes and crossing methods could change, and there is some potential for vehicle access and grading to occur in a seasonal wetland, if necessary to establish access. Driving through seasonal wetlands could damage wetland vegetation or cause rutting in the wetland, which would be a significant impact. Vegetation clearing and grading within jurisdictional wetlands could convert the wetlands to uplands and result in permanent loss of wetland habitats, which, if substantial, would be a significant impact.

PG&E-1.21 The last sentence of the paragraph referenced in PG&E-20 was revised to address this comment in the Final IS/MND.

PG&E-1.22 The following change was made on page 3.4-36 of the Final IS/MND:

> …A significant impact would occur if the proposed project interfered substantially with the movement of the aquatic species that use and

inhabit the system of creeks and rivers in the area or resulted in habitat fragmentation that would affect species movement in upland areas.

The following change was made on page 3.4-37 of the Final IS/MND:

…Substantial ~~I~~interference with species dispersal patterns would be a significant impact on wildlife movement.

PG&E-1.23 The heading for Operation and Maintenance on page 3.4-43 of the Final IS/MND was moved to replace the heading for Long-term Project Activities as suggested.

PG&E-1.24 The following change was made on page 3.12-8 of the Final IS/MND:

~~SDP~~G&E has proposed APMs PAL-1, PAL-2, PAL-3, and PAL-4 to reduce impacts on paleontological resources…

PG&E-1.25 The following change was made on page 3.12-7 of the Final IS/MND:

…These activities could result in the physical destruction of unique fossil localities, which would constitute a significant impact.

PG&E-1.26 The estimate for maximum daily vehicle trip in the Southern Segment was revised in Table 3.15-10 of the Final IS/MND. The value used for total daily trips was reduced to 92 peak hour trips, 50 non-peak hour trips, and 142 total trips. Traffic estimates associated with these values were revised on pages 3.15-15, 3.15-16, and 3.15-17 of the Final IS/MND.

PG&E-1.27 The following change was made on page 3.17-1 of the Final IS/MND:

Impact MFOS-1: Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

The following change was made on page 3.17-3 of the Final IS/MND:

…Direct and indirect impacts on special-status plants could substantially reduce the number of rare and endangered plants in the project study area, which would be a significant impact…

The following changes were made on pages 3.17-3 and 3.17-4 of the Final IS/MND:

> The proposed project has the potential to impact rare or endangered wildlife (refer to the discussion of direct and indirect impacts on special-status animals in Section 3.4: Biological Resources). Construction activities could injure or kill rare or endangered wildlife individuals, potentially resulting in a substantial reduction in the number of rare or endangered wildlife species occurring in the project study area. Construction activities would also result in noise and light impacts, which could affect wildlife breeding behavior or cause nest abandonment, and, therefore, potentially cause a substantial reduction in rare or endangered species numbers. APM BIO-7, APM BIO-8, APM BIO-9, MM Biology-3, MM Biology-4, MM Biology-5, and MM Biology-6 would reduce potentially substantial impacts on the number or range of CTS, American badger, western pond turtle, California red-legged frog, foothill yellow-legged frog, special-status and protected avian species, and special-status and protected bat species, respectively, to less than significant levels. Potentially substantial impacts on the number or ranges of other rare and endangered wildlife species would remain significant. Worker training, litter management, prohibition of firearms and pets, covering excavations, and biological monitoring, as required by APM BIO-1a, APM BIO-1f, APM BIO-1j, APM BIO 1k, and MM Biology-1, would avoid and/or reduce impacts on all other rare and endangered species' populations. The impact would be less than significant with mitigation.

5.9 REFERENCES

Bryant, William A. 1992. "Fault Evaluation Report FER-233 Alexander-Redwood Hill Fault Sonoma County, California." California Department of Conservation, Division of Mines and Geology, May 7.

Delattre, Marc P., and Carlos I. Gutierrez. 2011. *Preliminary Geologic Map of the Healdsburg 7.5' Quadrangle Sonoma County, California: A Digital Database.* September 29. http://www.conservation.ca.gov/cgs/rghm/rgm/Pages/preliminary_geologic_maps.aspx.